



## Livelihood improvement of Scheduled Caste farmers through improved spices cultivation practices



भाकृअनुप-अखिल भारतीय समन्वित मसाला अनुसंधान परियोजना ए आई सी आर पी एस  
ICAR-All India Coordinated Research Project on Spices  
ICAR-Indian Institute of Spices Research  
Kozhikode - 673012, Kerala, India



## **Livelihood improvement of Scheduled Caste farmers through improved spices cultivation practices**



**ICAR-All India Coordinated Research Project on Spices  
(ICAR-AICRPS), Kozhikode, Kerala**



**Contributors:**

Sudheesh Kulkarni, B Mahender, Pradip Kumar, Anamika Debnath, Suchand Dutta, Najeeb Naduthodi, Amit Kumar, Meenu Gupta, Parshuram Sial, Kusum Kumar Deka, Simi Asharaf, M Anand, S K Tehlan, T P Malik, T N Deka, Reena Nair, Motilal Mehriya, B. Senthamizh Selvi and Anupam Pariari

**Editors:**

John George, Sharon Aravind, Krishnamurthy K S, Alagupalamuthirsolai M, Thankamani C K, Rema J, S J Eapen and K Nirmal Babu

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Project Coordinator  
ICAR- All India Coordinated Research Project on Spices  
ICAR- Indian Institute of Spices Research, Kozhikode

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**Contact:**

ICAR- All India Coordinated Research Project on Spices  
ICAR-Indian Institute of Spices Research, Kozhikode, Kerala, 673 012  
E-mail: aicrpspices@gmail.com / Aicrp.Spices@icar.gov.in  
Phone: 0495-2731794/2731410

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# Contents

01. Introduction	01
02. Training programmes	04
03. Input distribution	08
04. Fron line demonstrations	13
05. Area expansion of spices	15
06 Future line of work	17

## Introduction

The scheduled castes (SC) accounts about 16.6% of India's population (according to the 2011 census) and there are 1108 scheduled castes across 28 states of India as per the Constitution (Scheduled Castes) Order, 1950. Scheduled castes are the economically and socially underprivileged caste which consist of small landholder farmers, agricultural labourers, artists and industrial employees. The Chamars of Uttar Pradesh, the Meghs of Gujarat, the Balais of Bengal, the Malas of Andhra Pradesh, the Mahars of Maharashtra, and the Adi-Davidas of Tamil Nadu are schedule castes who live in distinct areas. Punjab has the highest percentage of scheduled castes in relation to the overall population (31.9%), followed by Himachal Pradesh (25.2%), West Bengal (23.5%), and Uttar Pradesh (20.7%). The Union territories (Andaman and Nicobar, Lakshadweep), and the state of Nagaland have no scheduled caste population. Whereas Arunachal Pradesh, Goa, Manipur, Meghalaya, Mizoram, Dadra, Nagar Haveli, Daman, and Diu have less than 5% scheduled caste population, while the remaining states have a moderate 5-16% share.

Since the independence of India, the scheduled castes were given reservation status, guaranteeing political representation, quota in universities, free and stipend education, scholarships, preference in promotion, various government schemes and banking services. The National Commission for Scheduled Castes (NCSC) is a constitutional organization in India that works for the improvement of SC community and also protect the interests of scheduled castes and safeguard the SC people from prejudice and exploitation. For the integrated development of scheduled castes, 'Pradhan Mantri Adarsh Gram Yojana' (PMAGY), a Centrally Sponsored Pilot Scheme, is being implemented.

The SCSP (Scheduled Caste Sub Plan) has been started by the Government of India to ensure the flow of targeted financial and physical benefits from all the general sectors of development for the benefit of scheduled castes, ensuring a paradigm of equitable and inclusive growth. All the Ministries/Departments under the GOI are implementing SCSP (Special Component Plan for scheduled castes or SCP) as part of their Annual Plans by earmarking resources. The main objective is to give thrust to family-oriented schemes of economic development of SCs below the poverty line, by providing resources for filling the critical gaps and for providing missing vital inputs so that the schemes can be more meaningful.

The ICAR–All India Coordinated Research Project on Spices (ICAR-AICRPS) has been implementing the SCSP plan in spice crops through its nation-wide network of centres to benefit the spices growing farmers of the SC community so that the fruits of development in Agricultural Research & Development reach the unreached hitherto and accelerate the process of economic development of the target group.

The programme was initiated for the first time during 2018-19 with a modest fund of Rs. 10.0 lakhs made available to six centres and expanded to twelve more centres in the next three years with additional budgets totalling to Rs. 70 lakhs for the three years. The details of centres spread over 14 states is given in Table 1.

During the period 2018-2022, the activities of ICAR-AICRPS undertaken for the development of scheduled caste span around fourteen states covering the districts of Solan, Sirmaur and Bilaspur (Himachal Pradesh), Cooch Behar, Alipurduar and Nadia (West Bengal), Pakyong (Sikkim),



Kahikuchi (Assam), Hisar (Haryana), Jabalpur (Madhya Pradesh), Jodhpur (Rajasthan), Gonda and Bahraich (Uttar Pradesh), Raigarh (Chhattisgarh), Koraput (Odisha), Nizamabad and Nirmal (Telangana), Uttar Kannada (Karnataka), Wayanad and Idukki (Kerala), Erode (Tamil Nadu). The SCSP programme was undertaken under AICRP on Spices, for, economic upliftment of scheduled caste farmers and increment of spice acreage (through varietal spread and creation of mother block of elite varieties of spices) by organizing training programmes, providing them agro-inputs, small farm implements and field demonstrations. All these activities of ICAR-AICRPS is indeed a pathway for improving the socio economic status of SC beneficiaries.

**Table 1: SCSP activities undertaken by various AICRPS centres**

2018-19		2019-20		2020-21		2021-22	
State	AICRPS centre	State	AICRPS centre	State	AICRPS centre	State	AICRPS centre
Karnataka	Sirsi	Karnataka	Sirsi	Telangana	Kammarpally	Karnataka	Sirsi
Telangana	Kammarpally	Odisha	Pottangi	Odisha	Pottangi	Odisha	Pottangi
Uttar Pradesh	Kumarganj	Himachal Pradesh	Solan	Himachal Pradesh	Solan	Himachal Pradesh	Solan
West Bengal	Pundibari	West Bengal	Pundibari	West Bengal	Pundibari	West Bengal	Pundibari Kalyani
Kerala	Ambalavayal	Kerala	Ambalavayal	Kerala	Pampadumpara	Rajasthan	Mandor
Sikkim	Gangtok	Assam	Kahikuchi	Haryana	Hisar	Haryana	Hisar
				Tamil Nadu	Yercaud	Tamil Nadu	Coimbatore
				Chhattisgarh	Raigarh	Chhattisgarh	Raigarh
				Sikkim	Gangtok		
				Madhya Pradesh	Jabalpur		
				Rajasthan	Mandor		



**Fig 1: SCSP activities undertaken by various ICAR- AICRPS centres**



## Training Programmes

The ICAR-AICRPS through its network across the country has developed several improved varieties and sustainable technologies which are capable of doubling farmer's income. Scientists from various AICRPS centres are actively involved in popularization of the latest technologies through trainings to create awareness among farmers about scientific cultivation practices and sustainable spice production.

**Table 2: List of training programmes conducted by AICRPS centres under SCSP**

Sl. No.	Details of training	Place of training	No. of beneficiaries		AICRPS centre
			M	F	
<b>2018-19</b>					
1.	Awareness programme on spices cultivation	Cooch Behar, West Bengal	10	40	UBKVV, Pundibari
2.	Advanced production technology of spices	Ayodhya, Uttar Pradesh	101	47	NDUAT, Kumarganj
3.	Good Agricultural practices (GAP) in spices	Bahraich, Uttar Pradesh	32	70	NDUAT, Kumarganj
4.	Spice productivity enhancement through soil and plant health management	Wayanad, Kerala	22	28	RARS, Ambalavayal
<b>2019-20</b>					
1.	Scientific cultivation of spices	Gonda, Uttar Pradesh	74	96	NDUAT, Kumarganj
2.	Spices cultivation technologies	Koraput, Odisha	44	64	OUAT, Pottangi
3.	Modern techniques for turmeric cultivation	Nizamabad, Telangana	80	45	SKLTSHU, Kammarpally
4.	Advanced production technology of spices	Bahraich, Uttar Pradesh	109	57	NDUAT, Kumarganj
5.	Production technology of black pepper	Uttara Kannada, Karnataka	45	21	UHS, Sirsi
<b>2020-21</b>					
1.	Altitude specificity of cultivars & quality planting material production	Tadong, Sikkim	23	12	ICRI RRS, Gangtok
2.	Newer trends in spice production	Wayanad, Kerala	20	30	RARS, Ambalavayal
3.	Scientific cultivation of spices in Himachal Pradesh	Solan, Himachal Pradesh	20	23	Dr. YSPUH&F, Solan
4.	Exploring the potential of spices crops (ginger and turmeric) In NEH region	Gangtok, Sikkim	20	18	ICAR Research Complex for NEH Region, Sikkim
5.	Advanced production technology of spices	Alipurduar, West Bengal	19	1	UBKVV, Pundibari



6.	Awareness programme on cultivation of black pepper & turmeric	Cooch Behar, West Bengal	17	3	UBKVV, Pundibari
7.	Advanced production technology of spices	Raigarh, Chhattisgarh	13	-	IGKV, Raigarh
8.	Awareness programme on spices cultivation	Solan, Himachal Pradesh	21	30	Dr. YSPUH&F, Solan
9.	Spices cultivation technologies	Sarangarh, Chhattisgarh	12	-	CARS, Raigarh
10.	Production technology of spices in Himachal Pradesh	Solan, Himachal Pradesh	46	48	Dr. YSPUH&F, Solan
11.	Advanced production technology of spices	Bilaspur, Himachal Pradesh	21	28	Dr. YSPUH&F, Solan
12.	Spices cultivation technologies	Solan, Himachal Pradesh	32	51	Dr. YSPUH&F, Solan
13.	Awareness programme on spices cultivation	Sirmaur, Himachal Pradesh	39	57	Dr. YSPUH&F, Solan
14.	Scientific cultivation of spices in Himachal Pradesh	Shimla, Himachal Pradesh	23	15	Dr. YSPUH&F, Solan
15.	Training programme on seed spices cultivation	Jodhpur, Rajasthan	83	33	AUJ, Mandor
<b>2021-22</b>					
1.	Organic farming of turmeric in high curcumin content varieties	Nizamabad Telangana	100	27	SKLTSHU, Kammarpally
2.	Hi-tech production and post-harvest technologies in turmeric	Erode, Tamil Nadu	33	17	TNAU, Coimbatore
3.	Masala Phasalon ki unnat taniqi	Jabalpur, Madhya Pradesh	30	5	JNKVV, Jabalpur
4.	Spice clinic on spices (Ginger & Turmeric)	Pacheykhani, Sikkim	19	20	ICAR Research Complex for NEH Region, Sikkim
5.	Awareness programme on cultivation of black pepper & turmeric	Cooch Behar, West Bengal	38	10	UBKVV, Pundibari
6.	Training programme on spices cultivation	Raigarh, Chhattisgarh	28	-	CARS, Raigarh
7.	Scientific cultivation of black pepper & turmeric	Alipurduar, West Bengal	10	35	UBKVV, Pundibari
8.	Advanced production technology of turmeric	Sarangarh, Chhattisgarh	24	1	CARS, Raigarh
9.	Production technology of spices in Himachal Pradesh	Solan, Himachal Pradesh	31	19	Dr. YSPUH&F, Solan
10.	Awareness programme on spices cultivation	Sirmaur, Himachal Pradesh	32	28	Dr. YSPUH&F, Solan



11.	Spices cultivation technologies	Sarangarh, Chhattisgarh	55	-	CARS, Raigarh
12.	Advanced production technology of spices	Bilaspur, Himachal Pradesh	33	17	Dr. YSPUH&F, Solan
13.	Organic cultivation of turmeric in high curcumin content varieties	Nirmal, Telangana	100	31	SKLTSHU, Kammarpally
14.	Organic cultivation of turmeric in high curcumin content varieties	Jagtial, Telangana	100	25	SKLTSHU, Kammarpally



**Kammarpally**



**Mandor**



**Solan**



**Pottangi**



**Coimbatore**



**Jabalpur**

*Contd..*



**Fig 2: Training programmes conducted by AICRPS centres under SCSP**



As part of the efforts for accelerating technology spread and ensuring its reach to the most socially and economically disadvantaged sections, ICAR- AICRPS centres are actively involved in the distribution of healthy disease-free planting materials of elite varieties of black pepper, cardamom, ginger, turmeric, coriander, cumin, fennel and fenugreek. SC farmers also got the advantage of improved technologies as the scientists of AICRPS centres not only took training class on these aspects but also distributed the products of these improved technologies which include pro trays plantlets of ginger and turmeric developed through the method of rapid multiplication of planting materials. The new technology products like biocapsules with encapsulated microorganisms and crop-specific micro-nutrient mixtures were distributed to the farmers for creating awareness on balanced fertilization. Minor implements like sprayers, electric dryers and other farm tools were provided for reducing the drudgery and efficient spraying of chemicals. To encourage timely irrigation, sprinkler pipes and other irrigation accessories were provided to farmers. To adopt good agricultural practices in spice cultivation and to fetch high income from per unit land area, SC farmers were given FYM, vermicompost, neem cake, fertilizers and plant protection chemicals.

One such timely intervention was from Coimbatore centre where inorganic fertilizers (Urea, SSP, MOP), vermicompost, turmeric-micronutrient mixture, neem cake and other plant protection chemicals were distributed to SC farmers who were planning to drop turmeric cultivation due to price fluctuation and marketing issues in turmeric, motivating them to continue cultivation.



**Fig 3: Distribution of farm inputs for the betterment of SC people**

**Table 2: Details of input distribution carried out by various AICRPS centres**

Sl. No.	AICRPS centre	Planting materials/ seeds distributed	Micro nutrients (kg)	Bio capsules (no.)	Farm inputs	Minor implements (no.)
2018-19						
1.	ANDUAT, Kumarganj	Turmeric rhizomes – 30 q coriander seed- 46 kg, fennel seed- 46.25 kg, fenugreek seed-23 kg pea seed- 50 kg	-	-	-	-
2.	UHS, Sirsi	Black pepper rooted cuttings – 12300 no. black pepper grafts- 500 no.	-	-	-	-
2019-20						
1.	RARS, Ambalavayal	Black pepper rooted cuttings- 500 nos., turmeric rhizomes- 500 kg			<i>Trichoderma</i> - 150 kg, <i>Pseudomonas</i> - 150 kg vermicompost- 250 kg	
2.	UHS, Sirsi	Black pepper rooted cuttings – 14650 no.	-	-	-	-
2020-21						
1.	RARS, Ambalavayal	Turmeric rhizomes-100 kg ginger rhizomes- 100 kg	Sampoorna micronutrient mix- 25 kg		<i>Trichoderma</i> - 50 kg, <i>Pseudomonas</i> - 50 kg vermicompost- 250 kg	Sprayer (1L) – 50
2.	ICAR, Gangtok	Large cardamom- 20,000 suckers, turmeric rhizomes (IISR-Pragati) - 800 kg fennel- 85 kg fenugreek- 60 kg coriander- 45 kg nigella-15 kg and ajwain- 15 kg	-	-	Naapak 2000 kg, Phytoneem 100 litres, Spinosad 100 units, liquid NPK 100 litres, mulching sheet 74 rolls, Jalkund 30 Nos, agro shade net 30 bundles, gumboot 90, gloves 90	sprayers- 49, spades- 90, garden rake- 82, sprinkler 30 sickle-90 khurpi -90
3.	JNKVV, Jabalpur	Fenugreek- 90 kg	90	-	Fertilizers-2145 kg	hand operated battery sprayers- 10, hand hoes and spade- 16 pairs
4.	AUJ, Mandor		-	-	NPK fertilizers- 200 kg	knapsack sprayers- 60



5.	IGKVV, Raigarh	Seed spices- 15 kg turmeric- 50 kg	100	100	Vermicompost- 10 q	Sprayers- 7
2021-22						
1.	TNAU, Coimbatore	Turmeric- 500 kg	100	100	Fertilizers (Urea, SSP, MOP), vermicompost, neem cake, plant protection chemicals	-
2.	ICRI, Gangtok	Ginger rhizome (variety- Nadia)- 100 kg	50	-	-	Multipurpose electric driers- 16
3.	JNKVV, Jabalpur	-	90	-	Fertilizers-2400 kg, biofertilizers- 40 L	hand operated sprayers- 10 sprinkler pipes/irrigation pipes (2.5", 20 feet length)-80
4.	AUJ, Mandor	Cumin seed (GC- 4)- 150 kg	-	-	50 kg of various agro-chemicals	knapsack sprayers- 30, khurpi- 60, tripal- 60
5.	SKLTSHU, Kammarpally	Turmeric (IISR Pragati)- 350 kg	120	120	-	-
6.	UHS, Sirsi	Black pepper rooted cuttings – 16500 no.			<i>Trichoderma</i> - 120 kg	
7.	SKLTSHU, Kammarpally	Turmeric (IISR Pragati)- 400 kg (Rajendra Sonia)- 400 kg	230	230	-	-



**Fig 4: Distribution of rooted black pepper cuttings to SC farmers by Hon'ble MP of Wayanad, Sri. Rahul Gandhi at Ambalavayal under SCSP of ICAR-AICRPS**



**Fig 5: Distribution of seed materials to SC farmers by various AICRPS centres**





**Fig 6: Distribution of farm inputs to SC farmers by various AICRPS**



## Front Line Demonstrations

Front Line demonstration (FLD) is a unique approach to provide a direct interface between researcher and farmers as the scientists are directly involved in planning, execution and monitoring of the demonstration of the technologies developed by them and get direct feedback from the farmers. This enables the scientists to know the working of the technology at field level, helps in understanding the short comings and refine them accordingly and the farmers get awareness on the new technologies developed by the researchers. Thus, FLDs provide an opportunity for the researchers to understand the field situations, resources available with the farmers, requirement of farmers etc. and helps the researchers to fine tune or modify the technologies for acceptance and adoption by the farmers.

Under SCSP of ICAR- AICRPS, the various centres took keen interest in demonstrating the improved varieties and technologies in farmer's field. Some of the technologies demonstrated under SCSP programme are as follows

- ❖ Demonstration of stable curcumin variety IISR Pragati (Coimbatore, Kammarpally, ICAR Gangtok)
- ❖ Demonstration of high yielding turmeric variety CO 2 (Coimbatore)
- ❖ Demonstration of high yielding turmeric variety Suranjana (Pundibari)
- ❖ Demonstration of high curcumin turmeric variety Rajendra Sonia (Kammarpally)
- ❖ Demonstration of high yielding cumin variety GC 4 (Mandor)
- ❖ Demonstration of high yielding fenugreek variety RMt 1 (Jabalpur)
- ❖ Demonstration of high yielding fenugreek variety HM 273 (Hisar)
- ❖ Demonstration of high yielding coriander variety Chhattisgarh Shri Chandrahasini Dhaniya-2 (Raigarh)
- ❖ Demonstration of high quality coriander varieties Hisar Bhoomit and Hisar Sugandh (Hisar)
- ❖ Protray cultivation technique for quality seed production of ginger & turmeric (Kammarpally)
- ❖ Demonstration on beneficial effects of biocapsules and micronutrients specific to ginger, turmeric and black pepper and distribution of biocapsules and micronutrients were taken up on a pilot scale in all the spice growing tracts through AICRPS centres
- ❖ Demonstration of multipurpose electric dryers for drying large cardamom and ginger (ICRI Sikkim)

An FLD on cultivation of improved cumin variety GC-4 along with the recommended crop management and protection technologies was conducted by ARS Mandor in a farmer's field in Anwana Baori of Jodhpur district (12 ha). During 2021-22, thirty demonstrations were conducted in cumin in two villages of Jodhpur district viz., Padasala and Anwana. The seeds of GC 4 variety of cumin was distributed to the farmers. This variety has high yield, wilt resistance with superior seed quality and high aroma.

Through the lecture sessions/ farm-level demonstrations, knowledge level of the farmer/ farmers in the neighbourhood on cultivation practices, weed management and plant protection measures was substantially improved. There was perceptible increase in the productivity of the crop on account of adoption of different technologies like use of improved cumin variety GC-4, line sowing, weed management, diseases and insect pest management by different fungicides and insecticides, improved spray efficiency on account of use of knapsack sprayers. Details of the technology package was as follows.



**Table 3: Details of farmer and the cultivation practices adopted**

Personal details	
Name of farmer	Jai Ram
Fathers name	Mangi lal Meghwal
Age	40
Education	Illiterate
Mobile number	9001520243
Address	Anwana Baori, Jodhpur
Field details	
Cultivated area	1.0 ha
Cumin area	0.6 ha
Other crops	Mustard
Cost of cultivation	Rs 36,100
Net income	Rs 1,24,400
Before and after adoption of technologies in cumin	
Before	After
<ul style="list-style-type: none"> <li>• Use of local cumin variety</li> <li>• Seed rate</li> <li>• Seed treatment – No</li> <li>• Soil treatment – No</li> <li>• No optimum use of fertilizer</li> <li>• Hand weeding</li> <li>• No timely management of diseases and insect pests</li> <li>• Yield – 5 q/ha</li> </ul>	<ul style="list-style-type: none"> <li>• Improved cumin variety GC-4</li> <li>• Seed rate @ 12 kg/ha</li> <li>• Seed treatment with carbendazim @ 2 g/kg seed</li> <li>• Soil treatment with <i>Trichoderma</i> @ 2.5 kg mixed with 100 kg FYM</li> <li>• Fertilizer management (N- 30 kg, P-20 kg, K-15 kg, zinc sulphate 10 kg/ha)</li> <li>• Weed management with oxyfluorfen 50 a.i. g/ha at 20 DAS.</li> <li>• Wilt management with <i>Trichoderma viridae</i> (2.5 kg mixed with 100 kg FYM)</li> <li>• Sucking pest management (spray of acephate @ 750 g/ha)</li> <li>• Blight management – spray of Metiram 55% + Pyraclostrobin 5% WG</li> <li>• use of knapsack sprayer for improved spray efficiency</li> <li>• Yield - 8 q/ha</li> </ul>
Farmer feed back	
Increased yield due to adoption of improved crop production and protection technologies in cumin.	

**Fig 7: Field view of GC 4 cumin**

## Area expansion of spices

Spices are low volume and high value commodities of commerce in the world market and have great potential in increasing the farmer's income substantially. India has been a traditional producer, consumer and exporter of spices in the world and almost all states in the country produce one or other spices. Non availability of quality planting material (particularly improved varieties) is one of the important production constraints that affect the area expansion or gap filling programmes. There is immense scope for the employment and income generation through cultivation of spices which was even reflected during pandemic. But lack of awareness and technical know-how hampers spice production. Hence farmers need to adopt appropriate production techniques for planting material production.

With the mission of improving the livelihood of the SC communities and with the slogan of "SPICING UP WELFARE OF SC", through Scheduled Caste Sub Plan component, ICAR-AICRPS targeted intensification of spices cultivation and replacement of traditional cultivation practices in SC communities through scientific practices for improving the economic and social wellbeing of these castes. Area expansion programme was carried out to intensify the cultivation of spices in the non-traditional areas and to create the seed hub of elite varieties of spices. During the period 2018-22, the acreage of the following elite varieties of spices were expanded in the SC colonies and by adopting the scientific cultivation practices, they could harvest high yield which in turn could improve the socio economic status of the SC communities.

**Table 4: Area expansion of spices through SCSP**

Sl. No.	AICRPS centre	Crop	Variety	Area
1.	TNAU, Coimbatore	Turmeric	Co 2 IISR Pragati	10 acres 2.5 acres
2.	ICAR, Gangtok	Turmeric	IISR Pragati	2.5 acres
3.	SKLTSHU, Kammarpally Jakranpally & Kammarpet  Koritikal	Turmeric	IISR Pragati, Rajendra Sonia	0.40 acres
			IISR Pragati, Rajendra Sonia Waigon	0.30 acres
4.	IGKVV, Raigarh	Coriander	Chhattisgarh Shri Chandrasahini Dhaniya-2	1 acre
5.	ARS, Mandor	Cumin	GC-4	30 acres
6.	JNKVV, Jabalpur	Fenugreek	RMt-1	22.5 acres
7.	CCSHAU, Hisar	Coriander	Hisar Bhoomit Hisar Sugandh	4 acres 4 acres
		Fenugreek	HM-273	6 acres





**Fig 8: Spice varieties used for area expansion programme**

## Future line of work

The ICAR-AICRP on Spices is the largest spices research system in India, with a network of 19 regular, 11 co-opting, 8 voluntary and 2 project mode centres operating across the country. The AICRP on Spices has contributed substantially, ever since its inception, in developing high yielding varieties with desirable agronomic traits, technologies for increasing the production and productivity, and management strategies for combating pests and pathogens, substantially reducing crop losses. ICAR-AICRPS works for the up-liftment of the under privileged communities through its TSP (tribal sub plan) and SCSP components. AICRPS intends to cover more SC farmers and support spices cultivation to earn more income and improve their livelihood in the coming years. Some of the activities intended to be taken up include

- Cultivation of improved spices varieties and to encourage farmers to include spices in cropping system in the non-traditional areas.
- Front line demonstrations (FLDs) in SC farmers' fields for technology adoption and dissemination
- Popularization of ginger cultivation (Bold Nadia Ginger) among SC farmers in the NE region and black pepper cultivation in homestead gardens
- Scientific cultivation of large cardamom and improved drying practices for spices
- Continuation of spice clinic programme for on-spot diagnosis and management of biotic stresses
- Women employment and empowerment through trainings and formation of self-help groups.
- Development of model SC spice villages through convergence of resources and active participation of farmers, state extension agencies, NGOs, SHGs etc.





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ICAR-Indian Institute of Spices Research

Post bag No. 1701, Marikunnu P. O.,

Kozhikode- 673 012, Kerala, India.

Phone: 0495-2731794/2731410, Fax: 0495-2731794,

e-mail: aicrspices@gmail.com; AICRP.spices@icar.gov.in

Web site: [www.aicrspices.icar.gov.in](http://www.aicrspices.icar.gov.in)