वार्षिक रिपोर्ट
ANNUAL REPORT
2017-18

सत्यमेव जयते

DIRECTORATE OF ARECANUT AND SPICES DEVELOPMENT

Ministry of Agriculture and Farmers Welfare

(Department of Agriculture, Cooperation and Farmers Welfare)

Government of India

Calicut, Kerala 673 005

DASD Annual Report 2017-18

Directorate of Arecanut and Spices Development Ministry of Agriculture
(Department of Agriculture and Cooperation)
Government of India
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PREFACE

The Directorate of Arecanut and Spices Development, a subordinate office under Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India has the distinction of successfully implementing Central Sector Schemes on Spices, Arecanut and Medicinal & Aromatic Plants over the plan periods with the cooperation of State Departments, State Agricultural Universities, ICAR Institutes etc. During 2005-06, the Government of India launched National Horticulture Mission (NHM) to give further impetus to 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 Govts 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 in the country and reflected in the official statistics of area and production of spices in the country. The production of spices which was 3.8 million tonnes from an estimated area of 2.3 million ha during the year 2005-06 has increased to around 8.1 million tonnes from 3.9 million ha in 2017-18. Foreign exchange earnings through Spices export have also increased tremendously during this period from 592.9 million US $ in 2005-06 to 2781.46 million US $ in 2017-18. This gives me immense satisfaction in bringing out the Annual Report of the Directorate for the year 2017-18.

The Report carries all the activities undertaken by the Directorate in improving 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. Dissemination of technologies through frontline demonstration plots, farmers training programmes, seminars and workshops and accreditation of nurseries have been given the highest priority.

I take this opportunity to thank Dr. B.N.S. Murthy, Horticulture Commissioner for giving adequate support. I also thank my colleagues for their cooperation in achieving the goals set by the Directorate.

(Homey Cheriyan)
Director

CONTENTS

1 INTRODUCTION

The Directorate of Arecanut and Spices Development was established on 1st April, 1966 at Calicut in Kerala, as a subordinate office under 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.

1.1 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.

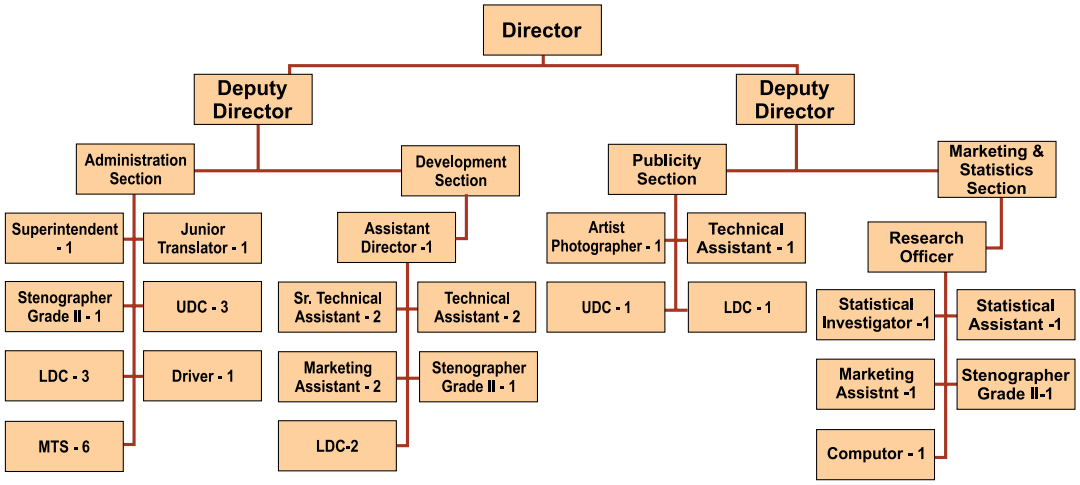
- Assessment of the developmental needs of the crops entrusted to it.
- Formulation of Central Sector / Centrally Sponsored Schemes and implementation of the same either directly or through the State Governments, Agricultural Universities etc.
- Monitoring the implementation of Central Sector / Centrally 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

1.2. 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.



1.3. Staff

a. Staff Strength as on 31-03-2018

Sl.No.	Name of the post	Group A/B/C/D	Sanctioned Strength	In Position
1.	Director	A	01	01
2.	Deputy Director	A	02	01
3.	Assistant Director	A	01	01
4.	Research Officer	A	01	01
5.	Superintendent	B	01	-
6.	Statistical Investigator	B	01	01
7.	Senior Technical Assistant	B	02	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	-
18.	Multi Tasking Staff	C	06	06
	TOTAL		**39**	**29**

b. Staff in position as on 31-03-2018

Name	Designation
Dr. Homey Cheriyan	Director
Dr. Femina	Deputy Director
Shri Babulal Meena	Assistant Director
Shri. Madhu N.	Research Officer
Smt. C.V. Divya	Senior Technical Assistant
Dr. J.S. Remya	Senior Technical Assistant
Shri. K. Manojkumar	Statistical Investigator
Dr. P.N. Jyothi	Junior Translator
Shri. C.F. Gedam	Artist Photographer
Smt. M.K. Suma	Technical Assistant
Smt. K. Thejas Das	Technical Assistant
Smt. K. Ushakumari	Marketing Assistant
Smt. K.S. Kanchana	Marketing Assistant
Kum. Sruthi Sreekumar	Statistical Assistant
Shri. P.R. Anilkumar	Stenographer Grade II
Shri. O.P. Haridasan	Stenographer Grade II
Shri. M.P. Unnikrishnan	Stenographer Grade II
Shri. P. Vinod Kumar	Upper Division Clerk
Shri. T.K. Damodaran Nair	Upper Division Clerk
Shri. P. Baiju	Upper Division Clerk
Shri. K.V. Rajesh	Lower Division Clerk
Shri. Palash Kanti Mollick	Lower Division Clerk
Shri. T. Srikumar	Lower Division Clerk
Shri. E. Ajithkumar	Multi Tasking Staff
Shri. K.S. Santhos	Multi Tasking Staff
Shri. K.V. Chandran	Multi Tasking Staff
Shri. T. Pramoth Kumar	Multi Tasking Staff
Shri. P.P. Sureshkumar	Multi Tasking Staff
Shri. L. Sujeesh	Multi Tasking Staff

1.4. Plan and Non-Plan Budget

1. Non-plan budget for 2017-18

Particulars of sub-head and name of the scheme etc. 1/2401	Sanctioned budget (Rs. in lakhs)	Expenditure (Rs. in lakhs)
040001 Salaries	205.36	204.49
040002 Wages	01.1	0.84
040003 Over Time Allowance	0.00	0.03
040006 Medical treatment	04.5	03.29
040011 Domestic Travel Expenses	14.00	13.75

040013 Office Expenses	32.00	24.48
040016 Publications	7.50	2.58
040026 Advertising & Publicity	1.25	0.00
040027 Minor Works	17.29	15.53
Total	**283.00**	**265.03**

b. Plan budget under Mission for Integrated Development of Horticulture (MIDH) 2015-16

Particulars of Sub-Head and name of the Scheme etc.	Sanctioned budget (Rs. in lakhs)	Expenditure (Rs. in lakhs)
MIDH	995.57	980.33 (98033195)

1.5. Right to Information (RTI) in DASD

During the year 2017-18, the Directorate has been receiving requests under various provisions of RTI Act seeking various kinds of information. During the year, Shri Babulal Meena, Assistant 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 request disposed off	Total no. of request in which information was denied	Total no. of appeals received
24	24	NIL	NIL

1.6. Vigilance Awareness Week

In pursuance to the direction of Central Vigilance Commission, Vigilance awareness week was observed in the Directorate during the period from 30th October to 5th November, 2017. The theme of the Vigilance Awareness Week was "Public participation in promoting Integrity and Eradicating Corruption". The posters containing the theme have been prominently displayed in the Directorate. Banners displaying the observance of Vigilance Week has also been prepared and displayed. On 30th October, 2017 at 11.00 am, the Deputy Director administered the pledge to all Officers and Staff of the Directorate. On 1st November, 2017 officers and staff of this Directorate attended the workshop on Vigilance Awareness organized in association with Regional Science Centre and Planetarium, Calicut. On 2nd November, 2017 officers and staff of this Directorate participated in the Vigilance Awareness Rally organized in association with Regional Science Centre and Planetarium, Calicut.

Fig. 3. Officers & Staff taking the Vigilance pledge

Fig. 4. A view of the starting point of Vigilance Rally

1.7. Swachhta Hi Sewa Campaign

In accordance with the instructions received from the Ministry "Swachhta Hi Sewa Campaign" was observed in the Directorate during 15th September - 02nd October, 2017. Banners on "Swachhta Hi Sewa" displayed in prominent places of the Directorate. On 17th September, 2017 all the officers and staff were gathered in the office premises. At the outset, Director addressed the staff highlighting the importance of Swachhta Hi Sewa Campaign emphasizing the necessity of cleanliness in the day to day activities and to uphold this message throughout their life. As a part of Shramdaan, the officers and staff cleaned the National Highway side in front of the Directorate. The waste water channels were cleaned and weeds and dirt were removed. All the officers and staff were gathered in the office compound. Director and Deputy Director planted seedlings of spices and medicinal plants.

Fig. 5. Cleaning drive during the Swachhta Hi Sewa Campaign

1.8. Swacchh Bharat Pakhwada

In accordance with the instructions received from the Ministry, Swacchh Bharat Pakhwada was observed in the Directorate during 16-31 May, 2017. On 16th May, 2017 all the officers and staff cleaned the office premises and pathway to the Black pepper nursery in the office premises and removed the

dust and dirt in the surroundings of office building. It has been decided to clean each and every section in the Directorate as a part of Swachhta Pakhwada.


Fig. 6. Cleaning drive during the Swachh Bharat Pakhwada

1.9. Sadbhavana Diwas

"Sadbhavana Diwas" was observed on 20th August, 2017 on the birth anniversary of former Prime Minister Late Rajiv Gandhi and all staff were gathered and took Sadbhavana Diwas pledge on 18th August, 2017 as 19th and 20th August, were holidays.

1.10. Rashtriya Ekta Diwas (National Unity Day)

Rashtriya Ekta Diwas (National Unity Day) was observed on 31st October, 2017 on the birth anniversary of Sardar Vallabhabhai Patel and all staff were gathered and took Rashtriya Ekta Diwas Pledge on 31st October, 2017.

1.11. International Yoga Day

3rd International Yoga Day was celebrated on 21st June, 2017 in the Directorate. On the same day all officers and staff performed Yoga under the guidance of Yoga master from "Friends of Yoga", Calicut.


Fig. 7. Officers and Staff performing Yoga

2 DEVELOPMENT

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 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, 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

The DASD is responsible for coordinating and monitoring the activities on the development of Arecanut, spices and aromatic plants in the country. The Directorate is responsible for organizing a series of Transfer of Technology Programmes viz. National/State Level Seminars, Workshops and technology dissemination through demonstration. In addition, the Directorate has been implementing the Planting material production programmes of spices and aromatic crops to make it available for further multiplication and distribution to the farmers.

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 characteristic 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. The efforts made by the implementation of NHM programmes have reflected in the production statistics of spices. Production of spices increased to the tune of 6.7 % and area has increased to the tune of 4.5% annually during the period from 2005-06 to 2017-18. The productivity of spices also had gone up substantially.

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.

- 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 and 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 through State Agriculture / Horticulture Departments, Research Institutes, voluntary and private organizations and individuals.
- 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 2017-18

The activities of the Directorate during the year 2017-18 were

- Coordinating and monitoring the activities on the development of Arecanut, spices and aromatic plants in the country.

- Monitoring of MIDH programmes in the mandate crops in various states in the country.
- Implementation of development programmes in the mandated crops through various state agricultural universities and central institutes to supplement the state's efforts in achieving the desired results in the production fronts as conceived in the Mission for Integrated Development of Horticulture.

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 2017-18, the Directorate implemented the MIDH programmes with an outlay of Rs.9.80 crores for the development of Spices and Aromatic Plants.

Table 1. Major programmes implemented and achievements made during 2017-18 are as follows:

S. No.	Programmes	Unit	Cost per unit (Rs. in Lakhs)	Target		Achievement	
				Physical	Financial (Rs. in Lakhs)	Physical	Financial (Rs. in Lakhs)
I	**Production and Distribution of Quality Planting Materials**						
i.	**Production and Distribution of nucleus planting materials of spices**						
1	Black Pepper / Betelvine	Nos. in lakhs	8.00	21.85	174.800	19.00	151.55929
2	Ginger rhizomes	Qty. in tonnes	0.30	127.00	38.100	107.00	32.100
3	Turmeric rhizomes	Qty. in tonnes	0.30	339.00	101.700	304.00	91.200
4	Chilli seeds	Qty. in qtls	0.75	34.00	25.500	34.00	25.500
5	Seed spices	Qty. in tonnes	0.40	136.00	54.400	126.00	50.400
6	Garlic	Qty. in tonnes	0.50	77.00	38.500	77.00	38.500
7	Tree spices grafts /seedlings						
i.	Nutmeg grafts (Orthotropic)	Nos. in lakhs	140.00	0.06	8.400	0.06	8.400
ii.	Nutmeg grafts (Plagiotropic)	Nos. in lakhs	80.00	0.29	23.200	0.29	23.200
iii	Tamarind / Kokum grafts	Nos. in lakhs	20.00	0.95	19.000	0.95	19.000
iv	Clove /Allspice seedlings	Nos. in lakhs	20.00	0.37	7.400	0.37	7.400
v	Cinnamon/ Cassia/Curry leaf seedlings	Nos. in lakhs	5.00	3.45	17.250	3.45	17.250
8	Aromatic Plants	Ha.	0.75	44.00	33.000	44.00	33.000

9	Nursery Centre for Aromatic Plants	Nos.	15	2.00	30.000	2.00	30.000
10	Establishment of seed storage and infrastructure	Nos.	10.00	5.00	50.000	5.00	50.000
	Sub Total				**621.250**		**577.50929**
II	**Accreditation of spice nurseries**	LS		25		19	
III	**Technology Dissemination through Frontline Demonstration**						
i.	Organic Farming Spices	Nos.	0.60/ 0.90/1.00	74.00	70.000	74.00	70.000
ii.	Maintenance of demo plots of pepper estt. during 2015-16	Nos.	0.125	11.00	1.375	11.00	1.375
iii.	Maintenance of demo plots of pepper estt. during 2016-17	Nos.	0.20	13.00	2.600	13.00	2.600
iv.	Demonstration plots of seed spices	Nos.	0.40	47.00	18.800	47.00	18.800
v	Demonstration plots of aromatic plants	Nos.	0.80	19.00	15.200	19.00	15.200
vi.	On farm management by micro irrigation	Nos.	LS	26	11.850	26.00	11.850
vii.	Multi species cropping in Arecanut Gardens	Nos.	LS	1	6.780	1.00	6.780
viii	Demonstration of E P N in Arecanut	Nos.	LS	1	7.350	1.00	7.350
ix	Demonstration of IDM technologies for mgt of bacterial wilt of ginger		LS		6.000		6.000
	Sub total				**139.9550**		**139.9550**
IV	**Skill Development Schemes**	Nos. in lakhs	LS		78.607		78.607
V	**Project based programmes**						
a.	Hi tech production system for quality disease free seed rhizomes of Ginger		LS		9.000		9.000

b.	Pilot project on participatory mode rehabilitation of Black Pepper garden in Cherutazham Panchayat	LS	LS		5.480		5.480
c.	Participatory mode rehabilitation of black pepper gardens in Kuttiyatoor panchayath	Nos.	LS		7.390		7.390
d.	Pilot project on establishment of seed production centres in ginger growing areas of Kerala in collaboration with FPOs	Nos.	LS		34.670		0.31572
	Sub Total				**56.540**		**22.185720**
VI	**Value Chain Studies**						
a.	Value Chain Study on Turmeric in Telangana				10.254520		10.254520
b.	Value Chain Study on Seabuckthorn in J & K				2.1882500		2.1882500
	Sub Total				**12.442770**		**12.442770**
VII	**Transfer of Technology programmes**						
a.	National Level Seminar	Nos.	1.00	1.00	5.000	1.00	5.000
b.	State Level Seminar/ Workshop	Nos.	3.00	3.00	9.000	3.00	9.000
c.	District Level Seminar/Workshops	Nos.	2.00	7.00	14.000	7.00	14.000
d.	Farmers Training programme	Nos.	0.75	96.00	72.000	96.00	71.840
	Sub Total				100.000		99.840
VIII	**T S G (Monitoring)**			LS	12.210		8.564210
IX	**Mission Management**	LS	55.04500		41.22820		
	GRAND TOTAL				**1076.04977**		**980.33195**

2.1 Production of Quality Planting Materials of Spices

The NHM/MIDH programmes on spices implemented in different States such as area expansion, replanting/rejuvenation etc. requires a sizeable quantity of quality planting materials of the respective spices crop. Non-availability of quality planting materials of high yielding varieties is identified as a major constraint in achieving the desired productivity of these crops as conceived in the Mission. Quite a good number of varieties of various spices and aromatic crops have been evolved in various research centres. However, for want of basic infrastructure and adequate funds, the required quantum of nucleus planting material are 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 2017-18 also with a financial outlay of Rs. 696.410 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

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 centres of pepper. A total of 19.00 lakhs of planting materials were produced and distributed with a financial utilisation of Rs.151.56 lakhs. Rate of assistance given for production of quality nucleus planting materials of pepper was Rs. 8/cutting. Kerala, Karnataka, 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 tabulated below.

Table 2. Planting material production of black pepper during 2017-18, University-wise

S.No.	Institute	Quantity produced and distributed (Nos in lakhs)	Financial utilization (Rs. in lakhs)
1.	Assam Agriculture University, Assam	0.100	0.800
2.	Bidhan Chandra Krishi Vishwavidyalaya, West Bengal	1.000	8.000
3.	Central Island Agri. Research Institute, Port Blair	0.300	2.400
4.	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli	1.000	8.000
5.	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	0.500	4.000
6.	Indian Institute of Spices Research, Calicut	1.200	9.600
7.	Kerala Agricultural University, Thrissur	10.750	86.000
8.	Nagaland Central University, Nagaland	0.050	0.400

9.	Navsari Agriculture University, Gujarat	0.050	0.400
10.	Orissa Agricultural University, Orissa	0.100	0.800
11.	Tamil Nadu Agricultural University, Coimbatore	2.500	20.000
12.	University of Agriculture and Horti. Sciences, Shimoga	2.000	16.000
13.	University of Agricultural Sciences, Bangalore	0.500	4.000
14.	University of Agricultural Sciences, Dharwad	0.100	0.800
15.	University of Horticultural Sciences, Bagalkot	0.500	4.000
16.	Uttar Banga Agricultural University, West Bengal	0.700	5.600
17.	DASD, Calicut, Kerala	0.500	4.000

2.1.2. Ginger

The Directorate produced and distributed 107.00 tonnes of nucleus seed rhizomes of high yielding varieties of ginger through various SAUs and ICAR institutes located all over the country. Assistance was provided at the rate of Rs. 0.30 lakh/ tonnes of ginger rhizomes. An amount of Rs.32.10 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 during 2017-18, University-wise

S.No.	Institute	Quantity produced and distributed (in tonnes)	Financial utilization (Rs. in lakhs)
1	Assam Agri University, Assam	6.000	1.800
2	Bidhan Chandra Krishi Vishwavidyalaya, West Bengal	5.000	1.500
3	Central Island Agri. Research Institute, Port Blair	5.000	1.500
4	College of Horti. & Forestry, Pasighat	5.000	1.500
5	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli	4.000	1.200
6	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	10.000	3.000
7	Dr. Y.S Parmer Univ. of Hort & Forestry, HP	2.000	0.600
8	Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	5.000	1.500
9	Indian Institute of Spices Research, Calicut	3.000	0.900
10	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur	5.000	1.500
11	Kerala Agricultural University, Thrissur	15.000	4.500
12	Mahatma Phule Krishi Vidyapeeth, Rahuri	12.000	3.600
13	Narendra Dev Univ. for Agri & Technology, UP	2.000	0.600
14	Nagaland Central Univ., Nagaland	10.000	3.000
15	Orissa Agricultural University, Orissa	3.000	0.900
16	Sri Konda Laxman Telangana State Hort. Univ., Hyderabad	10.000	3.000
17	Tamil Nadu Agricultural University, Coimbatore	1.000	0.300
18	University of Agricultural Sciences, Bangalore	1.000	0.300
19	University of Agricultural Sciences, Dharwad	1.000	0.300
20	University of Horticultural Sciences, Bagalkot	4.000	1.200
21	Uttar Banga Agricultural University, West Bengal	18.000	5.400

2.1.3. 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, 304 tonnes of turmeric seed rhizomes were produced and distributed and Rs. 91.20 lakhs has been utilized for the same. The Institute-wise production details of turmeric seed rhizomes are given below.

Table 4. Planting material production of turmeric during 2017-18, University-wise

S. No.	Institute	Quantity produced and distributed (in tonnes)	Financial utilization (Rs. in lakhs)
1.	Anand Agricultural University, Gujarat	3.000	0.900
2.	Assam Agri. University, Assam	10.000	3.000
3.	Bidhan Chandra Krishi Vishwavidyalaya, West Bengal	10.000	3.000
4.	Birsa Agricultural University, Jharkhand	10.000	3.000
5.	C C S Haryana Agricultural University, Hisar	3.000	0.900
6.	Central Island Agri. Research Institute, Port Blair	2.000	0.600
7.	C S Azad Agricultural University, UP	0.600	0.180
8.	College of Horti. & Forestry, Pasighat	10.000	3.000
9.	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli	4.000	1.200
10.	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	24.400	7.320
11.	Dr. Y.S Parmer Univ. of Hort & Forestry, HP	2.000	0.600
12.	Dr. YSR Hort. University, Andhra Pradesh	20.000	6.000
13.	Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	20.000	6.000
14.	Indian Institute of Spices Research, Calicut	5.000	1.500
15.	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur	5.000	1.500
16.	Kerala Agricultural University, Thrissur	16.000	4.800
17.	Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbani	5.000	1.500
18.	Mahatma Phule Krishi Vidyapeeth, Rahuri	15.000	4.500
19.	Narendra Dev Univ. for Agri. & Technology, UP	4.000	1.200
20.	Nagaland Central Univ., Nagaland	10.000	3.000
21.	Navsari Agri University, Gujarat	20.000	6.000
22.	Punjab Agricultural University, Punjab	20.000	6.000
23.	Rajendra Agricultural University, Bihar	20.000	6.000
24.	Sri Konda Laxman Telangana State Hort.Univ., Hyderabad	24.000	7.200
25.	Sardar Vallabh Bhai Patel Uni. of Agri & Tech., Meerut, UP	2.000	0.600
26	Tamil Nadu Agricultural University, Coimbatore	40.000	12.000
27	University of Agricultural Sciences, Bangalore	4.000	1.200
28	University of Agricultural Sciences, Dharwad	5.000	1.500
29	University of Horticultural Sciences, Bagalkot	10.000	3.000
30	Uttar Banga Agricultural University, West Bengal	15.000	4.500

2.1.4. 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 2017-18, a quantity of 34.00 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. 25.50 lakhs was incurred for this purpose during the year.

Table 5. Planting material production of chilli seeds during 2017-18, University-wise

S.No.	Institute	Quantity produced and distributed (in quintals)	Financial utilization (Rs. in lakhs)
1	Agriculture University, Jodhpur	1.000	0.750
2	Anand Agricultural University, Gujarat	2.000	1.500
3	Bidhan Chandra Krishi Vishwavidyalaya, West Bengal	0.500	0.375
4	Birsa Agricultural University, Jharkhand	0.500	0.375
5	C S Azad Agricultural University, UP	0.200	0.150
6	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	1.000	0.750
7	Dr. YSR Hort. University, AP	3.000	2.250
8	Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	2.000	1.500
9	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur	0.250	0.1875
10	Kerala Agricultural University, Thrissur	0.050	0.038
11	Mahatma Phule Krishi Vidyapeeth, Rahuri	4.000	3.000
12	Narendra Dev Univ. for Agri. & Technology, UP	1.500	1.125
13	Sardar Krushi Nagar Dantiwada Agri. Univ., Gujarat	1.000	0.750
14	Sri Konda Laxman Telangana State Hort. Univ., Hyderabad	4.000	3.000
15	Sher-e-Kashmir University of Agri. Sci. & Tech, J & K	2.000	1.500
16	Tamil Nadu Agricultural University, Coimbatore	0.500	0.375
17	University of Agricultural Sciences, Bangalore	2.000	1.500
18	University of Agricultural Sciences, Dharwad	5.500	4.125
19	University of Horticultural Sciences, Bagalkot	3.000	2.250

2.1.5. Seed spices

Seed spices occupy about 46.2 % of area under spices and contributes 22 % 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 126.00 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. 50.40 lakhs was incurred for this programme.

Table 6. University-wise details of seed spices seed production programme during 2017-18

S.No.	Institute	Quantity produced and distributed (in tonnes)	Financial utilization (Rs. in lakhs)
1	Agriculture University, Jodhpur	10.000	4.000
2	Agriculture University, Kota	20.000	8.000
3	Anand Agricultural University,Anand, Gujarat	3.000	1.200
4	Bidhan Chandra Krishi Vishwavidyalaya, West Bengal	5.000	2.000
5	Birsa Agricultural University, Jharkhand	1.000	0.400
6	C C S Haryana Agricultural University, Haryana	7.000	2.800
7	C S Azad Agricultural University, UP	1.500	0.600
8	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	3.000	1.200
9	Dr. Y.S Parmer Univ. of Hort & Forestry, HP	1.000	0.400
10	Dr. YSR Hort University, AP	3.000	1.200
11	Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	10.000	4.000
12	Junagadh Agri. University, Gujarat	2.000	0.800
13	Narendra Dev Univ. for Agri. & Technology, UP	2.000	0.800
14	National Research Centre for Seed Spices, Ajmer	23.000	9.200
15	Punjab Agricultural University, Punjab	1.500	0.600
16	Rajendra Agricultural University, Bihar	0.500	0.200
17	Sardar Krishi Nagar Dantiwada Agri. University, Gujarat	10.000	4.000
18	Sri Konda Laxman Telangana State Hort. Univ., Hyderabad	8.000	3.200
19	Sardar Vallabh Bhai Patel University of Agri. & Tech. Meerut	1.000	0.400
20	Sher-e-Kashmir University of Agri. Science & Tech,J&K	1.000	0.400
21	SKN Agriculture University, Jobner	15.000	6.000
22	Tamil Nadu Agricultural University, Coimbatore	1.000	0.400
23	University of Agricultural Sciences, Dharwad	1.500	0.600
24	University of Horticultural Sciences, Bagalkot	5.000	2.000

2.1.6. Garlic

Garlic is an important spice crop grown in an area of 3.2 lakh ha with an estimated production of around 16.5 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 2017-18 so as to make available enough materials for further multiplication and distribution among the farmers.

Table 7. Nucleus seed production programme of garlic during 2017-18

S.No.	Institute	Quantity produced and distributed (in tonnes)	Financial utilization (Rs. in lakhs)
1	Agriculture University, Kota	20.000	10.000
2	Bidhan Chandra Krishi Vishwavidyalaya, West Bengal	1.000	0.500
3	C C S Haryana Agricultural University, Hisar	15.000	7.500
4	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	3.000	1.500
5	Dr. Y.S Parmer Univ. of Hort. & Forestry, HP	1.000	0.500
6	Junagadh Agri. University, Gujarat	2.000	1.000
7	Mahatma Phule Krishi Vidyapeeth, Rahuri	8.000	4.000
8	Narendra Dev Univ. for Agri. & Technology, UP	2.000	1.000
9	Navsari Agri University, Gujarat	5.000	2.500
10	Sri Konda Laxman Telangana State Hort.Univ., Hyderabad	5.000	2.500
11	Sardar Vallabh Bhai Patel University of Agri. & Tech., Meerut	1.000	0.500
12	Sher-e-Kashmir University of Agri. Science & Tech,J&K	1.000	0.500
13	Tamil Nadu Agricultural University, Coimbatore	8.000	4.000
14	University of Agricultural Sciences, Dharwad	2.000	1.000
15	University of Horticultural Sciences, Bagalkot	3.000	1.500

2.1.7. 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 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. 5.12 lakh grafts/ seedlings of various tree spices were produced and distributed with a financial utilization of Rs. 75.25 lakhs.

Table 8. Details of tree spices planting material production programme

Programmes	Rate of assistance/unit (Rs. in Lakhs)	Physical Nos. in lakhs)	Financial (Rs. in lakhs)
a. Nutmeg grafts			
Orthotropic	140.00	0.060	8.400
Plagiotropic	80.00	0.290	23.20
b. Tamarind / Kokum grafts	20.00	0.950	19.00
c. Clove /Allspice seedlings	20.00	0.370	7.400
d. Cinnamon /Cassia /Curry leaf seedlings	5.00	3.450	17.250
Total		**5.120**	**75.250**

Table 9. Institute-wise details of planting material production of tree spices

a) Nutmeg

Institute	Produced and distributed (in lakh nos.)	Financial utilization (Rs. in lakhs)
Nutmeg Plagiotropic		
Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli	0.250	20.000
Tamil Nadu Agricultural University, Coimbatore	0.010	0.800
University of Agricultural Sciences, Bangalore	0.020	1.600
University of Horticultural Sciences, Bagalkot	0.010	0.800
Total	**0.290**	**23.200**
Nutmeg Orthotropic		
Kerala Agricultural University, Thrissur	0.060	8.400
Total	**0.060**	**8.400**

b) Tamarind/Kokum grafts

Institute	Produced and distributed (in lakh nos.)	Financial utilization (Rs. in lakhs)
Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli	0.500	10.000
Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	0.050	1.000
Dr. YSR Hort. University, AP	0.050	1.000
Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur	0.010	0.200
Kerala Agricultural University, Thrissur	0.100	2.000
Tamil Nadu Agricultural University, Coimbatore	0.050	1.000
University of Agricultural Sciences, Bangalore	0.050	1.000
University of Agricultural Sciences, Dharwad	0.040	0.800
University of Horticultural Sciences, Bagalkot	0.100	2.000
Total	**0.950**	**19.000**

c) Clove/all Spice Seedlings

Institute	Produced and distributed (in lakh nos.)	Financial utilization (Rs. in lakhs)
Central Island Agri. Research Institute, Port Blair	0.020	0.400
Kerala Agricultural University, Thrissur	0.300	6.000
University of Agricultural Sciences, Bangalore	0.050	1.000
Total	**0.370**	**7.400**

d) Cinnamon/Cassia/Curry leaf

Institute	Produced and distributed (in lakh nos.)	Financial utilization (Rs. in lakhs)
Bidhan Chandra Krishi Vishwavidyalaya, West Bengal	0.750	3.750
Central Island Agri. Research Institute, Port Blair	0.050	0.250
Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli	0.200	1.000
Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	0.550	2.750
Kerala Agricultural University, Thrissur	0.750	3.750
Orissa Agricultural University, Bhubaneshwar	0.050	0.250
University of Agricultural Sciences, Bangalore	1.000	5.000
University of Agricultural Sciences, Dharwad	0.100	0.500
Total	**3.450**	**17.250**

2.1.8 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 15 Universities/ICAR Institutes spread across the country during the year 2017-18. Assistance was granted @ Rs.75,000/- per ha. A total of 44 ha were covered under the programme with a financial outlay of Rs. 33.00 lakhs.

Table 10. Institute-wise details of planting material production programme in Aromatic plants

Institute	Area in ha	Financial utilization (Rs. in lakhs)
Bidhan Chandra Krishi Vishwavidyalaya, West Bengal	1.000	0.750
C C S Haryana Agriculture University, Hissar	3.000	2.250
Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli	2.000	1.500
Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	10.000	7.500
Directorate of M & A Plants, Anand	1.000	0.750
Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	4.000	3.000
Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur	1.000	0.750
Kerala Agricultural University, Thrissur	4.000	3.000
Mahatma Phule Krishi Vidyapeeth, Rahuri	6.000	4.500
Punjab Agricultural University, Punjab	1.000	0.750
Sri Konda Laxman Telangana State Hort.Univ., Hyderabad	2.000	1.500
Tamil Nadu Agricultural University, Coimbatore	4.000	3.000
University of Agricultural Sciences, Bangalore	5.000	3.750
Total	**44.000**	**33.000**

Fig. 1. Rooted black pepper cuttings raised at HRS, Sirsi, UHS, Bagalkot

Fig. 2. Pepper cuttings raised at HRS, Pottangi, OUAT, Bhubaneshwar

Fig. 3. Quality pepper planting material multiplied by Kerala Agri University

Fig. 4. Pepper planting material production at BCKV, West Bengal

Fig. 5. Nucleus planting materials for pepper raised by IISR, Kozhikode

Fig. 6. Pepper cuttings raised at Assam Agri. University

Fig. 7. Rapid multiplication method followed for pepper planting material production at Assam Agriculture University

Fig. 8. Rooted black pepper cuttings at BSKKVP, Dapoli

Fig. 9. Betelvine Baroj for planting material production at UBKV, West Bengal

Fig. 10. Ginger Seed production plot at UAHS, Shimoga

Fig. 11. Quality ginger rhizomes multiplied at BCKV, West Bengal

Fig. 12. Ginger seed multiplication in growbags under protected structures at IISR, Kozhikode

Fig. 13. Protray method of turmeric multiplication using single buds at UBKV, West Bengal

Fig. 14. Planting in turmeric seed production plot at MAU, Parbhani

Fig. 15. Tumeric seed production plot at Dr. BSKKVP, Dapoli

Fig. 16. Quality seed rhizome production of turmeric at Anand Agri. University, Gujarat

Fig. 17. Byadagi chilli seed production plot at UAS, Dharwad

Fig. 18. Scientists visiting chilli seed production plot at CSAUST, Kanpur

Fig. 19. Winnowing of chilli seeds produced at HRS, Lam, Dr. YSRHU, Hyderabad

Fig. 20. Kashmiri Chilli seeds multiplied at SKUAST, Kashmir

Fig. 21. Seed production plot for seed spices at Agriculture University, Jodhpur

Fig. 22. Kasuri Methi seed production at HAU, Hisar

Fig. 23. Coriander seed multiplication at SKLTSHU, Telengana

Fig. 24. Celery seed production plot at PAU, Ludhiana

Fig. 25. Garlic bulbs multiplied at HAU, Hisar

Fig. 26. Garlic seed production plot at Navsari Agri University, Gujarat

Fig. 27. Cinnamon seedlings raised at BSKKVP, Dapoli

Fig. 28. Nutmeg grafts raised at Kerala Agri. University

Fig. 29. Curryleaf seedling production at Kerala Agri. University

Fig. 30. Kokum grafts raised at UAHS, Shimoga

Fig. 31. Lavender planting material production plot at UAS, Banglore

Fig. 32. Lemongrass slips multiplied at MPKV, Rahuri

Fig. 33. Vetiver slips multiplied at Dr. PDKV, Akola

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. 100% assistance was provided for this programme. A total of 5 Universities were covered under the programme with a total financial utilization of Rs.50.00 lakhs. Each university were provided with an assistance of Rs. 10 lakhs for establishing a seed processing and storage infrastructure. Following are the Universities/Institutes involved in this programme.

1. Agriculture University, Jodhpur
2. Agriculture University, Kota
3. Kerala Agricultural University, Thrissur
4. SKN Agriculture University, Jobner
5. Tamil Nadu Agricultural University, Coimbatore

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 2 small nurseries in different SAUs. An amount of Rs. 15.00 lakhs were provided per University for establishing the nursery centre. Total Rs.30.00 lakhs were incurred for this purpose. Following SAUs implemented this programme.

1. Tamil Nadu Agricultural University, Coimbatore
2. Kerala Agricultural University, Thrissur

Fig. 34. Seed storage Infrastructure for chilli established at HRS, Lam, Dr. YSRHU, AP

Fig. 35. Seed storage facility established at BCKV, West Bengal

Fig. 36. Seed Storage structure at COH, Sirsi

Fig. 37. Storage structure for seed spices, established at SKNAU, Jobner

Fig. 38. Small nursery for spices established at UAHS, Shimoga

Fig. 39. Nursery for aromatic plants established at OUAT, Bhubaneshwar

Fig. 40. Nursery structure established for aromatic crops at SKLTSHU, Telengana

Fig. 41. Black pepper nursery established at HRS, Thadiyankudisai, TNAU

2.4 Accreditation of 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 material need to be procured only from accredited nurseries for all government programmes. Towards this direction, DASD has been authorized by the Union Ministry of Agriculture and Farmers Welfare for accrediting spice nurseries.

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 accreditation work is carried out through a special committee formed for this purpose. 19 spice nurseries accredited under this programme during 2017-18 are as follows.

1. Horticulture Research Station, TNAU, Pechiparai, Tamil Nadu
2. Horticulture Research Station, TNAU, Yercaud, Tamil Nadu
3. Horticulture Research Station, TNAU, Thadiyankudisai, Tamil Nadu
4. State Horticulture Farm, Yercaud, Tamil Nadu
5. M/s Panackavayalil Nursery, Kozhikode, Kerala
6. M/s Choorapuzha Agri Synergies, Ernakulam district, Kerala
7. Nursery at Padmasree Dental Clinic, Shimoga, Karnataka
8. M/s Gagan Nursery Farm, Shimoga, Karnataka
9. RCRS, Bhatye, Dr. BSKKVP, Dapoli, Maharashtra
10. Deptt. of Horti, Dr. BSKKVP, Dapoli, Maharashtra
11. M/s Kinattukara Nutmeg Plantation and Nursery Pvt. Ltd, Kottayam, Kerala
12. M/s Sasyadri Nursery & Farm, Shimoga, Karnataka
13. M/s Kalpataru Farm & Nursery, Shimoga, Karnataka
14. M/s Shree Krishna Farm & Nursery, Shimoga, Karnataka
15. M/s Varashree Farm & Nursery, Shimoga, Karnataka
16. M/s Srinidhi Nursery, Chikmangalore, Karnataka
17. M/s Apremaya Nursery, Shimoga, Karnataka
18. State Horti Farm, Mudigere, Karnataka
19. M/s Maruthi Nursery, Hassan, Karnataka

Fig. 42. Accreditation awareness training conducted for nurserymen by DASD at UAHS, Mudigere

Fig. 43. Evaluation of Pepper nursery at Regional Coconut Research Station, Dapoli

Fig. 44. Accredited Hi-Tech pepper nursery at ZARHS, Mudigere

Fig. 45. Accreditation team evaluating the infrastructure at HRS, Pechipparai

Fig. 46. Mother block of Kokum at COA, BSKVP, Dapoli

Fig. 47. DASD Accreditation Team evaluating the Nursery at Shimoga

Fig. 48. Training programme on Accreditation of large cardamom conducted at Sikkim

Fig. 49. DASD nursery accreditation team evaluating the spice Nursery at HRS, Yercaud

2.5 Technology Dissemination through Frontline Demonstration

The Directorate established frontline demonstration plots for technology dissemination of organic cultivation of major spices like pepper, ginger, turmeric and chilli. The Directorate also gave assistance for maintenance of demonstration plots established during the preceding years. The details of the above programmes are given below.

2.5.1 Demonstration of organic farming in Spices

Organic farming in the spices sector is becoming increasingly important. Its environmental,health 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, the country's natural advantages in this regard need to be fully exploited. The Directorate established frontline demonstration plots in SAUs/ National Institutes and reputed NGOs for dissemination of latest technologies developed in organic cultivation of Black Pepper, Ginger, Turmeric and Chilli. All the demonstration plots were established with the participation of reputed farmers.

Table 11. Rate of assistance for organic demonstration plots

Demonstration plot -Crop	Cost (Rs./ha)		
	1st year	2nd year	3rd year
Black Pepper	60,000	20,000	25,000
Ginger	1,00,000	-	-
Turmeric	90,000	-	-
Chilli	1,00,000	-	-

Table 12. Frontline Demonstration plots in organic farming of spices - Crop wise details

Demonstration Plot - Crop	No. of Demonstration plots established	Rate of Assistance (Rs. in lakhs) per unit of 1 ha.	Financial Utilization (Rs. in lakhs)
Black Pepper	10.00	0.60	6.00
Ginger	19.00	1.00	19.00
Turmeric	28.00	0.90	28.00
Chilli	17.00	1.00	17.00
Total	**74.00**		**70.00**

Table 13. Frontline demonstration of organic cultivation of pepper

S.No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Assam Agri. University, Assam	1.000	0.600
2	Bidhan Chandra Krishi Vishwavidyalaya, WB	1.000	0.600
3	Central Island Agri. Research Institute, Port Blair	1.000	0.600
4	Kerala Agricultural University, Thrissur	1.000	0.600
5	Nagaland Central University, Nagaland	1.000	0.600
6	Orissa Agricultural University, Orissa	1.000	0.600
7	Tamil Nadu Agricultural University, Coimbatore	1.000	0.600
8	University of Agri. and Horti. Sciences, Shimoga	1.000	0.600
9	University of Agricultural Sciences, Bangalore	1.000	0.600
10	University of Horticultural Sciences, Bagalkot	1.000	0.600
	Total	**10.0000**	**6.0000**

Table 14. Frontline Demonstration of organic cultivation of Ginger

S.No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Assam Agri University, Assam	1.000	1.000
2	Bidhan Chandra Krishi Vishwavidyalaya, WB	1.000	1.000
3	Central Island Agri. Research Institute, Port Blair	1.000	1.000
4	College of Horti. & Forestry, Pasighat	1.000	1.000
5	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	1.000	1.000
6	Dr. Y.S Parmer Univ. of Hort. & Forestry, HP	1.000	1.000
7	Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	1.000	1.000
8	Indian Institute of Spices Research, Calicut	1.000	1.000
9	Kerala Agricultural University, Thrissur	2.000	2.000
10	Nagaland Central University, Nagaland	1.000	1.000
11	Orissa Agricultural University, Orissa	1.000	1.000
12	Sri Konda Laxman Telangana State Hort. Uni., Hyderabad	1.000	1.000
13	Tamil Nadu Agricultural University, Coimbatore	1.000	1.000
14	University of Agri. and Horti. Sciences, Shimoga	2.000	2.000
15	University of Agricultural Sciences, Bangalore	1.000	1.000
16	Uttar Banga Agricultural University, WB	2.000	2.000
	Total	**19.0000**	**19.0000**

Table 15. Frontline Demonstration of organic cultivation of Turmeric

S.No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Assam Agri. University, Assam	1.000	1.000
2	Bidhan Chandra Krishi Vishwavidyalaya, WB	1.000	1.000
3	College of Horti. & Forestry, Pasighat	1.000	1.000
4	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	1.000	1.000
5	Dr. Y.S Parmer Univ. of Hort. & Forestry, HP	1.000	1.000
6	Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	1.000	1.000
7	Indian Institute of Spices Research, Calicut	1.000	1.000
8	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur	1.000	1.000
9	Kerala Agricultural University, Thrissur	1.000	1.000
10	Mahatma Phule Krishi Vidyapeeth, Rahuri	1.000	1.000
11	MYRADA, KVK, Tamil Nadu	2.000	2.000
12	Nagaland Central Univ., Nagaland	1.000	1.000
13	Navsari Agricultural University, Gujarat	1.000	1.000
14	Orissa Agricultural University, Orissa	1.000	1.000
15	Punjab Agricultural University, Punjab	4.000	4.000
16	Rajmata Vijayaraje Scindia Krishi V V, Gwalior, MP	2.000	2.000
17	Sri Konda Laxman Telangana State Horti. Uni. Hyderabad	1.000	1.000
18	Tamil Nadu Agricultural University, Coimbatore	1.000	1.000
19	University of Agri. and Horti. Sciences, Shimoga	1.000	1.000
20	University of Agricultural Sciences, Bangalore	1.000	1.000
21	University of Agricultural Sciences, Dharwad	1.000	1.000
22	Uttar Banga Agricultural University, W.B.	2.000	2.000
	Total	**28.0000**	**28.000**

Table 16. Frontline Demonstration of organic cultivation of Chillies

S.No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Anand Agricultural University , Gujarat	1.000	1.000
2	Bidhan Chandra Krishi Vishwavidyalaya,W.B.	1.000	1.000
3	College of Horti& Forestry, Pasighat	1.000	1.000
4	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	1.000	1.000
5	Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	1.000	1.000
6	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur	1.000	1.000
7	Kerala Agricultural University, Thrissur	1.000	1.000
8	Rajmata Vijayaraje Scindia Krishi VV, MP	2.000	2.000
9	Sri Konda Laxman Telangana State Horti. Uni., Hyderabad	1.000	1.000
10	Sher-e-Kashmir University, J & K	3.000	3.000

11	Tamil Nadu Agricultural University, Coimbatore	1.000	1.000
12	University of Agri. and Horti. Sciences, Shimoga	1.000	1.000
13	University of Agricultural Sciences, Bangalore	1.000	1.000
14	University of Agricultural Sciences, Dharwad	1.000	1.000
	Total	**17.0000**	**17.0000**

Benefit of the programme

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 established served to demonstrate and convince farmers of the applicability of various technologies developed for organic cultivation in different crops. The programme encouraged the farmers to take up the organic farming thereby increasing the countries share in the organic products.

2.5.2 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 17.63 lakh tonnes of seed spices annually from an estimated area of about 17.84 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 47 demonstration plots in the major production centres of the seed spices for dissemination of technological information among the farming community. The demonstration plot established was one hectare size. The financial assistance for one unit of the demonstration plot was Rs. 0.40 lakh/hectare. An amount of Rs. 18.80 lakhs was utilized for this programme.

Table 17. University-wise details of demonstration plots for seed spices

S.No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Agriculture University, Jodhpur	5.000	2.000
2	Agriculture University, Kota	1.000	0.400
3	Bidhan Chandra Krishi Vishwavidyalaya, WB	1.000	0.400
4	Birsa Agricultural University, Jharkhand	1.000	0.400
5	C S Azad Agricultural University, UP	2.000	0.800

6	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	3.000	1.200
7	Dr. Y.S Parmer univ of Hort& Forestry, HP	2.000	0.800
8	Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	1.000	0.400
9	Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur	1.000	0.400
10	Junagadh Agri. University, Gujarat	2.000	0.800
11	National Research Centre for Seed Spices, Ajmer	8.000	3.200
12	Rajmata Vijayaraje Scindia Krishi VV, MP	2.000	0.800
13	Sri Konda Laxman Telangana State Hort. Uni., Hyderabad	3.000	1.200
14	Sher-e-Kashmir University and Agri. Science & Tech, J&K	3.000	1.200
15	SKN Agriculture University, Jobner	8.000	3.200
16	Tamil Nadu Agricultural University, Coimbatore	2.000	0.800
17	University of Agricultural Sciences, Dharwad	1.000	0.400
18	Uttar Banga Agricultural University, WB	1.000	0.400
	Total	**47.0000**	**18.8000**

2.5.3 Demonstration plots for Aromatic Plants

India with 16 different agroclimatic zones, is one of the top 12 mega biodiversity centres of the world with two hot spots located in the Eastern Himalayas and Western Ghats containing 3500 and 1600 endemic species of higher plants, respectively. The Indian biodiversity is immensely rich in medicinal and aromatic plants occurring in diverse ecosystems.

Dissemination of information regarding cultivation of the above crops, among the farming community is very essential. This Directorate established 19 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.15.20 lakhs was utilized for this purpose.

Table 18. Institute-wise details of demonstration plots for aromatic crops

S. No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	2.000	1.600
2	Dte. M & A Plants, Anand	3.000	2.400
3	Indira Gandhi Krishi Vishwavidyalaya, Chattisgarh	2.000	1.600
4	Kerala Agricultural University, Thrissur	1.000	0.800
5	Mahatma Phule Krishi Vidyapeeth, Rahuri	3.000	2.400
6	MYRADA, KVK, TN	2.000	1.600
7	Tamil Nadu Agricultural University, Coimbatore	4.000	3.200
8	University of Agricultural Sciences, Bangalore	2.000	1.600
	Total	**19.0000**	**15.2000**

2.5.4 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. 33 No. of demonstration plots of spice crops on drip irrigation system were established in different spices in SAUs/ ICAR institutes and selected farmers fields.

Table 19. Demonstration of drip irrigation in Black pepper

S.No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Kerala Agricultural University, Thrissur	1.000	0.5000
2	Nagaland Central Univ, Nagaland	1.000	0.5000
3	Tamil Nadu Agricultural University, Coimbatore	1.000	0.5000
	Total	**3.0000**	**1.5000**

Table 20. Demonstration of drip irrigation in Ginger

S.No	Institute	No. of plots	Financial (Rs. in lakhs)
1	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	1.000	0.450
2	Dr. Y.S Parmer univ of Hort. & Forestry, HP	1.000	0.450
3	Kerala Agricultural University, Thrissur	1.000	0.450
4	Mahatma Phule Krishi Vidyapeeth, Rahuri	1.000	0.450
5	Sri Konda Laxman Telengana State Hort. Uni., Hyderabad	2.000	0.900
6	Tamil Nadu Agricultural University, Coimbatore	1.000	0.450
	Total	**7.0000**	**3.1500**

Table 21. Demonstration of drip irrigation in Turmeric

S.No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola	1.000	0.450
2	Kerala Agricultural University, Thrissur	1.000	0.450
3	Mahatma Phule Krishi Vidyapeeth, Rahuri	1.000	0.450
4	MYRADA, KVK, TN	1.000	0.450
5	Sri Konda Laxman Telangana State Hort. Uni., Hyderabad	2.000	0.900
	Total	**6.0000**	**2.7000**

Table 22. Demonstration of Drip irrigation in Chilli

S.No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Anand Agricultural University, Gujarat	1.000	0.450
2	Kerala Agricultural University, Thrissur	1.000	0.450
3	Rajmata Vijayaraje Scindia Krishi VV, MP	2.000	0.900
4	Sri Konda Laxman Telangana State Hort. Uni., Hyderabad	1.000	0.450
5	Tamil Nadu Agricultural University, Coimbatore	1.000	0.450
	Total	6.0000	2.7000

Table 23. Demonstration of drip irrigation in Seed Spices

S.No.	Institute	No. of plots	Financial (Rs. in lakhs)
1	Dr. Y.S Parmer Univ. of Hort. & Forestry, HP	1.000	0.450
2	Rajmata Vijayaraje Scindia Krishi VV, MP	2.000	0.900
3	Sri Konda Laxman Telangana State Hort. Uni., Hyderabad	1.000	0.450
	Total	**4.0000**	**1.8000**

Fig. 50. Organic management of black pepper demonstrated by Assam Agri. University

Fig. 51. FLD for organic pepper established at OUAT

Fig. 52. Organic ginger production demonstration at Kerala Agri University

Fig. 53. Inputs for Organic ginger FLD distributed to farmers at CAU, Pasighat

Fig. 54. Organic ginger production demonstrated at TNAU, Coimbatore

Fig. 55. Demonstration plot for organic ginger cultivation at RVSKVV, Gwalior

Fig. 56. Organic turmeric plot established at Kandhmal District by OUAT, Bhuvaneswar

Fig. 57. Turmeric organic production demonstrated at SKLTSHU, Telengana

Fig. 58. Organic turmeric demonstration plot established by IISR at Telengana

Fig. 59. Organic chilli production technology demonstrated at UAS, Dharwad

Fig. 60. Chilli demonstration plot established at JNKVV, Jabalpur

Fig. 61. Inputs for establishing organic spice production FLDs distributed at UAHS, Shimoga

Fig. 62. Cumin production technology demonstrated by AU, jodhpur

Fig. 63. Field day conducted at AU, Kota in connection with FLD on seedspices

Fig. 64. FLD for coriander variety AD-1 under CSUAST, Kanpur

Fig. 65. Field day conducted at NRCSS, Ajmer in connection with FLD on seed spices

Fig. 66. Inputs distributed to FLD beneficiaries at NRCSS, Ajmer

Fig. 67. Organic coriander production demonstrated at RVSKVV, Gwalior

Fig. 68. FLD for Fennel variety RF-143 at SKNAU, Jobner

2.5.5 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 environmental friendly alternative to manage white grubs by CPCRI, Kasaragod. To popularize ecofriendly management of white grub using EPNs, DASD has established 4 acres of demonstration plots in farmer's fields in arecanut growing areas of Karnataka during 2015-16. The project period was for three years and implemented by CPCRI, Kasaragod. Initially, orientation trainings were given to the farmers of selected gardens on EPN technology for the integrated management of root grub. Farmers were supplied with critical inputs viz., neem cake and EPN bio-control agents for management of root grub in the demonstration plots. Drainage facility and intercultural operations were undertaken in the selected demonstration plots during the year. Mass multiplication of EPN and host insect were done imposing treatments for the management of root grub at Sringeri and Sullia taluks of Karnataka. A survey on incidence of root grub and other pests in arecanut based cropping system was conducted in these areas and technical guidance were provided to the beneficiaries.

2.5.6 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 garden aimed at increasing the net returns from unit area is being identified as thrust area for sustenance of Arecanut farming. This Directorate had established frontline demonstration plots for dissemination of technology on multi species cropping in Arecanut Gardens during 2007-08 and 2012-13 which was found to be very successful. In 2016-17, DASD has established 8 nos. of such demonstration plots of size 1 ha each in the farmers field at Karnataka in association with the Central Plantation Crop Research Institute, who are involved in the pioneer research in multi species cropping in Arecanut. The programme was for 3 years. The plots established under this programme are a combination of crops like Arecanut + Black Pepper + Cocoa + Banana. These plots were established in Dakshin Kannada district of Karnataka.

2.5.7 Demonstration of IDM technologies for management of bacterial wilt of ginger

Bacterial wilt is one of the most lethal diseases prevalent in the ginger growing areas in the country. *R. solanacearum*, the bacterial wilt pathogen can survive in the soil saprophytically for long time without true hosts. Dissemination of the pathogen through infected planting material is a serious issue in case of ginger, potato etc. In such cases detection and diagnosis of the pathogen is imperative to develop the adequate control strategies. Management of the pathogen with chemical /biological control measures has met with limitations. Among the several strategies evaluated, integrated management using soil solarization followed by rhizome priming and soil application of a disinfecting salt solution has found to be a very effective, feasible and promising technology by Indian Institute of Spices Research (IISR) for the management of bacterial wilt.

Using the above technologies, DASD in association with IISR has initiated demonstrating IDM strategies for bacterial wilt in 2017-18. Field diagnosis of bacterial wilt pathogen using real time LAMP for testing soil and seed rhizome is also conducted as a part of demonstration.

Activities done in 2017-18

Two farmers plot at Wayanad were selected for the demonstration of IDM technology developed against bacterial wilt. Two systems were included in the demonstration- one for organic system of cultivation using biocontrol agent *Bacillus licheniformis* (GAP107 MTCC12725) and another for inorganic system using $CaCl_2$. In the integrated strategy, soil solarization was the main component. Before planting soil was indexed for the presence of pathogen and subjected to solarization for 50 days. Planting was done with the onset of rains. The treatments were imposed at the time of planting and at 30, 45, 60 and 90 days. No bacterial wilt incidence occurred in both the plots whereas control and adjacent plots showed more than 30% disease incidence. The harvest data showed absolutely disease free rhizomes suitable for seed purpose. Being convinced with both the technologies in Wayanad area, the technology is going to be demonstrated in Karnataka and North-East region in four locations of one acre each during 2018-19.

Fig. 69. Demonstration of use of Entomo Pathogenic Nematode (EPN) in root grub management of arecanut

Fig. 70. Multi species cropping in Arecanut Garden

Fig. 71. Demonstration of IDM technologies for management of bacterial wilt of ginger

2.6 Innovative Programmes

The Directorate introduced some innovative programmes on Hi-tech production system for quality disease free seed rhizomes of Ginger and Turmeric and participatory mode rehabilitation of black pepper. A brief of these programmes are given below.

2.6.1 Hi-tech production system for quality disease free seed rhizomes of Ginger

The National Consultative Meet on Planting Material Production of Ginger and Turmeric organized by DASD under the chairmanship of Horticulture Commissioner had recommended for establishment of a production system for ginger and turmeric that could ensure freedom from disease and maintain the purity in the planting material produced for distribution to farmers. The Meet recommended to resort to microrhizome production followed by multiplication of rhizome in soil less medium in protected structure before it is multiplied in field for distribution among farmers. Based on the recommendations of the meeting, KAU and IISR has submitted a proposal for high tech production system for quality seed production in ginger with the following objectives.

- To produce high quality disease free Ginger and Turmeric micro rhizome through tissue culture
- Seed multiplication through high tech production system with single bud derived plants from microrhizomes

In vitro cultures of improved varieties of ginger and turmeric were established and multiple shoots were induced in the cultures. Best response for induction of microrhizomes was observed with MS medium with high (8%) sucrose. Different treatment trials for hardening were also conducted and standardised.The total Project cost was Rs. 9.00 Lakhs for the year 2017-18.

2.6.2 Pilot Project on Participatory mode Rehabilitation of Black Pepper Gardens

Cheruthazham panchayath was adopted for three years farmer participatory mode rehabilitation of pepper gardens from 2014-15 to 2016-17 under DASD-MIDH programme. After completing the programme, handholding of pepper farmers of the cheruthazham panchayath was required to reap the full potential of the programme and DASD proposal for extending the project for the next two years was approved in 2017-18.

To recover from the decline in black pepper production due to the soil deterioration, an integrated soil health management, crop health management and need based plant protection measures were followed in farmer participatory mode to improve the productivity of the black pepper plantations under this programme. Pepper samithies were formed in 17 wards of the panchayath and continuous trainings on soil health management, crop nutrition and crop protection were conducted for farmers. Mini nurseries and mother progeny gardens were established to ensure supply of quality planting material and healthy pepper cuttings were distributed in the project area. Demonstration plots were laid out and soil testing, diagnostic field visits and hands on training on biocontrol agent multiplication and application were also conducted as a part of the programme. As a result of this programme, the demo plots have survived drought condition much better than the other areas. Crop health has improved in general and almost 60% of the crop in the area has been rehabilitated. By the continuous awareness training and agro clinics, farmers are now convinced about the importance of soil health

management. The best indication of the success of this programme is the increase in the litre weight noticed from 450 g to 550 g of pepper produced in this area.

2.6.3 Participatory mode rehabilitation of black pepper gardens in Kuttiyatoor panchayath

The Directorate had initiated a black pepper rehabilitation programme in Kuttiatoor panchayath (identified under SAGY in Kannur constituency) for a period of 3 years from 2017-18 to 2019-20. It is one of the important potential pepper growing areas in the district with 1427 pepper farmers having more than 212 ha under pepper cultivation at present. The success of the pepper rehabilitation programme in Cheruthazham panchayath has instigated for proposing a similar programme in Kuttiyattoor panchayath. Similar to the situation in Cheruthazham panchayath, here too poor soil health, improper management practices with changes in climatic factors leading to the incidence of biotic and abiotic stress and predominance of senile and uneconomic vines are the primary reason for decline in pepper productivity. The rehabilitation programme is implemented in association with KVK, Kannur of Kerala Agricultural University.

During 2017-18, Participatory Rural Appraisal (PRA) was coducted involving all stakeholders and first hand information on the basic issues in black pepper production in the area was documented. Pepper samithies were formed for planning, implementation and monitoring of the project in the panchayath and trainings were given to the samithi for capacity building. Twenty-five numbers of farmers plots were identified for demonstration of soil reclamation activities and inputs were distributed to these farmers. Ten decentralised nurseries with a production capacity of 10,000 cuttings/year/nursery following RMP and serpentine method of multiplication and two mothervine progeny garden with RMP method were established in the panchayath.

An increase in area under pepper from 212 ha. to 500 ha is proposed under the programme. The pepper farmers would almost double from the present 1427 nos. to 2500 farmers. The productivity level would rise from the present 525 gm per standard to 1,000 gm dry pepper per standard. The Panchayath will be self-sufficient with its own planting material and would not require introduction from outside. Farmers Field Schools (FFS) at different stages of development of pepper would give the farmers a clear understanding of the critical stage of pepper for different operations.

Improvement in the litre weight of the pepper produce in the area from 500 to 600 gm, is expected in 3 years which is sought after by the exporters. The pepper production from this area would increase from the present level of 100 tonnes to 300 to 400 tonnes. The impact of the technological solutions offered in the production and productivity of black pepper in the area will be documented on completion of the project.

Fig. 72. Participatory mode rehabilitation of black pepper gardens in Kuttiyatoor panchayath

Fig. 73. Pilot Project on Participatory mode Rehabilitation of Black Pepper Gardens

Fig. 74. Hi-tech production system for quality disease free seed rhizomes of Ginger

2.7 Skill Development Schemes

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 2017-18, 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). More than 15 institutes with sufficient infrastructure and facilities were affiliated as per the ASCI norms and a trainers training (ToT) for the nominated trainers was conducted in two batches. First ToT was conducted at Krishi Vistar Sadan, Directorate of Extension, Ministry of Agriculture & Farmers Welfare, Pusa, New Delhi on 21-23 August, 2017 and the Second ToT was held at SAMETI, Thiruvananthapuram, Kerala on 30-31 October and 1st November, 2017. The qualified trainers were given ASCI Trainer Certificate.

The affiliated centres have conducted 200 hrs. skill training successfully on different job roles like Gardener, Vermicompost producer, Essential oil extractor etc. during 2017-18. The beneficiaries identified for these trainings were rural unemployed youth. Out of 349 certified trainees under this programme, 125 trainees were from SC/ST category. Trainees were encouraged to take up their own enterprise related to the skillset achieved and thus attained improved income and livelihood.

Table 24. Details of trainings completed is shown in the table below.

S No.	ASCI affiliated training Centre	Job role	ASCI approved Trainees	No. of Trainer Participated	M	F	SC/ ST	OBC	Gen
1	HMAARI, Sher-e Kashmir Uni. of Agri. Sci. & Tech, J&K	Greenhouse operator	Dr.Deldan Namgial	25	8	17	25	0	0
2.	HMAARI, Sher-e Kashmir Uni. of Agri. Sci. & Tech, J&K	Vermi compost producer	Dr.Jigmet Yangchen	24	6	18	24	0	0
3.	ASPEE College of Hort. & Forestry, NAU, Navsari	Florist	Dr.Dipal Bhatt	25	18	7	9	11	5
4.	Bidhan Chandra Krishi Viswa Vidyalaya, WB	Gardner	Dr.Dipak Kumar Ghosh	25	20	5	11	3	11

5.	Dte. of M &A Plants, Boriyavi, Anand, Gujarat	Gardner	Dr.P.I. Saran	25	21	4	1	7	17
6	Dte. of M &A Plants, Boriyavi, Anand, Gujarat	Gardner	Dr. P.I. Saran	25	21	4	0	1	24
7.	Uttar Benga Krishi Viswa Vidyalaya, WB	Vermi-compost producer	Dr. Ranjit Chatterjee	25	21	4	6	4	15
8.	ICAR-Indian Institute of Spices Research, Calicut	Gardner	Dr. Rajeev	25	7	18	4	18	3
9.	ICAR-Indian Institute of Spices Research, Calicut	Vermi-compost producer	Dr. Rajeev	25	7	18	1	18	6
10.	HRS, Thadiyan-kudisci, Tamil Nadu Agri.University	Gardner	Dr. Muthu-rmalingam	25	17	8	5	20	0
11.	Dr.Punjabrao Deshmuk Krishi Viswa Vidyalaya, Akola	Gardner	Dr. Vijay Kale	25	19	6	10	11	4
12.	Indira Gandhi Krishi Viswa Vidyalaya, Chittisgarh	Vermi compost producer	Dr.Arun Tripathi	25	3	22	7	18	0
13.	Horticulture Research Station, Ooty, Tamil Nadu Agri. University	Gardner	Dr. Karthi-keyan	25	22	3	21	3	1
14.	College of Agri., Central Agri. Uni., Pasighat	Gardner	Dr. Bhanu Mishra	25	10	15	1	4	20
				349	**200**	**149**	**125**	**118**	**106**

Fig. 75. Skill trainees trained on 'Florist' from Navsari agricultural University

Fig. 76. Skill development training on Gardener held at Dr. PDKV, Akola

Fig. 77. Training on Vermi compost producer for skill trainees at IGKV, Raipur

Fig. 78. Participants at Skill development training on Gardner held at IISR, Kozhikode

Fig. 79. Participants at Skill development training on vermicompost producer held at IISR, Kozhikode

Fig. 80. Trainees attending skill training on Gardener at BCKV, West Bengal

Fig. 81. Skill development training on Essential oil extractor held at DMAPR, Anand

Fig. 82. Trainees at skill development training on Gardener at DMAPR, Anand

Fig. 83. Field training given for trainees at skill training held at CAU, Pasighat on Vermicompost producer

Fig. 84. Field Training on Vermicompost producer for trainees at HMAARI, Leh, SKUAST

Fig. 85. Skill Training on greenhouse operator for trainees HMAARI, Leh, SKUAST

Fig. 86. Participants for skill training on Vermicompost producer held at HMAARI, Leh

Fig. 87. Skill training beneficiaries for Vermicompost producer held at UBKV, Pundibari

Fig. 88. Inauguration of Skill training on Gardener at HRS, Thadiyankudisai

Fig. 89. Release of Skill training manual on Gardener at HRS, Ooty

2.8 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.

2.8.1 National Seminar/Symposium

The National Symposium on Spices and Aromatic Crops (SYMSAC IX) was jointly organized by Indian Society for Spices, Kozhikode and School of Agricultural Sciences & Rural Development, Nagaland University, Medziphema with the theme "Spices for doubling farmer's income" was held during 15-17 March, 2018 at School of Agricultural Sciences & Rural Development, Nagaland University, Medziphema Campus, Nagaland under DASD-MIDH programme.

The symposium was inaugurated by Shri. Padmanaba Balakrishna Achariya, Hon'ble Governor of Nagaland. Prof. Pardeshi Lal, Vice-Chancellor, Nagaland University was the Guest of Honour. During the symposium, Dr. S.P. Ghosh, Former DDG (Hort.), ICAR, New Delhi, Prof. T. Lanusosang, Pro-Vice Chancellor, NU, SASRD, Medziphema, Dr. V.A. Parthasarathy, Former Director, ICAR-IISR, Kozhikode, Dr. K. Nirmal Babu, Director and Project Coordinator (Spices), ICAR-IISR, Kozhikode, Dr. M. Anandaraj, Former Director, ICAR-IISR, Kozhikode and Prof. V.B. Singh, President, HSNEI, Medziphema, Nagaland were felicitated. During the symposium, the Souvenir, a book on Sustainable Horticulture and folders on cultivation practices of spices published by the Department of Horticulture and SASRD, Nagaland University were released.

During the Symposium various awards, *viz.*, ISS Honorary Fellow, Sugandhasree Innovative Farmer, ISS Fellow, Dr. V. S. Korikanthimath and Smt. Vijaya Korikanthimath Awards for best Ph.D. and M.Sc. theses respectively, Dr. J. S. Pruthi (for best research publication), H.S. Mehta Memorial (best research papers - oral and poster) and Alapatti Prasada Rao (best research paper - poster) were presented.

The symposium had six technical sessions on various themes like, Status of spice industry in India with special reference to North East Region (NER); Crop improvement and biotechnology; Nutrient, soil, water and plant health management; Climate resilience in spice crops production; Technology - led organic production of spices and safe foods and post-harvest management, value addition and marketing of spices besides the plenary, separate session on developing road map for spice industry in NER region, farmer's interactive sessions, business meet (B2B) and exhibitions during which the farmers representing different North Eastern states and other parts of India, entrepreneurs as well as industrial personnel participated.

The symposium witnessed the convergence of 86 officials representing various organizations, 65 students, more than 130 farmers and 75 Buyers/Growers/Exhibitors besides scientists representing ICAR and different State Agricultural Universities.

Highlights of National Seminar held at SASRD, Nagaland

Fig. 90. Inauguration

Fig. 91. Inaugural address

Fig. 92. Exhibition inauguration

Fig. 93. Exhibition

Fig. 94. Farmer scientist interaction

Fig. 95. Business meet

Fig. 96. Valedictory function

2.8.2 State Level Seminar

2.8.2.1 State Level Seminar at Anand Agricultural University, Gujarat - A state level seminar was organized by Main Vegetable Research Station (MVRS), Anand Agricultural University, Anand on 7 - 8 February, 2018 under the scheme of Centrally Sponsored Scheme on 'Mission for Integrated Development of Horticulture (CSS-MIDH)'. This two day state level seminar was conducted with the topic 'Shakbhaji Masala Pakoma Nutan Abhigam" and 140 farmers participated from different districts of Gujarat. During the inaugural session, Director of Research & Dean P. G. Studies, Dr. K. B. Kathiria addressed the farmers in relation to the importance of spices vegetable cultivation at present scenario. He also briefed to the audience about the doubling income and cultivation of spices vegetable crops has the great scope for income generation.

Dr. R.R. Acharya, Research Scientist & Head, MVRS, AAU, Anand conveyed the objectives of the seminar and highlighted the importance of spice vegetable crops in human diet. Dr. H.L. Dhaduk, Associate Research Scientist & Head, Medicinal & Aromatic Plants Research Station, AAU, Anand has drawn special attention to the farmers during inauguration session regarding the importance of medicinal and aromatic plants and its conservation modules, present needy requirement in the pharmaceutical industries and status of its cultivation practices. The inauguration session was completed with the distribution of seminar souvenir, kits and seeds of released varieties of different spice vegetable crops by Director of Research & Dean P. G. Studies, Dr. K. B. Kathiria. After the inauguration session, there were 16 different topics discussed during the two days seminar by the scientists of various faculties.

Dr. A.S. Jethava from Junagadh Agricultural University discussed about the new technical practices useful in cultivation of onion and also informed about the adaptive advantages associated with acceptance of these modernized approaches in onion cultivation. Later in the second session, Dr. Pankaj Bhalerao from Navsari Agricultural University delivered an informative lecture on the topic of modern techniques in turmeric cultivation, drawing attention towards new practices involved in cultivation of turmeric and its processing now-a-days as useful alternative of traditional farming practices. Dr. H. B. Patel, Sardar Krushinagar Agricultural University, Jagudan conveyed to the farmers about the scientific methods and approaches useful in the cultivation of fenugreek and coriander, with emphasis on the improved cultivation practices of these vegetable spice crops alongwith its growing requirement and market demand.

Dr. Ravi Kalsariya informed the farmers about the growing problem of increasing amount of insecticidal residues due to indiscriminate use of insecticides and also gave the remedial measures to solve this problem with efficient and need based application of insecticides. Surbhi Chauhan took the farmers on a visit to the Main Vegetable Research Station providing them with handy knowledge and scientific information about research work and varieties of the station and held an interactive session solving their queries.

On the second day, Dr. J.J. Dhruve, shared some excellent information discussing about the nutritional value of vegetable spice crops and benefits derived from it by incorporation in daily diet. Dr. Jalpa Lodaya, Assistant Research Scientist, MVRS, AAU, Anand discussed about the plant

protection measures that should be used for successful management of pests in vegetable spices and also solved many queries of farmers regarding management of insects and diseases having an important status in these crops. Prof. L. N. Baraiya, Research Scientist, MVRS, AAU, Anand informed the farmers about the efficient management of fertilizers and irrigation scheduling for better stability of yield of vegetable spices over years. Dr. V.I. Joshi, Assistant Research Scientist, MVRS, AAU, Anand shared information for successful nursery management of vegetable spice crops.

Later in the 4th session of the seminar, Dr. D.P. Gohil, delivered a lecture upon the cultivation practices in ginger. He also informed about modern and novel scientific methods that should be utilized in ginger cultivation. Dr. N. A. Patel, Assistant Research Scientist, MVRS, AAU, Anand discussed about the cultivation practices in garlic crop and emphasized upon the use of novel approaches for better quality yield in garlic cultivation. At the end, Dr. R.R. Acharya, Research Scientist & Head, MVRS, AAU, Anand headed the visit to the Seed Production Research Farm for Vegetable Spices and informed about the modern and continuous evolving scientific approaches for vegetable spice cultivation and also solved queries of the farmers in an interactive session. The seminar was concluded with the distribution of certificates and vote of thanks by Dr. V.I. Joshi to scientists, staff and farmers for their valuable participation.

2.8.2.2 State Level Seminar at Kerala Agricultural University, Kerala

The state level seminar on 'Spices for urban horticulture' was organized with the objective of ensuring availability of safe-to-eat food for people living in urban and peri-urban areas. The aim of the seminar was to provide technical knowledge for producing quality spices as per their requirement to farmers for whom limited availability of space for cultivation is a concern.

The inauguration of the seminar was carried out on 6th January, 2018 at 2:00 pm in the premises of Model Nursery on Spices, Kerala Agricultural University, Thrissur. The programme started with the invocation song of Kerala Agricultural University. The programme was presided by Adv. K. Rajan, M.L.A.. Dr. P. Indira Devi, Director of Research, KAU delivered the welcome speech. The seminar was inaugurated by Sri. C. N. Jayadevan, M.P., Thrissur. Thereafter, saplings of curry leaf, ginger and black pepper were planted by Sri. C.N. Jayadevan, Adv. K. Rajan and Dr. Homey Cherian respectively.

As part of the seminar, a compilation titled *'Sugandhavilakal nagarodyanangalilekku'* was released which consisted of the topics covered by various experts during the two days. Three brochures, titled *'Mathrukasugandhavila nursery', 'Kurumulak- muttathum mattupaavilum'* and *'Inchithai'* were also published. The publications were distributed to the participants along with the seminar kit. The kit comprised of planting materials of ginger, turmeric, black turmeric, wild turmeric and mango ginger.

The participants were awarded with certificates. The resource persons who handled various classes were awarded with spice kit as a memento. The farmers expressed satisfaction over the classes taken and practical experience gained during the seminar. The participants were able to get hands-on-experience of various skills in growing sufficient quantity of safe-to-eat spices within the limited space available in cities.

Table 25. Resource persons and classes handled

S. No.	Topic	Resource persons
1	Organic biofertilizers	Dr. K. E. Usha, Professor, Central Nursery, KAU, Vellanikkara
2	Safe-to-eat spices	Dr. Thomas Biju Mathew, Associate Director (Plant protection), KAU and Head, Pesticide Residue Research and Analytical Laboratory, Vellayani
3	Chilli and coriander cultivation around home and in terrace	Dr. K. Krishnakumary, Professor, Department of Plantation crops and Spices, College of Horticulture, Vellanikkara
4	Ginger and turmeric cultivation in homestead	Dr. Jalaja S. Menon, Assistant Professor, Department of plantation crops and Spices, College of Horticulture, Vellanikkara
5	Growing black pepper -around home and in terrace	Dr N. Mini Raj, Professor, Department of Plantation crops and Spices, College of Horticulture, Vellanikkara
6	Safer pest control measures	Dr.Berin Pathrose, Assistant Professor, Department of Agricultural Entomology, College of Horticulture, Vellanikkara
7	Management of organic wastes	Dr. D. Girija, Professor and Head, Department of Agricultural Microbiology, College of Horticulture, Vellanikkara
8	Safer plant protection measures	Dr.Resmi Vijayaraghavan, Assistant Professor, Department of Plant Pathology, College of Horticulture, Vellanikkara

Recommendations:

Seminars and training programmes on the technologies suitable for spice production in the city areas should be conducted in urban and peri-urban areas of the state.

Fig. 97. State level seminar on Urban Horticulture organised at Kerala Agri. University, Thrissur

Fig. 98. State Level Seminar on spices held at Anand Agri. University, Gujarat

Fig. 99. Participants at State level seminar held at Anand Agri. University, Gujarat

Fig. 100. Participants at state level seminar held at RAU, Bihar

Fig. 101. Inauguration of State level seminar on spices at CIARI, Portblair

Fig. 102. State level seminar on temperate spices held at SKUAST, J&K

Fig. 103. Book release at state level seminar held at SKUAST, J&K

Fig. 104. State level seminar on spices and aromatic crops held at Dr. PDKV, Akola

2.8.3 District Level Seminar

1. Doubling the farmer income through arecanut cropping system organized by Central Plantation Crops Research Institute, Kasargod, Kerala, 19th and 20th February, 2018 at ICAR - CPCRI RC Kahikuchi, Assam

A two day district level seminar on 'Doubling the farmer income through arecanut cropping system', was organized by Central Plantation Crops Research Institute, Kasargod, Kerala, 19th and 20th February, 2018 at ICAR - CPCRI RC Kahikuchi, Assam. More than 500 farmers participated in the programme. Dr. Alpana Das, Scientist in charge, ICAR CPCRI RC Kahikuchi, delivered the welcome address. The meeting was inaugurated by Dr. Homey Cheriyan, Director, Directorate of Arecanut and Spices Development, Calicut, Kerala. Dr. P. Chowdappa, Director, ICAR-CPCRI, Kasaragod delivered the introductory remarks. Dr. Femina, Deputy Director, DASD, Kozhikode, Kerala delivered a lecture on "Planting material production in spices". Dr. Alpana Das emphasized on increasing farmers income through arecanut based cropping system, which will not only help in doubling the income but also can be more than double, if proper scientific methods and techniques used. Scientists from NRC on Pig, Dr. K. Barman, Pr. Scientist, Dr. S.Pegu, Scientist, Dr. B. N. Bhattacharya, Head, CIFRI Regional Station, Guwahati, Dr. J.C Nath, Dr. N.Majumdar, Dr. A.A. Ahmed and Dr. S.Pathak, Principal Scientists from Horticulture Research Station, Assam Agricultural University, Dr. L.Obed, Director, Coconut Development Board, Director, NRRI regional station (RRLRRS), Gerua, Dr. S. Kalita, SMS, KVK Kamrup Guwahati, Dr. H. Choudhury and Dr. H. Kalita, SMS, KVK, Goalpara and ATARI, Guwahati participated during the programme. The programme ended with a vote of thanks from Dr. C. Thamban, Principal Scientist, ICAR-CPCRI, Kasaragod, Kerala.

An exhibition was also organized on this occasion where apart from CPCRI, ICAR-NRC on Pig, CIFRI, Regional Station, Guwahati, NRRI, Regional station, Gerua, Spices Board, Coconut Development Board, Assam Agricultural University, KVK, Kamrup, Assam participated.

2. District level seminar with special focus on Turmeric, 19 & 20 January, 2018, ICAR -IISR

A district level seminar on 'Scientific interventions in the conservation and improvement of spices, provisions under PPV&FR Act 2001 & experiences in the registration of farmers' varieties in spices was organised by IISR, Calicut on 19 & 20 January, 2018.

Community efforts in the conservation of spice biodiversity, Turmeric varietal wealth for value addition,Turmeric processing and value addition, Scope and demand of organic turmeric and value addition were the topic dealt in the two day seminar. Participation of Scientists from ICAR-IISR, Kozhikode and All India Coordinated Research Programme on Spices (AICRPS) along with more than 200 turmeric farmers from Kozhikode and nearby districts gave an opportunity for meaningful exchange of ideas and deliberations during the course of the seminar.

3. Scope and opportunities for cultivation as a cash crop in Himachal Pradesh, Sandhasu Chirgaon block, district Shimla, Himachal Pradesh organized by Dr. Y S Parmer University of Horticulture and Forestry, Solan, HP

The District level seminar was organised at Sandhasu, Chirgaon Tehsil (a backward block of the state), district Shimla, Himachal Pradesh. The area is predominantly under Apple cultivation and there is a scope for spice crops cultivation as an inter crop in the orchards. The seminar has been attended

by 184 farmers of the region. The seminar was conducted in two sessions. In the morning session, the participants were given latest technology for growing and plant protection of different spice crops including their scope and opportunities for cultivation as a cash crop in Himachal Pradesh by different specialists. In the afternoon, a Scientists-farmers interaction meet was organised wherein the on-spot solutions to the different queries and questions raised by the farmers were provided and few tips were given on spice growing.

Fig. 105. District level seminar and turmeric fest held at IISR, Kozhikode

Fig. 106. District Level Seminar at Chirgaon Block, Distt. Shimla, H.P.

2.8.4 Farmers Training Programme

Table 26.

S. No.	Institute	Training topic	Date & Venue	Training details
1	Central Plantation Crop Research Institute, Kasaragod	Management of root grub using entomopathogenic nematodes and multispecies cropping system in arecanut	22nd June, 2017 at Bare village, Uduma Panchyath, Kasaragod	About 150 stakeholders covering farmers, development officials, elected members, private input supplier agency, college stdents etc. had participated in the training.
		Crop health management in arecanut specific to root grub management using EPN	31st July, 2017 at Perla village, Enmakaje Panchayath, Kasaragod	Scientists from CPCRI presented topics viz., Varieties in arecanut, crop production in arecanut, arecanut based cropping system, integrated pest & disease management, post harvest processing and marketing. 120 participants including arecanut farmers and entrepreneurs, extension officials of state departments, students and local print media participated in the training. An exhibition of CPCRI technologies on agronomic practices, nursery management, pest and disease management and harvesting were displayed for giving first hand information to the farmers and field demonstration of IPM and IDM were also conducted as part of training programme. Interactive session was organized between the farmers and scientists.
		Management of root grub using entomopathogenic nematodes and multispecies cropping system in arecanut	27th January, 2018 at Renjala village, Sullia	Scientists from CPCRI had presented topics viz., Varieties in arecanut, crop production in arecanut, arecanut based cropping system, integrated pest & disease management, post-harvest processing and marketing.
		Multispecies cropping system and management of root grub using EPN in Arecanut	6th January, 2018 at ICAR-CPCRI, Kasaragod	Scientists from CPCRI had presented topics viz., Varieties in arecanut, crop production in arecanut, arecanut based cropping system, integrated pest & disease management, post harvest processing and marketing. An exhibition was arranged showcasing various technologies and products of plantation crops for the benefit of stake holders.

		Root grub management using entomopathogenic nematodes and multispecies cropping system in arecanut	17th February, 2018 at Sankesha village, Sullia	About 100 stakeholders covering farmers, development officials from Horticultural Department Karnataka and elected local panchyath members took part in the training. Scientists from CPCRI had presented topics viz., Varieties in arecanut, crop production in arecanut, arecanut based cropping system, integrated pest & disease management, post harvest processing and marketing.
2	Indian Institute of Spices Research, Calicut, Kerala	Good Agriculture Practices in Spices	August 17, 2017 Kattippara Gram Panchayat, Kozhikode	Bio intensive management of nursery and Quality planting material production, Soil test based nutrient management, Use of bio control agents and PGPR, Use of safe pesticides, Integarted disease and pest management, inputs for organic farming. On farm value addition, clean storage and processing were dealt in the training. 100 farmers participated.
		Ginger cultivation and value addition	12th February, 2018 Krishi Vigyan Kendra, ICAR-Indian Institute of Spices Research, Peruvannamuzhi, Kozhikode	Over 200 farmers participated in the training. Scientific cultivation and value addition of ginger were the topics dealt in the training. Exhibition with seventeen stalls showcased improved agricultural technologies including ginger value added products.
		Recent advance in production and processing of major spices (Black pepper, Cardamom & Ginger)	27th Feb, 2018 Indian Institute of Spices Research, Regional Station, Appangala.	Training programme emphasized on recent advances in production and processing of black pepper, cardamom and ginger. During the training lectures were given on varietal wealth, quality planting material production, agronomy and physiological interventions, pest and disease management and post harvest processing of spices by various scientists of ICAR-IISR. Progressive planters from various agro-climatic regions shared their experiences in black pepper cultivation. An exhibition was also arranged for the benefit of farmers; more than 120 farmers from different regions of Karnataka attended the training programme.

3	Sardar Krushinagar Dantiwada Agri. University, Gujarat	Training on seed spices	5th Jan, 2018 Moral Dungari 9th Jan, 2018 Kashipura Kampa 6th March, 2018 Navapura 12th March, 2018 Asjol 21st March, 2018 Rangpurda 30th Dec, 2018 Sanval 12th March, 2018 Dhanakwada	A total of 935 farmers/ participants including 253 woman farmers from different talukas of Mehsana, Banaskantha and Sabarkantha districts of Gujarat, Officers from line departments, NGOs, other organizations and Scientists from SDAU attended and participated. The printed material in form of leaflets along with pen, pad and portfolio were distributed to all the participants during trainings.
4	Sardar Vallabhai Patel University of Agri. & Tech, Meerut, U.P	Production technology of spice crops	26th Feb, 2018, KVK Chholas, Gautam Budh Nagar 12th March, 2018, Krishi Vigyan Kendra, Saharanpur of Uttar Pradesh	During the training session, the emphasis was given to adopt the recent technology for spice crop production under western UP condition. It was also discussed that the recent production technology in different spice crops helps to produce quality spices for domestic and international markets. Total 160 farmers were participated in these district level farmers training on production technology of spice crops.
5	Dr. Y S Parmer University of Horticulture and Forestry, Solan, HP	Scope of spice cultivation as intercrop in apple orchards	Gram Panchayat Biong Tatwa Tehsil Sangrah, District Sirmour, H.P. on 23.2.2018. Gram PanchayatJarwa-Juneli Tehsil Shillai, District Sirmour H.P. on 24.2.2018. Gram Panchayat Dharampur in Village Sihardi District Solan, H.P. on 28.2.2018. Village Naya Gaon, Gram Panchayat Tikkari-Kuthar, Dist., Sirmour on 25.4.2018	About 350 farmers participated in the training conducted at different locations. Scope of spice cultivation in the state was explained in detail.

6	Central Agri. University, Pasighat, Arunachal Pradesh	Production Technology of Turmeric & Ginger	17 & 18 Oct, 2017 Komkar Village, in collaboration with KVK, Geku, Upper Siang District 30 & 31 Jan, 2018 Roing Village in association with KVK, Lower Dibang Valley.	Technical session covered various need based aspects of ginger and turmeric cultivation in the region followed by the field visit to the instructional farm and farmer's field.
7.	Punjab Agri. University, Ludhiana, Punjab	Cultivation of Aromatic and spice crops KVK, Ropar	16th Feb,2018 KVK, Moga 19th Feb, 2018 KVK, Moga	Lectures related to importance, scope, uses, cultivation practices, processing and marketing of aromatic and spice crops were delivered. An exhibition, comprising live samples of various aromatic and spice crops, essential oil and processed products was also arranged at both the locations to make the training programme more informative by familiarizing the farmers with these crops.
8.	Anand Agri. University, Gujarat	Aromatic and Spices crops production Aromatic and Spices Crop awareness	19th Jan, 2018 Agriculture Research Station, Sansoli, AAU, Anand 5th Feb, 2018 KVK, AAU, Arnej	75 farmers were participated from the Kheda districts of Gujarat. The production practices of important vegetable spice crops, disease management practices in various Aromatic and Spices plants, cropping practices of aromatic crops and importance of medicinal and aromatic crops were the topics dealt in the training.
9	Agriculture University, Jodhpur, Rajasthan	Production technology and constrains in seed spices	17th Feb, 2018 ARS, Mandor (Jodhpur) 19th Feb, 2018, ARS, Mandor (Jodhpur) 25th Feb, 2018, Kadam, Kadamni Bhuryasni, (Merta city) Nagpur. 13th March, 2018, Dundhadia (Osian)	More than 375 farmers participated in the training held at different locations.
10	Agriculture University, Kota, Rajasthan	Production, crop protection and improvement in seed spices	28th Feb, 2018 AU, Kota	More than 100 farmers participated in the training.

11	SKN Agriculture University, Jobner, Rajasthan	Production technologies of seed spices crops Production and value addition in seed spices Production technologies of seed spices crops	8th Feb, 2018, KVK, Fatehpur Shekhawati Sikar 15th Feb, 2018, KVK, Khumer, Bharatpur 14th March, 2018, KVK, Kotputali	Over 300 farmers participated in the training held at different locations
12	Junagadh Agriculture University, Junagadh, Gujarat	Technology, Value addition and Marketing of seed spices crops	29th Dec, 2017, KVK, J.A.U., Nana Kandhasar, Surendranagar	More than 100 progressive farmers attended the training. Different aspects on production,crop management, pest and disease control, seed production and value addition in spices crops were dealt in the training.
13	National Research Centre for Seed Spices, Ajmer	Improved production technology of seed spices	25th Nov, 2018, Piprali, Sikar	Advances in production technology of spices were dealt in the training.
14	University of Horticulture, Bagalkot	Improved cultivation practices on Ginger and value addition on Ginger Improved cultivation practices on Turmeric and value addition on Turmeric Improved cultivation practices on Chilli and value addition on Chilli Improved cultivation practices on Chilli and value addition on Chilli	12th Sept, 2017 College of Horticulture Bidar 8th Aug, 2017 College of Horticulture, Mysore 10th Feb, 2017 Kundagol village 16th March, 2018 Hiregunjal Village	Detailed sessions on improved production technology of spices were dealt in the training.
15	Orissa University of Agriculture and Technology, Bhubaneshwar, Orissa	Organic turmeric cultivation	15th March, 2018 Boria, Kesinga, Kalahandi	Over 75 farmers took part in the programme. Resource persons from the State Agri. Department delivered lectures on organic nutrient management, organic source of pest and disease management, post-harvest management and value addition in turmeric. Details about government schemes, subsidy etc. were also informed to the farmers.

		Organic turmeric cultivation	17th March, 2018 Dahal, Narla, Kalahandi	Over 75 farmers took part in the programme. Resource persons from the State Agricultural Department delivered lectures on organic nutrient management, organic source of pest and disease management, post-harvest management and value addition in turmeric. Details about government schemes, subsidy etc. were also informed to the farmers.
		Organic ginger and turmeric cultivation	19th Jan, 2018 HARS, Pottangi	Over 75 farmers took part in the programme. Resource persons from the State Agricultural Department delivered lectures on (1) organic pakages for Ginger and turmeric farmers (2) organic means of insect control and disease management (3) value addition in ginger and turmeric etc. Resource persons from OUAT imparted training to the farmers in organic cultivation of Ginger and Turmeric.
16	Dr. Punjabrao Deshmukh Krishi Vishwavidyalaya, Akola, Maharashtra	Advance in production technology of chilli and seed spices	9th Feb, 2018 Amboda, Yavatmal district	The Chilli and Vegetable Research Unit of the University conducted the Training programme. Dr. S.M. Ghawade, Dr. V.U. Sonalkar and Dr. A.P. Mankar of the Univesity delivered lectures on various matters on the subject. A visit was carried out to the field of a progressive farmer Shri M.L. Raut. Seed material of chilli and seed spices were distributed to the farmers.
17	University of Agriculture Sciences, Bangalore	Spices and Aromatic crops	22nd March, 2018 at the University campus	The topics covered by the resource persons of the University were 1. Cultivation practices of Nutmeg, Cinnamon, Turmeric and Ginger, 2.Cultivation practices of Aromatic plants. 3. Agronomic practices of important spices and aromatic crops 4. pest and disease management in spices and aromatic crops. Over 75 farmers took part in the training programme.

18	Birsa Agricultural University, Ranchi, Jharkhand	Cultivation practices of Ginger, Turmeric and Seed Spices	23rd March, 2018 at Ekabma, 28th March, 2018 at Nagri, 29th March, 2018 at Purio, Bero	The topics for which the trainings held were 1. Scope and importance of spice crops in Jharkhand, 2. Cultivation of Ajwain 3. Commercial cultivation of gingerand turmeric, 4. Scientific cultivation of coriander and fenugreek and 5. Cultivation and post-harvest technology of fennel. Over 75 farmers fook part in the programmes.
19	Kerala Agriculture University, Thrissur	Good Agricultural Practices in Ginger	6th Feb, 2018 at Erimayur Panchayat	Over 102 farmers took part in the training programme. The topics covered by the resource persons were 1. Soil management to maximize productivity in ginger, 2.Disease management in black pepper, 3.Integrated pest and disease management in ginger.
		Black Pepper cultivation	6th March, 2018 Seminar Hall, PRS, Panniyur	Over 55 farmers took part in the training programme. The topics covered by the resource persons were 1. Black pepper varieties and nursery management, 2. Plant protection in nursery.
		Black Pepper varieties management and plant protection	7th March, 2018 Seminar Hall, PRS, Panniyur	Over 43 farmers took part in the training programme. The topics covered by the resource persons were 1. Black pepper varieties and nursery management and cultivation practices, 2. Plant protection in black pepper.
		Black Pepper Cultivation	14th March, 2018 Seminar Hall, PRS, Panniyur	Over 148 farmers took part in the training programme. The topics covered by the resource persons were 1. Black pepper cultivation, 2. Disease management in black pepper.

		Aromatic and Medicinal plants in day to day life	3rd Feb, 2018, AMPRS, Odakkali	Over 133 farmers took part in the training programme. The topics covered by the resource persons were 1. Importance of Aromatic plants, plants of culinary use, 2. Aromatic tree species, product extraction, processing 3. Rules and procedures for starting a processing unit 4. Home remedy uses of aromatic and medicinal plants, home scale preparation of medicines 5. Important aromatic plants and their cultivation 6. Processing and product making, oil extraction of aromatic plants,familiarization of equipments.
		Advanced technologies for production of Spices	21st March, 2018 Training Hall, ARS, Anakkayam	Over 78 farmers were participated in the training. Advanced crop production technologies for Pepper, spices Ginger and Turmeric, Micro irrigation in major spice crops, Pest and Disease management in spice crops and also Explanatory Quiz programme on spices were conducted in the training.
		Organic cultivation of spices	9th March, 2018 PPNMU	Over 77 farmers took part in the training programme. The topics covered by the resource persons of the University were 1. Organic cultivation of spices 2. Spice crops of Kerala 3. Pest and disease management in spices - Organic way.
		Production technology and propagation techniques of Spices Cultivation of black pepper	18 & 19 Jan, 2018, State Seed Farm, Kozha	Over 50 farmers were participated in the training. Production techniques of Ginger and Turmeric, Prospects of Nutmeg & Pepper cultivation in Kerala, Propagation techniques in nutmeg and garcinia and also Integrated pest and disease management in spice crops were dealt in the training.
20	Kerala Agriculture University, Thrissur	Cultivation of black pepper	27th March, 2018, College of Agriculture, Vellayani	Over 133 farmers took part in the programme. The topics covered by the resource persons of the University were 1. Varieties, planting material production & cultivation of black pepper 2. Pest and disease management in black pepper 3. Processing & value addition in black pepper.

Fig. 107. Assam Agriculture University, Assam

Fig. 108. Agriculture University, Jodhpur

Fig. 109. Agriculture University, Kota

Fig. 110. Dr. BSKKVP, Dapoli

Fig. 111. College of Horti. & Forestry, Pasighat

Fig. 112. CPCRI, Kasargod

Fig. 113. CPCRI, Kahikuchi

Fig. 114. CS Azad Agri. University, Kanpur

Fig. 115. CCS Haryana Agri. University, Hisar

Fig. 116. IISR, Appangala

Fig. 117. IISR, Kozhikode

Fig. 118. VNMNV, Parbhani

Fig. 119. Navsari Agri University

Fig. 120. OUAT, Bhubaneshwar

Fig. 121. Punjab Agri University

Fig. 122. Dr. PDKV, Akola

Fig. 123. SDAU, Jagudan

Fig. 124. SKNAU, Jobner

Fig. 125. SKUAST, Kashmir

Fig. 126. SVBPUAT, Meerut

Fig. 127. TNAU, Coimbatore

Fig. 128. UAS, Bangalore

Fig. 129. UAS, Dharwad

Fig. 130. Dr. YSPHU, Solan

2.9 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.

2.9.1 Review Meeting of MIDH programmes being implemented by DASD

The Eleventh Annual Review meeting of the MIDH programmes implemented through the Directorate of Arecanut and Spices Development, was held on 12th & 13th May, 2017 at the CCSHAU, Hisar. There were 65 participants representing 40 agencies implementing DASD programmes.

The inaugural session began at 10.00 AM after registration of the Delegates. The welcome address was delivered by Dr. S. K. Sethi, Director of Research, CCSHAU, Hisar. Dr. Homey Cheriyan, Director DASD conveyed the objectives of the Review Meeting in his Introductory address. He briefed the audience about the changes in perception to be brought in the implementation of MIDH programmes and briefly explained the new programmes proposed by the Directorate like outcome based Skill training programmes, nursery accreditation programme etc. Dr. M. Tamil Selvan, Additional Commissioner (Hort), Govt. of India and former Director of DASD was the Guest of Honour in the inaugural function. He is due to superannuate on 31st May, 2017 and he was felicitated by the Chief guest Dr. S.K. Malhotra, Agri. Commissioner, Govt. of India for his active service and contributions to the spice sector. Following the felicitation, Dr. S. K Malhotra inaugurated the review meeting and launched the DASD website 'www.spicenurseries.in'. In his inaugural address, he stressed on the importance of developing seed certification standards for more crops like kalonji, celery etc. He also stated that it is a positive sign that due to several policy initiatives by the Ministry, country's food grain, pulses and oilseed production has reported higher estimates in 2016-17.

After a break for tea, the technical sessions began at 11.30 AM. The Review Team consisted of Dr. S. K. Malhotra, Agri. Commissioner, Dr. Homey Cheriyan, Director, DASD, Dr. Femina, Deputy Director, DASD and Shri. Babulal Meena, Asst. Director, DASD. The review team critically evaluated the performance of each University and appreciations and suggestions for further improvement were given to them.

Director, DASD in his closing address mentioned the following points:

(a) In order to ensure quality planting material, all the spice nurseries under Govt./private agencies have to get accredited under the Accreditation programme of DASD. Therefore, the applications for recognizing nurseries may be sent to the Directorate immediately.

(b) It was noticed that the implementing agencies are not submitting the AUCs. AUCs are mandatory and should be submitted in time.

(c) The revalidated funds of the previous year are to be utilized first and on the approved components only. Only then the current years funds are to be utilized.

(d) For all project based programmes such as Seed infrastructure and Nursery Centre, a completion report is to be sent to DASD.

(e) It will be the responsibility of the PI to collect the reports from different implementing centres and submit the consolidated report to DASD. The PI should ensure prompt correspondence with the Directorate.

(f) The implementing agencies who agreed to take up skill development training programmes in 2017-18 should confirm their programmes and share details of trainers at the earliest.

(g) All the implementing agencies will be provided with user name and password for uploading stock of planting material in the DASD website 'www.spicenurseries.in'. Availability of planting material of spices under scheme/non scheme at each centre must be uploaded in the site without fail.

(h) All the successfully implemented programmes like FLDs, micro irrigation and innovative projects need to be documented and the reports should be sent to the Directorate for publishing in the journal of the Directorate.

Dr. S.K. Malhotra, Agri. & Horti. Commissioner in his concluding remarks, appreciated the good work done by most of the Universities and hoped others would also rise to the expected levels and stated that continuation of MIDH scheme in the Universities can be justified only if sufficient level of breeder seed production of released HYVs is made at SAUs. Therefore, Universities must focus more to produce nuclear seeds and planting material of released / notified varieties of spices for further multiplication and distribution. To ensure supply of good quality of planting material, it has been made mandatory for all productivity enhancement programmes implemented by the Ministry that, the planting materials should be procured from certified nurseries, so more nurseries under public/private sector need to be accredited. He advised all agencies to send applications for the accreditation to DASD immediately. The Principal Investigators were also advised to prepare calendar of operations for all the activities under the scheme so as to ensure timely implementation of the programmes. The Commissioner emphasized that scheme funds need to be utilized judicially and periodic progress reports UCs/AUCs need to be submitted in time which ensures timely release of money. The implementing agencies were informed that updating the status of planting materials available at the SAUs at DASD website will facilitate farmers across the country to directly approach the centre.

The Commissioner also opined that as the pepper rejuvenation programme implemented by KAU in Kerala has been successful and reported improved productivity, a mini mission for pepper rejuvenation in the same model can be planned as a special programme for better production and productivity in other areas. To chalk out the modalities of the programme, he advised Director, DASD to hold a meeting of all concerned, preferably in Calicut. He directed the implementing agencies to prepare an impact analysis report on Ten years of NHM which covers the planting material production programme, area coverage etc. achieved under the scheme. He wished the participants all success.

Dr. Femina, Deputy Director, DASD delivered the formal Vote of Thanks. She thanked Agri. & Horti. Commissioner, Addl Commissioner, Deputy Commissioner, the VC and the DR of CCSHAU University officials, all participants of the Review Meeting and each and every one who contributed to make the function a grand success.

Fig. 131. Dr. S.K. Malhotra, Hort. Commissioner inaugurating the review meeting

Fig. 132. Inaugural address by Horticulture Commissioner

Fig. 133. Presentation by delegate

3 STATISTICS

Collection and compilation of reliable data are essential to assess the demand and supply of spices and arecanut and to address the problems and constraints in this sector. Realizing this, the Directorate was assigned with collection and compilation of statistics of area, production, export, import and prices etc. of various spices and arecanut and dissemination of the same as one of its mandates since its inception. In 2008, the Directorate of Arecanut and Spices Development has been authorized as the nodal agency for the collection and compilation of area and production of spices and arecanut.

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 estimates for 2016-17, there was a production of 86.43 lakh tonnes of spices from an estimated area of 40.37 lakh ha. As per the revised estimates for 2017-18, India produced 80.29 lakh tonnes from an estimated area of 38.67 lakh ha. Thus, the area of spices in the country has decreased by 4.4% and production has also decreased by 8% respectively compared to previous year. All India estimates of area, production and productivity of spices for the years 2016-17 and 2017-18 are given below.

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

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

Crops	2016-17			2017-18		
	Area	Prod.	Yield	Area	Prod.	Yield
Pepper	134.28	62.08	462	135.83	69.49	512
Ginger	159.99	1048.96	6556	160.75	1049.78	6531
Chillies	863.08	2416.38	2800	751.66	2146.83	2856
Turmeric	247.63	1226.62	4954	224.17	1070.95	4777
Garlic	302.89	1722.18	5686	317.09	1645.81	5190

Crops	2016-17			2017-18		
	Area	Prod.	Yield	Area	Prod.	Yield
Cardamom	84.85	27.26	321	84.20	27.03	321
Coriander	673.70	864.37	1283	533.30	710.63	1333
Cumin	780.92	500.36	641	966.14	688.66	713
Fennel	89.54	148.56	1659	65.98	103.89	1575
Fenugreek	220.67	310.07	1405	148.99	202.45	1359
Ajwan	35.01	23.97	685	34.76	24.04	692
Dill/Poppy/Celery	35.57	35.44	996	35.91	34.04	948
Cinnamon/Tejpat	2.68	5.14	1923	2.71	5.09	1879
Nutmeg	22.76	14.02	616	22.74	14.17	623
Clove	2.20	1.23	557	2.23	1.23	551
Tamarind	49.66	202.15	4070	49.36	202.29	4098
Vanilla	0.93	0.31	331	0.93	0.31	331
Mint (Mentha oil)	327.85	34.48	105	327.36	32.74	100
Saffron	3.69	0.01	1	3.69	0.01	1
Total	**4037.88**	**8643.56**	**2141**	**3867.79**	**8029.42**	**2076**

Country-wise area and production of spices are being collected from International organizations like Food and Agriculture Organization, Rome and International Pepper Community, Jakarta. As per the estimates collected from International Pepper Community, the world production of pepper during 2016 was 4,13,713 tonnes with a major contribution of 1,40,000 tonnes from Vietnam followed by 69,000 tonnes from Indonesia. In 2015, India ranks 3rd in pepper production with 65,000 tonnes.

Table 2. Country wise production of pepper during 2012 to 2016

(Production in tonnes)

Country	2012	2013	2014	2015	2016
Vietnam	1,00,000	1,22,000	1,48,761	1,22,000	1,65,000
Indonesia	72,000	63,500	52,000	80,000	75,000
India	47,162	57,884	37,000	70,000	48,500
Brazil	32,000	34,000	39,000	44,000	40,000
Malaysia	23,000	19,000	20,500	22,500	21,000
Sri Lanka	18,600	28,000	14,139	28,177	19,150
Others	40,750	47,800	48,003	49,503	51,503
World	**3,33,512**	**3,72,184**	**3,59,403**	**4,16,180**	**4,20,153**

1.2 Arecanut

Arecanut production in the country was 8,10,766 tonnes from an estimated area of 4,96,244 ha during 2016-17. As per the final estimates for 2017-18, area of Arecanut have marginally increased to 4,96,637 ha and production has increased to 8,32,985 tonnes. Karnataka, Kerala, Assam, Meghalaya, 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 2016-17 and 2017-18 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	2016-17			2017-18		
	Area	Prod.	Yield	Area	Prod.	Yield
Karnataka	254.64	517.35	2032	254.64	517.35	2032
Kerala	97.70	116.84	1196	98.52	130.10	1321
Assam	80.81	77.90	964	80.81	77.90	964
Meghalaya	18.19	23.93	1316	16.93	24.99	1476
West Bengal	11.55	22.85	1979	11.55	22.85	1979
Tamil Nadu	7.08	12.72	1797	6.50	10.14	1560
Tripura	4.70	9.92	2111	5.99	20.41	3409
Mizoram	11.86	7.27	613	11.86	7.27	613
Andaman & Nicobar Islands	4.63	10.61	2293	4.70	10.50	2234
Maharashtra	2.29	3.52	1538	2.31	3.41	1478
Goa	1.81	3.10	1715	1.84	3.30	1797
Andhra Pradesh	0.56	2.37	4197	0.56	2.37	4197
Nagaland	0.39	2.30	5897	0.39	2.30	5897
Pondicherry	0.05	0.09	1755	0.05	0.09	1755
All India	**496.244**	**810.766**	**1634**	**496.637**	**832.985**	**1677**

Country-wise area and production of arecanut were collected from Food and Agriculture Organization, Rome. The latest available data are of 2016. As per the FAO estimates, India accounts for 49% of area and 58% of production of Arecanut in the world. World production of Arecanut during 2016 was estimated at 12.14 lakh tonnes from an estimated area of 9.59 lakh ha.

Table 4. Country-wise area and production of Arecanut

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

Country	2015			2016		
	Area	Prod.	Yield	Area	Prod.	Yield
India	450.00	747.00	1660	473.00	703.00	1486
Bangladesh	181.28	109.07	602	203.40	121.11	595
Indonesia	137.60	134.57	978	130.76	54.06	413
Myanmar	56.11	129.44	2307	55.46	129.17	2329
China, Taiwan Province of	43.22	113.18	2618	41.94	99.99	2384
Thailand	22.97	39.06	1700	22.44	38.14	1700
Sri Lanka	17.24	44.32	2570	18.19	44.06	2422
Bhutan	8.96	9.41	1049	9.37	9.86	1052
Nepal	3.91	13.69	3504	3.91	14.23	3643
Others	0.11	0.48	4279	0.12	0.45	3862
World total	**921.42**	**1340.21**	**1455**	**958.58**	**1214.06**	**1267**

Source: www.fao.org (accessed on 28 Nov. 2018)

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.

As per the data collected from Spices Board, Cochin, export of spices from the country during 2017-18 was 10,28,060 tonnes valued at Rs. 17,929.55 crore (US$ 2781.46 million). The export has increased by 8% in volume and 1% in value as compared to last year. Chilli continued to propel the growth story as India's largest exported spice, accounting for Rs. 4,256.33 crores in value and 4,43,900 tonnes in quantity. Export of chilli, ginger, turmeric, cumin, celery, fennel, fenugreek, garlic, curry powder/paste, spice oils and oleoresins registered a significant increase during this year. Export of pepper, ginger, turmeric, fennel, other spices and other mint products decreased during the year 2017-18.

Table 5. Estimated export of Spices during 2016-17 and 2017-18

Spices	2016-17		2017-18	
	Quantity (tonnes)	Value (Rs. in lakhs)	Quantity (tonnes)	Value (Rs. in lakhs)
Pepper	17,600	114,313	16,840	82,078
Cardamom (Small)	3,850	42,150	5,680	60,909
Cardamom (Large)	780	8,266	760	5,646
Chilli	400,250	507,075	443,900	425,633
Ginger	24,950	25,705	22,605	21,607
Turmeric	116,500	124,189	107,300	103,567
Coriander	30,300	29,208	35,185	27,275
Cumin	119,000	196,320	143,670	241,800
Celery	6,250	6,246	6,480	5,950
Fennel	35,150	30,876	34,550	25,907
Fenugreek	34,680	18,277	29,280	12,689
Other seeds (1)	18,100	15,455	22,175	16,046
Garlic	32,200	30,712	46,980	30,936
Nutmeg & Mace	5,070	23,642	5,500	22,094
Other spices (2)	40,210	50,595	38,305	60,193
Curry powder/Paste	28,500	59,910	30,150	61,620
Mint Products (3)	22,300	252,750	21,500	322,836
Spice Oils and Oleoresins	12,100	230,775	17,200	266,172
Total	**9,47,790**	**17,66,461**	**10,28,060**	**17,92,955**
Million US $		**2,633.30**		**2,781.46**

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

During the year 2017-18, import of spices in the country registered an increase of 2% in terms of quantity and that in terms of value, it increased by 8%. In 2017-18, India imported 2,06,205 tonnes of various spices and spice products valued at 686.78 million US $ as against the import of 2,03,225 tonnes valued at 686.78 million US $ in 2016-17. In 2017-18 Ginger is the major item in the import contributing 17% of the total spices imported followed by Ginger (18%), Pepper (14%), Coriander (13.5%), Cassia (13%), clove (9.4%) etc. are the major spices imported into the country during the period. Item-wise import of spices during the year 2016-17 and 2017-18 are given below.

Table 6. Import of Spices in India during 2016-17 and 2017-18

Spices	2016-17		2017-18	
	Quantity (tonnes)	Value (Rs. in lakhs)	Quantity (tonnes)	Value (Rs. in lakhs)
Pepper (1)	20265	111590	29650	109084
Cardamom (Small)	1720	8870	685	4379
Cardamom (Large)	3120	24242	5670	33109
Chilli/Paprika	1055	1932	1450	2700
Ginger Fresh/Dry	35,605	9201	34,300	10060
Turmeric	14,150	16498	17,120	18434
Coriander	44485	22049	28040	13200
Cumin black/white	2800	4975	3420	6066
Mustard Seed	850	478	300	216
Poppy seed	18010	29515	8540	14005
Garlic	80	208	450	988
Clove	17095	86970	19510	96759
Nutmeg	340	1458	530	1817
Mace	1055	7284	1750	11888
Cassia	22280	29062	26430	33251
Star anise	4965	9530	7900	15107
Other spices (2)	12090	45648	16880	77611
Oils & Oleoresins (3)	3260	51183	3580	51545
Total	**203225**	**460692.2**	**206205**	**500217.21**
Value in Million US $		**686.78**		**776.07**

(1) Include white pepper, light pepper & black pepper
(2) Include Aniseed, Asafoetida, Cinnamon, Pepper long, Cambodge, Herbal spices and Spices NES
(3) Include Spice Oils & Oleoresins and Mint products

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 2017-18, export of arecanut has decreased substantially and India could export only 4,614 tonnes valued at Rs 67.88 crores, against an export of 11,652.67 tonnes valued at Rs.140.26 crores in 2016-17. Nepal is the major export destination of arecanut.

Table 7. Country-wise export of Arecanut from India

Countries	2016-17		2017-18	
	Quantity (tonnes)	Value (Rs. in lakhs)	Quantity (tonnes)	Value (Rs. in lakhs)
Nepal	4175.58	4169.12	1758.24	1904.38
UAE	2837.38	4289.16	200.59	543.21
Bangladesh	2448.84	359.12	1220.00	165.46
Thailand	1067.00	2108.04		
Maldives	530.61	1463.01	781.04	2191.22
U S A	188.53	636.58	233.28	554.48
Singapore	92.19	192.74	3.27	7.26
Sri Lanka	59.40	100.44	53.00	117.33
U K	59.02	177.80	79.67	219.19
Indonesia	57.00	111.34	8.82	47.16
South Africa	29.98	120.63	22.22	70.88
Canada	27.36	92.67	40.63	93.58
Saudi Arabia	22.32	30.74	29.65	50.81
Mouritius	14.23	36.31	11.86	29.23
Others	43.24	137.97	171.93	794.05
Total	**11652.68**	**14025.67**	**4614.20**	**6788.24**

Table 8. Product-wise export of arecanut from India

Type of Arecanut	2016-17		2017-18	
	Quantity (tonnes)	Value (Rs. in lakhs)	Quantity (tonnes)	Value (Rs. in lakhs)
Arecanut, whole	1133.21	2105.74	1281.95	3239.76
Arecanut, split	4602.26	4787.12	1615.41	1695.68
Arecanut, ground	3685.17	5981.24	160.72	332.09
Other arecanuts	2232.04	1151.57	1556.12	1520.71
Total	11652.68	14025.67	4614.20	6786.24

In 2016-17 and 2017-18, the import of Arecanut in the country registered a significant decline compared to 2015-16. In 2015-16, India imported 45,190 tonnes of arecanut valued at Rs. 722.216 crores. However, in 2016-17, the import had declined to 16,151 tonnes and in 2017-18, it further declined to

11,875 tonnes. Usually arecanut is imported in the form of whole, split and other arecanuts. However, in 2017-18, 97% of our arecanut import was in the form of other arecanuts. Sri Lanka contributes 96.68% of our arecanut import during 2017-18. Country-wise import of Arecanut in the country during the last two years are given below.

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 mandate 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 Department 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 9. Country-wise import of Arecanut in India

Country	2016-17		2017-18	
	Quantity (tonnes)	Value (Rs. in lakhs)	Quantity (tonnes)	Value (Rs. in lakhs)
Sri Lanka	13538	24157	11837	30404
Myanmar	2400	4276		
Indonesia	108	70	36	23
UK	17	30		
Malaysia	54	35		
Timor Leste	34	60		
Pakistan			2	5
Total	**16151**	**28628**	**11875**	**30431**

Table 10. Product-wise import of Arecanut in India

Type of Arecanut	2016-17		2017-18	
	Quantity (tonnes)	Value (Rs. in lakhs)	Quantity (tonnes)	Value (Rs. in lakhs)
Arecanut, whole	524	972	276	708
Arecanut, split	2566	4362	89	159
Other arecanuts	13061	23294	11510	29564
Total	**16151**	**28628**	**11875**	**30431**

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

(Price Rs./Quintal)

Month	Pepper Garbled (Cochin)		Ginger Dry (Cochin)		Chillies (Virudhunagar)	
	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
April	70596	60274	17625	13156	11250	4312
May	72421	53560	18000	12156	12657	4000
June	71819	51452	18000	11700	12600	3600
July	72225	50320	18000	11531	12025	4812
August	72185	49968	18000	12718	11812	5410
September	72048	46620	17200	13406	12150	6000
October	71085	44700	14906	13500	10937	6000
November	69045	42891	14000	13500	9687	6500
December	70069	43492	14350	13500	9500	5800
January	68248	43880	14500	13500	6833	6812
February	62674	41761	14343	13500	5687	7167
March	61310	39556	13468	13500	4950	7875
Mean	**69477**	**47373**	**16033**	**12972**	**10007**	**5691**

Table 11 contd...

(Price Rs/Quintal)

Month	Turmeric (Chennai)		Garlic (Chennai)		Coriander (Chennai)	
	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
April	12500	11750	5438	4300	7913	7875
May	12750	11625	5750	4487	8250	7813
June	12650	11350	6150	4900	8250	7500
July	12500	11600	10000	4875	8625	6875
August	12562	12000	11625	4850	8937	6950
September	12010	12000	11300	5250	8800	7000
October	11462	12000	10500	6125	9000	7825
November	11575	12000	12750	6250	8375	8000
December	11350	12000	12440	3750	8600	7400
January	12000	12000	10812	3500	8750	7000
February	11937	12000	8125	2937	8625	7000
March	11750	12000	4400	2460	7910	6700
Mean	12087	11860	9108	4474	8503	7332

Table 11 contd...

(Price Rs/Quintal)

Month	Cumin (Chennai)		Fennel (Chennai)		Fenugreek (Chennai)	
	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
April	16875	20387	11750	10125	5500	4781
May	17937	20000	11600	8500	6125	4125
June	17870	19400	10720	8500	5660	3940
July	19975	19875	11400	9125	5625	4175
August	20400	20240	11375	9750	5612	4330
September	19470	19800	10800	9750	5370	4225
October	18787	19625	10500	9187	5187	4018
November	18875	19925	10375	9075	5062	3937
December	19800	20790	10000	9680	4956	3940
January	19750	21600	10000	9475	4900	4450
February	19825	19987	10625	10000	4900	4375
March	19350	18230	10100	9860	4890	4180
Mean	**19076**	**19988**	**10770**	**9419**	**5316**	**4206**

Table 11 contd...

(Price Rs/Quintal)

Month	Tamarind (Chennai)		Ajwan (Chennai)		Mace-Rs/kg (Cochin)	
	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
April	11500	10750	19888	10437	546	534
May	11500	9687	22444	10250	523	435
June	11500	9500	23100	10250	500	450
July	11500	9500	24250	9875	420	344
August	11450	11100	21750	9600	432	398
September	11460	12500	19600	9750	450	350
October	11500	12812	19325	9187	450	354
November	11312	14687	18750	8750	450	450
December	11500	17900	17700	8900	450	478
January	11500	16700	17500	10625	502	500
February	9687	16725	14500	10975	593	500
March	8800	15840	11550	10750	498	500
Mean	**11101**	**13142**	**19196**	**9946**	**485**	**441**

Table 11 contd...

(Price Rs/Quintal)

Month	Clove (Cochin)		Nutmeg without shell (Cochin)		Arecanut-Dry (Kozhikode)	
	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
April	75604	63182	37630	42045	22000	20600
May	74270	63458	36615	33146	21500	19375
June	75519	67928	36000	32000	21125	18125
July	74500	68980	31217	27923	20500	19125
August	74500	68596	37269	29000	20000	19300
September	74550	68476	42595	31500	NA	19125
October	75000	69159	43000	29261	17750	19250
November	76270	67900	41965	31000	18000	19750
December	75896	67260	40500	33374	17500	20300
January	73120	66442	43250	36846	18625	21500
February	77217	67152	46931	34804	20375	21000
March	72595	66791	43604	34660	19833	21000
Mean	**74920**	**67110**	**39998**	**32963**	**22000**	**19870**

4.Value Chain Analysis

4.1. Value Chain Analysis of Turmeric in Telangana

The Directorate conducted a study on Value Chain Analysis of Turmeric in Telangana in collaboration with Centre for Good Governance, Hyderabad, as per the approved annual action plan under MIDH for 2017-18. The primary objective of the study was to understand the turmeric value chain in Telangana State with a view to tap the opportunities available and the potential improvements that can be done for this purpose. The specific objectives were as follows:

1. Value chain analysis of turmeric in four major districts of Telangana
2. To study the varietal preferences of turmeric crop in relation to various stakeholders in turmeric value chain
3. To study the feasibility of cluster approach for seed and commercial turmeric cultivation

The study focused on turmeric cultivation in the four major districts (erstwhile) of Telangana State Adilabad, Karimnagar, Nizamabad and Warangal. Most of the findings in this study have emerged from the firsthand account of farmers, the key stakeholder in the turmeric value chain. These findings have been validated through meetings and consultations with stakeholders at district and state level.

During 2015-16 turmeric was cultivated in an area of 42,535 ha with a production of 1,84,285 tonnes in Telangana State. In recent times concerns have been raised about the decline in acreage and production, though not alarming. An encouraging sign is the spread of this crop to new areas and is expected to make up for the small declines in traditional areas of production. The issue of varietal preferences is also studied and presented in the report. Seed material is an important cost and the most vital component in the turmeric cultivation. Traditional crop, as it is, there is lot of

diffidence towards adoption of new varieties unless proven. This is also one of the reasons for the continued use of the same seed material over decades. Primary processing at the farmers' level is becoming cumbersome and adding to the high cost of production, almost 13% of cost of production. An important aspect is the enthusiasm of farmers in applying farm yard manure and tank silt well above the recommended levels. This practice is deep rooted, probably due to the nature of soils in which turmeric is being cultivated and the notion that good soil structure is a necessary condition for good turmeric yields. Lack of machinery and farm implements for sowing,weeding and harvesting operations is glaring. Primary processing involving boiling and drying of fresh turmeric also needs interventional support both in terms of technology development and adoption at farmers' end.

A major portion of turmeric produced in Telangana State is exported to regional markets like Maharashtra, Madhya Pradesh and Uttar Pradesh. Further, it moves to Haryana, Punjab and Delhi. A minor portion of this is consumed locally either as rhizome or powder. The absence of major processing facilities in the state is an issue that needs attention as it is a first important step in value addition and the cascading effect on other sectors. Turmeric offers opportunities beyond turmeric powder and has a potential export market for products such as curcumin, essential oil and oleoresin. This study has identified constraints at various stages of the value chain: production, marketing and processing and involving various stakeholders: horticulture university, horticulture and agricultural marketing department, institutional support through banks, risk mitigation through insurance and a few governance related such as developing enterprise through FPOs. Some of these challenges provide opportunities to reduce market inefficiencies, increase producers' share in consumer spending and generate local employment opportunities. The priority interventions for short term in production and processing include: popularizing methods which can reduce seed material requirement, development of implements for bed preparation, overcoming drip irrigation related issues and designing new farm machinery which can reduce manual labour requirement. For the medium term the interventions suggested are marketing related aspects such as price determination based on specified grading and curcumin content, addressing scale of finance and insurance issues. Development of high yielding varieties suitable to local agro-climatic conditions, varieties with high curcumin content which is the primary requirement for secondary processing industry are the long term interventions which need an actionable template immediately.

Fig. 1. Focus Group Discussion (FGD) at Koritikal village of Adilabad District

Fig. 2. FGD at Donkeshwar village of Nizamabad District

Fig. 3. FGD at Armoor village of Nizamabad District

Fig. 4. Turmeric cultivation field view from Nizamabad District

Fig 5. View of Turmeric Market at Nizamabad

4.2. Value Chain Analysis of Seabuckthorn in Leh

The Directorate conducted a value chain study of Seabuckthorn in Leh (Jammu & Kashmir) in collaboration with Ladakh Autonomous Hill Development Council (LAHDC) with the following objectives:

1. To improve the value addition of Seabuckthorn at various stages of the value chain
2. To study the potential of Seabuckthorn cultivation on vast barren land in Ladakh.

Scopes of the study are:

1. To study the missing links in value chain of Seabuckthorn in trans-Himalayan Ladakh
2. Suggest measures to increase berry harvest from natural stand
3. Suggest measures to improve post-harvest losses of Seabuckthorn berry
4. Suggest measures to take up Seabuckthorn cultivation on vast barren land

The major findings of the study can be summarized as follows.

4.2.1 Constraints and Intervention required in Value Chain

- Less than 5% of the natural Seabuckthorn available in Ladakh is being harvested. There is a need of a Government policy for converting the dense Seabuckthorn forest into productive stand.
- Seabuckthorn berry harvesting is a tedious process. Currently berry is harvested by beating the bush method. The harvesting tools at R&D stages need to be studied in field conditions. Commonly used harvesters in other countries such as China, Russia and Canada need to be studied in conditions of Ladakh.
- Seabuckthorn berry is a delicate and highly perishable one. It needs to be processed the same day of harvesting. There is a need to develop cold chain facilities in major Seabuckthorn growing areas to prolong the time between harvest and processing.
- Seabuckthorn harvested in Ladakh are wild harvest. Efforts need to be made to certify Seabuckthorn of Ladakh as organic. There is a need for GI tagging of Seabuckthorn of Ladakh origin.
- Over 90% of the Seabuckthorn harvested in Ladakh are sold after primary processing. Government support is required in providing incentives for developing value added products in Ladakh.
- Market linkage for Seabuckthorn is poor. There are many small players in the value chain. In order to strengthen the market linkages there is a need to set up a single window online system for providing information and services related to Seabuckthorn trade. Local entrepreneurs focus only on selling the raw material. Their risks taking capacity is low, and are fully dependent on demand for raw material from outside the region. Formation of 'Ladakh Seabuckthorn Cooperative Society' comprising of all the local entrepreneurs would strengthen their role in Seabuckthorn value chain.
- There is gap in demand and supply. Demand for Seabuckthorn far exceeds that of the supply capacity of the region. Government policy is required for increasing the raw material supply.

4.2.2 Potential of Seabuckthorn cultivation on vast barren land in Leh Ladakh

- The vast barren land in the region can be brought under Seabuckthorn plantation either by planting along existing water resources or through lifting of water from the rivers. As per an estimate of the Forest Department, 2500 ha of barren land can be brought under Seabuckthorn plantation without much investment in Leh district.
- Cultivation of Seabuckthorn on 2,500 ha in Ladakh is projected to result in net income of Rs. 491 crore per annum in 2030 from raw material harvesting and its primary processing. Income generation will increase many-fold if value added products are also manufactured in the region.
- Farmers have shown keen interest in growing Seabuckthorn.

4.2.3. Constraints and Intervention required in Seabuckthorn Plantation

- Seabuckthorn is considered as forest crop. There are no policies or incentives to promote Seabuckthorn as horticultural crop.
- There is no standard package of practices for large scale Seabuckthorn cultivation.Works being done on experimental fields at Defence Institute of High Altitude Research should be continued and carried forward.

- There is no released variety of Seabuckthorn in India. There is a need to undertake multi location trials of high yielding selections available at Defence Institute of High Altitude Research, Leh and CSK, HPKV, Palampur. There is a need to initiate R&D on varietal development. Commercial varieties available in China, Russia, Mongolia and Canada need to be exploited for varietal trial.
- Vast geographical areas in cold desert are barren primarily due to lack of irrigation. Area under forest cover is only 0.064% and total cropped area is just 0.2% in Leh district. Existing vast barren land can be converted into green patch by planting Seabuckthorn.

4.2.4 Policy Suggestions

Promote Seabuckthorn for National Security: People living along the international border play key role in securing the border. However, in recent years a trend in migration of people living along the international border to the nearby Leh town has been observed due to economic reasons. Promote Seabuckthorn cultivation in villages along the international border to improve the socio-economic status of the villagers and to discourage abandoning their settlement.

National mission on Seabuckthorn: Developmental work on Seabuckthorn needs to be carried on mission mode. There is a need to initiate a National Programme on Seabuckthorn.

Focus on Ladakh: Over 70% of the Seabuckthorn natural resource is in Ladakh. Developmental activities on Seabuckthorn, therefore, need to be focused in Ladakh. The successful model can then be replicated in other Himalayan region.

Promote Seabuckthorn as horticultural crop: Seabuckthorn is considered as a forest crop.The crop needs to be declared as a horticultural crop.

Organic certification and GI registration: Seabuckthorn harvested in Ladakh are wild harvest and believed to be superior due to climatic condition of the growing areas. For all activities related to Seabuckthorn, organic certification may be made mandatory. Efforts need to be made for GI tagging of Seabuckthorn of Ladakh origin.

Value added products: Over 90% of the harvested raw material is currently sold outside the region. There is an opportunity for development of value added products in the study area. Hence, government needs to create a favourable environment for the investors through partial support in the form of subsidies, training and skill development on value added products.

Convert thick forest into productive stand: Less than 5% of the natural Seabuckthorn available in Ladakh is being harvested. There is a need to have a government policy for converting the dense Seabuckthorn forest into productive stand.

Increase raw material: Most of the processors and manufacturers reported non-availability of raw material for large scale commercial activities. Government support is required for scientific cultivation of Seabuckthorn. Involvement of private players for large scale cultivation may also be considered.

Quality planting material: Import commercially available Seabuckthorn varieties from Russia, China, Canada and Mongolia for growing in Ladakh.

Support local entrepreneurs: The local processors are key players in the value chain. They are in need of financial assistance to create infrastructure facility to augment their business prospects. Hence, the banks and government should come forward to provide financial support in addition to technical support.

Fig. 6. Seabuckthorn - prominent thorn

Fig. 7. Seabuckthorn - male plant

Fig. 8. Seabuckthorn - female plant

5. Third National Consultative Meet on Spices Statistics

The 3rd National Consultative Meet on Spices Statistics was held at Thiruvananthapuram, Kerala on 18th January, 2018 under the Chairpersonship of Smt. Sudha P. Rao, Principal Adviser, Department of Agriculture, Cooperation and Farmers Welfare, Govt. of India to evaluate the action taken on the recommendations of the 2nd National Consultative Meet on Spices Statistics held on 11th July, 2016 at Calicut and also to review the existing methodologies adopted by various state agencies like Department of Economics and Statistics (DES)/Department of Horticulture (DoH)/Land Records for the estimation of area and production of spices. Total 30 members participated in the meeting representing above mentioned State Departments and National level agencies like ICAR-IASRI, ICAR-IISR, MNCFC, Spices Board etc.

The major recommendations are given as below:

1. States who have not designated a nodal agency as State Horticulture Statistics Authority (SHOSA) may do so at the earliest.

2. DASD to form an expert group to review the present methodologies and develop uniform methodology for at least major spices, which may be tested through pilot study with the help of IASRI.
3. Reconciliation may be done between the Departments of Horticulture and E&S before finalizing the estimates.
4. States to ensure timely reporting of data to DASD.
5. Proper training should be given to field investigators for collecting data.
6. All the states should report ginger in fresh form and turmeric in processed form. DASD may apply the conversion factor (4.65) for ginger, if reported in dry form. For turmeric apply conversion factor (0.20) for converting fresh to processed form.
7. Chilies may be separately reported - red & green, if reported.
8. Include curry leaf and mint in the list of spices from 2017-18 onwards.
9. For Mint, Department of Horticulture, UP may take necessary steps to provide reliable estimates on area and production. Remote sensing technology may also be utilized for mint data.
10. Remote sensing techniques to be developed for chilli, cumin, coriander, garlic, mentha and geo-spatial studies for expansion of area, to identify suitable sites for data collection.
11. Curry leaf productivity is being high in Andhra Pradesh, Andhra Pradesh to share the technology with DASD, which will promote productivity in other curry leaf growing states.
12. Madhya Pradesh Horticulture Department may take necessary steps to rectify the anomalies noticed in data. The Department may adopt statistically sound methodology with the help of E&S for estimation of area and production.
13. Maharashtra Horticulture Department may rectify the anomalies noticed in their data. The present methodology is to be reviewed and data collection to be attempted in more professional way.
14. Chhattisgarh should reconcile the data with DES before reporting it to the national grid in the current year itself.
15. Karnataka: Area recorded under pepper may be reviewed and improve the methodology for area estimation of pepper in the State immediately.
16. Karnataka: Sampling size for yield estimation of pepper may be increased in proportion to area in each district.
17. Karnataka, Andhra Pradesh Hort/E&S, Telangana may send the methodology to IASRI for review within a month.
18. IASRI to develop pre-harvesting forecasting technique in black pepper
19. Kerala SHM may reconcile the spice data with DES before reporting in HAPIS.
20. DASD may take up studies on Cost of cultivation of pepper in association with IISR and KAU.

Fig. 9. Glimpses of NCM on Spices Statistics at Thiruvananthapuram on 18-01-2018

Inaugural Session, Smt. Sudha P. Rao, Principal Adviser, Dr. B.N.S. Murthy, Horticulture Commissioner

Dr. Homey Cheriyan addressing the delegates

Smt. Sudha P. Rao addressing the gathering

Dr. B.N.S. Murthy addressing the gathering

4 PUBLICITY

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. The Directorate had 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 6 National/State level exhibitions during the period under report as given below.

1. Mathrubhumi Karshika Mela held at New Bus Stand Ground, Kannur, Kerala from 1-5 April, 2017 organised by Mathrubhumi Publications. The Exhibition aims to showcase the continuous upgradation of technology and interrelated development in Agriculture.

2. International Agriculture & Horti Expo 2017 held at Pragati Maidan, New Delhi from 14-16 July, 2017 organised by NNS Media Group, New Delhi. The main objective of the Expo was to bring the agriculture sector, horticulture sector, food processing sector, agro based industries, related technologies & service providers, growers, consumers and government departments on one platform and provide them the opportunity to showcase their products/services and form fruitful market alliance.

3. 4th Vibrant India - 2017 and Meri Dilli Utsav held on 13-15 October, 2017 at Dilli Haat, Pitampura, New Delhi organized by NNS Media Group. The programme was an ideal platform for showcasing the achievement, policies and development schemes and create awareness among the people about the welfare policies in the agriculture sector.

4. Calicut Flower Show 2018 held from 25-31 January, 2018 at KTC Ground, PT Usha Road, Calicut, Kerala organized by the Calicut Agri Horticultural Society, Calicut. The main purpose of the show was to educate and impart practical knowledge to the public, farmers and interested growers on various aspects of agriculture, horticulture and floriculture, spices and allied subjects like scientific cultivation, processing and marketing of products.

5. Silver Jubilee Celebration Expo at KVK-IISR, Peruvannamuzhi, Kozhikode, Kerala from 12-17 February, 2018.

6. Krishi Unnati Mela - 2018 at IARI Campus, Pusa, New Delhi from 16-18 March, 2018 organised by the Department of Agriculutre, Cooperation & Farmers Welfare, Government of India jointly with IARI, New Delhi. Research Institutes and Krishi Vigyan Kendras under ICAR, State Agricultural Universities, State Departments of Agriculture, Agriculture Technology Management Agencies(ATMAs) and companies related seeds, fertilizers pesticides, water conservation, plant protection, farm machinery etc. particpated in the Exhibition. During the three day exhibition, more than one lakh farmers, extension functionaries, scientists, students, general public and other stakeholders from all over the country visited.

Fig. 1. Dr. B.N.S. Murthy, Commissioner of Horticulture, visiting the stall at Agri & Horti Expo held at Pragati Maidan, New Delhi

Fig. 2. Stall in the Vibrant India 2017 held at Dilli Haat, Pitampura, Delhi

Fig. 3. Shri Mullappally Ramachandran, M.P. visiting the stall at KVK, IISR, Peruvannamuzhi, Kozhikode

Fig. 4. Public visiting the stall at KVK, IISR, Peruvannamuzhi, Kozhikode

Fig. 5. Stall of the Directorate in the Krishi Unnati Mela held at PUSA, New Delhi

Fig. 6. Stall of the Directorate in the Krishi Unnati Mela held at PUSA, New Delhi

Fig. 7. Stall of the Directorate in the Calicut Flower Show 2017

Fig. 8. Cover pages of published Journals

5 OFFICIAL LANGUAGE

राजभाषा कार्यान्वयन

भारत सरकार की राजभाषा नीति के प्रभावपूर्ण कार्यान्वयन के लिए सुपारी और मसाला विकास निदेशालय, कालिकट सर्वदा सक्रिय है। निदेशालय के 80 प्रतिशत से अधिक कर्मचारी हिंदी में कार्यसाधक ज्ञान प्राप्त कर लिए हैं और यह कार्यालय राजभाषा नियम 10 के उप नियम (4) के अंतर्गत भारत सरकार के राजपत्र में अधिसूचित किया गया है।

राजभाषा कार्यान्वयन समिति

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

डॉ. होमी चेरियान	निदेशक	अध्यक्ष
डॉ. फेमिना	उप निदेशक	सदस्य
श्री बाबुलाल मीणा	सहायक निदेशक	हिंदी संपर्क अधिकारी
श्री मधु एन.	अनुसंधान अधिकारी	सदस्य
श्रीमति सी.वी. दिव्या	वरिष्ठ तकनीकी सहायक	सदस्य
श्री के. मनोजकुमार	साँख्यिकीय अन्वेषक	सदस्य
श्री के.वी. राजेश	अवर श्रेणी लिपिक	सदस्य
डॉ. पी.एन. ज्योति	कनिष्ठ हिंदी अनुवादक	सदस्य-सचिव

राजभाषा के कार्यान्वयन में हुई प्रगति की जायजा लेने के लिए इस समिति की बैठकें हर तिमाही में आयोजित की जाती हैं। राजभाषा 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 कायवृत्त 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

कार्यालय में राजभाषा नियम 1976 के धारा 3(3) का अनुपालन शत प्रतिशत 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। कार्यालय का नाम बोर्ड त्रिभाषी -मलयालम-हिंदी-अंग्रेज़ी- में है।

आज का शब्द

कर्मचारियों के बीच हिंदी प्रयोग के शब्द वाक्यांशों का परिचय देने के उद्देश्य से कार्यालय के प्रवेशद्वार पर रखे गए बोर्ड पर हर दिन अंग्रेज़ी के समानार्थक हिंदी शब्द/वाक्यांश लिखा जाता है। हिंदी पखवाड़ा के दौरान इन शब्दों और वाक्यांशों के आधार पर प्रतियोगिता चलाकर विजेताओं को पुरस्कार दिया जाता है।

हिंदी दिवस/पखवाड़ा

कार्यालय में हिंदी के प्रयोग के लिए अनुकूल वातावरण बनाने के उद्देश्य से हर वर्ष निदेशालय में हिंदी पखवाड़ा आयोजित किया जाता है। इस वर्ष 14 सितंबर, 2017 को हिंदी पखवाड़ा का शुभारंभ किया। दिनांक 14 सितंबर, 2017 को निदेशक डॉ. होमी चेरियान ने दीप जलाकर हिंदी पखवाड़ा का उद्घाटन किया। अपने उद्घाटन भाषण में उन्होंने कहा कि कार्यालय में हिंदी के प्रयोग करना संवैधानिक दायित्व है। टिप्पण और पत्राचार हिंदी में करके सरकार की राजभाषा नीति का शत प्रतिशत पालन करें। ड्रॉ फेमिना, उप निदेशक ने स्वागत भाषण दिया। श्री बाबुलाल मीणा, सहायक निदेशक ने अपने भाषण में, हिंदी का प्रयोग सिर्फ हिंदी पखवाड़े के दौरान ही नहीं, बल्कि पूरे वर्ष में जारी रखने का अनुरोध किया। डॉ. पी. एन. ज्योति, कनिष्ठ हिंदी अनुवादक ने हिंदी की संवैधानिक प्रावधोनों और नियमों का विवरण दिया और पखवाड़ा के लिए प्रस्तावित कार्यक्रमों का ब्योरा दिया।

हिंदी दिवस के अवसर पर कर्मचारियों को राजभाषा के प्रयोग में लाभकारी विभिन्न प्रकाशनों का परिचय देने के लिए संदर्भ ग्रन्थों, हिंदी में तैयार किए गए पोस्टरों और अन्य प्रदर्शन सामग्रियों, निदेशालय के हिंदी प्रकाशन, कार्यालय में उपलब्ध हिंदी पत्रिकाएँ, पुस्तकें, समाचार पत्र आदि शामिल करते हुए राजभाषा प्रदर्शनी तैयार किया गया। आठवीं अनुसूची में सम्मिलित 22 भाषाओं को भारत की पृष्ठभूमि में सजाकर रंगीन पोस्टर और मसाले फसलों एवं औषधीय पौधों से संबन्धित नए प्रदर्शन सामग्रियाँ भी राजभाषा प्रदर्शनी में शामिल किए गए।

हिंदी के प्रयोग के लिए प्रेरणा एवं प्रोत्साहन देने के उद्देश्य से पखवाडे के दौरान हिंदी में विभिन्न प्रतियोगिताएँ आयोजित की गई। टिप्पण-आलेखन, टंकण, तकनीकी शब्दावली, हस्तलिपि, अंताक्षरी, पढ़न आदि प्रतियोगिताओं में सभी कर्मचारियों ने भाग लिया। राजभाषा संबंधी प्रश्नों को शामिल करके हिंदी में प्रश्नोत्तरी कार्यक्रम चलाया गया।

हिंदी पखवाडा का समापन समारोह निदेशक डॉ.होमी चेरियान की अध्यक्षता में संपन्न हुआ। श्री सजी जोर्ज, निदेशक, केन्द्रीय प्रतिदर्शी सर्वेक्षण संघटन, कालिकट इस समारोह के मुख्य अतिथि थे। अपने भाषण में उन्होंने हिंदी भाषा की संभावनाओं पर विस्तार से विवरण किया।

डॉ पी.एन. ज्योति, कनिष्ठ हिंदी अनुवादक ने हिंदी के संवैधानिक प्रावधानों एवं कार्यान्वयन की अनिवार्यता पर ज़ोर देकर इसके उत्तरोत्तर प्रयोग को बढ़ावा देने का अनुरोध किया और पखवाड़ा के दौरान आयोजित कार्यक्रमों की रिपोर्ट प्रस्तुत की।

Fig. 1. डॉ. होमी चेरियान, निदेशक, हिंदी पखवाड़ा का उद्घाटन करते हुए

Fig. 2. पुरस्कार वितरण

Fig. 3. हिंदी पखवाड़े का प्रेक्षकगण

हिंदी कार्यशाला

कर्मचारियों को हिंदी में प्रशिक्षण देने के लिए दिनांक 20-09-2017 को एक-दिवसीय कार्यशाला आयोजित किया गया। इसमें पूर्वाह्न सत्र में श्रीमती प्रवीणा, हिंदी प्राद्यापक, हिंदी शिक्षण योजना, कोषिक्कोड ने राजभाषा हिंदी व्याकरण और टिप्पण-आलेखन के विषय पर क्लास चलाया।

Fig. 4. श्रीमती प्रवीणा, हिंदी प्राद्यापक क्लास चलाते हुए

Fig. 5. हिंदी कार्यशाला का प्रेक्षकगण

नगर राजभाषा कार्यान्वयन समिति की सदस्यता

कालीकट नगर राजभाषा कार्यान्वयन समिति के तत्वावधान में आयोजित प्रत्येक कार्यक्रम में निदेशालय सक्रिय रुप से भाग ले रहा है। नगर राजभाषा कार्यान्वयन समिति की हर बैठक में निदेशक और हिंदी अनुवादक नियमित रुप से भाग ले रहे हैं। समिति द्वारा आयोजित कार्यशाला में कर्मचारियों को प्रशिक्षण दिया गया।

हिंदी प्रकाशन

निदेशालय द्वारा प्रकाशित त्रैमासिक पत्रिका 'इंडियन जर्नल ऑफ एरीकनट, स्पाइसेस एण्ड मेडिसिनल प्लान्ट्स' में विभिन्न मसाले फसलों पर आधारित वैज्ञानिक लेख, कृषि क्रियाएँ, बाज़ार भाव की समीक्षा आदि नियमित रुप से हिंदी में प्रकाशित किए जाते हैं। कृषकों को वितरण करने के लिए बीजीय मसाले फसलों की खेती से संबन्धित हिंदी पत्रकों का प्रकाशन किया गया। कृषि से संबंधित शब्दों को शामिल करते हुए हिंदी में तकनीकी शब्दावली पुस्तिका का प्रकाशन किया गया।

Fig. 3. तकनीकी शब्दावली पुस्तिका

प्रोत्साहन योजना

कार्यालयीन कामकाज में मूल रूप से हिंदी में काम करने के लिए कर्मचारियों को प्रेरणा देने के लिए राजभाषा विभाग द्वारा लागू किए गए प्रोत्साहन योजना और अंग्रेज़ी के अलावा हिंदी में टंकण करने के लिए लागू किए गए प्रोत्साहन भत्ता योजना का कार्यान्वयन निदेशालय में किया गया। दोनों योजनाओं में कर्मचारी भाग ले रहे हैं।

पुस्तकों की खरीद

कार्यालय में संदर्भ के लिए राजभाषा के विभिन्न विषयों से संबन्धित हिंदी पुस्तकें खरीदी जाती हैं। इसके अलावा निदेशालय में हिंदी दैनिक पत्र 'नवभारत टाईम्स' तथा अन्य पत्रिकाएँ जैसे कृषि समीक्षा, उन्नत कृषि, नारियल पत्रिका, भारतीय मसाले पत्रिका, कैरली, रेशनी, मसालों का महक आदि भी उपलब्ध है।