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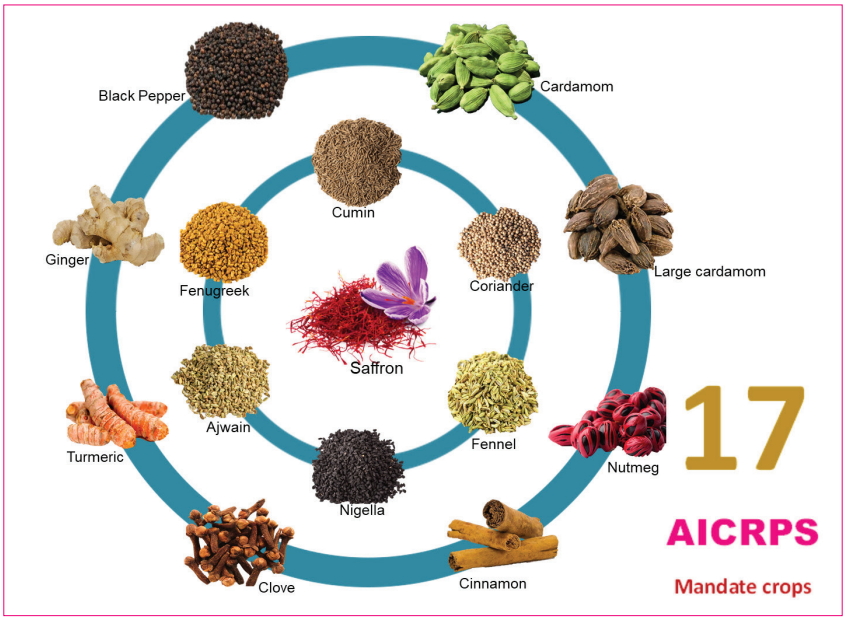
Fifty years of ICAR-AICRPS: Spices, sustainability and the pursuit of sustainable development goals

Spices have been the cornerstone of India's cultural and economic identity for millennia, attracting global demand from ancient civilizations to modern markets. The ICAR-All India Coordinated Research Project on Spices (AICRPS), based at ICAR-IISR in Kozhikode, began in 1971 and has evolved into India's largest spices research network, spanning 38 centres across 14 agroclimatic zones and covering 17 spice crops. By advancing sustainable, equitable, and climate-resilient practices, ICAR-AICRPS contributes meaningfully to the UN Sustainable Development Goals, including Zero Hunger, Gender Equality, and Responsible Production and Consumption.

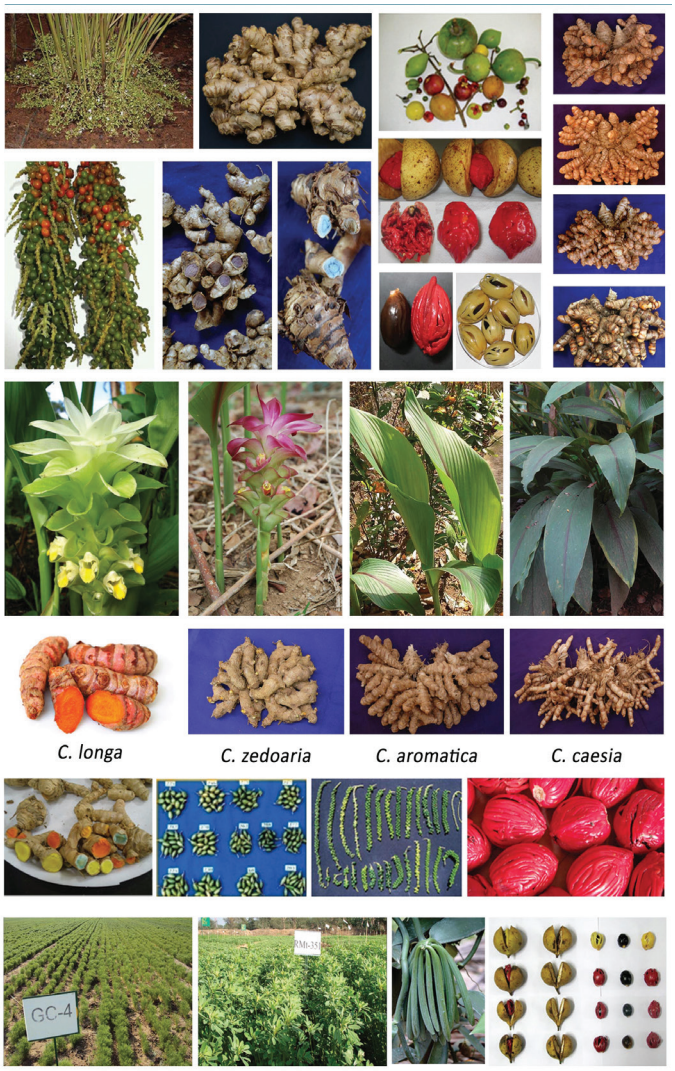
ICAR Spices have shaped India's identity since antiquity–drawing explorers, traders, and civilizations. The United India Project on Spices (ICAR-AICRPS), launched in 1971 at ICAR-IISR, Kozhikode, is now India's largest spice research network, spanning 40 centers across 14 agroclimatic zones in 25 states, focusing on 17 spice crops.

ICAR-AICRPS maintains over 7,762 germplasm accessions–the largest repository of spice genetic diversity in India. It has developed approximately 192 improved varieties, including game-changing cultivars: *Panniyur* 1 (first hybrid black pepper), Gujarat Cumin4, IISR *Pragati* and *Prathibha* (turmeric), IISR *Keralashree* (nutmeg), and others. *Panniyur*1 alone covers ~70% of India's pepper area and boosts export earnings. The project has introduced 194 cropspecific technologies ranging from micropropagation and single-bud protray planting to drip irrigation, seed coatings, and organic nutrient and pest management systems benefiting tribal farmers, women, and marginal communities. These innovations support multiple SDGs, including Zero Hunger (SDG 2), Clean Water (SDG 6), Gender Equality (SDG 5), and Sustainable Production (SDG 12). By transforming spice cultivation into sustainable, equitable, and climate-resilient enterprises, ICAR-AICRPS exemplifies the journey from traditional spice trade to modern, SDG-aligned agricultural innovation.



Genesis to journey of excellence

The genesis of ICAR-AICRPS dates back to 1971, during the Fourth Five-Year Plan, when ICAR launched the All India Coordinated Spices and Cashew Improvement Project (AICSCIP) with four foundational centres headquartered at the Central Plantation Crops Research Institute (ICAR-CPCRI), Kasaragod, Kerala. As research momentum grew, the need for focused work led to the bifurcation of AICSCIP into separate coordinated projects for spices and cashew. By 1986, the spices wing became a standalone body renamed the All India Coordinated Research Project on Spices (AICRPS), headquartered at ICAR-IISR, Kozhikode. The network expanded to 13 centres, laying the foundation for systematic research on varietal improvement, germplasm conservation, and crop management across India's agro-ecological zones. By 1996, ICAR-AICRPS had grown to 19 regular centres, fueled by intensified multi-locational evaluation in breeding, plant



protection, and spice-specific agrotechnologies. By 2008, the network further increased to 34 centres, including 17 voluntary ones, ensuring broader regional representation and collaborative research. Its institutional strength was bolstered when ICAR-IISR (Kozhikode) and ICAR-NRCSS (Ajmer) coordinated support across 14 agroclimatic zones. In 2018, ICAR-AICRPS diversified thematically by adding saffron and kalazeera to its mandate. Today, ICAR-AICRPS operates via 40 centres–19 regular, 19 voluntary, and 2 project-mode centres–driving the nation's spice revolution.

Seeds of change: Germplasm and varietal breakthroughs

At the heart of ICAR-AICRPS lies its unmatched contribution to crop improvement. With over 7,762 germplasm accessions collected and preserved from across India's diverse agro-ecological zones, ICAR-AICRPS maintains one of the richest repositories of spice biodiversity. Even undergoing a simple selection procedure among these unique germplasms has been the exclusive midwife to approximately 80% of the spice varieties that have gracefully graced our spice fields. Noteworthy among these genetic treasures are the monoecious nutmegs, yellow mace nutmeg and the seedless, double seeded nutmegs, white gingers, Zanzibar cloves, *Karivilanchi* black peppers, Pepper thekkan, determinate fenugreek, large fennel, etc., exemplifying the distinctive and illustrious lineage preserved within this haven of biodiversity. The ICAR-AICRPS is also involved in identification of elite lines including farmer's varieties in black pepper, cardamom and nutmeg, through participatory breeding and establishing specialty gardens in perennial tree spices, especially nutmeg.

Glimpses of germplasm aceesions conserved at various ICAR-AICRP on Spices centres

Utilizing the germplasm, about 192 varieties in spice crops have been developed and released for cultivation through initial evaluation trial (IET) and coordinated varietal trial (CVT) at various agro-climatic regions of the country through ICAR-AICRPS with high yield, pest/disease resistance and quality attributes. These improved varieties of various spices available in the country capable of doubling the farmers' income directly or indirectly. High yielding varieties enhances the income by increasing the yield from 10-30 % compared to the local cultivars.

Certain mega-varieties, evolved through ICAR-AICRP on Spices, including Gujarat Cumin-4 (GC-4) in Cumin, *Panniyur*-1 in Black Pepper, IISR *Pragati,* IISR *Pratibha, Roma, Megha* Turmeric in Turmeric, IISR Kerala shree, and *Konkan Sugandh* in Nutmeg, along with Bold *Nadia* in Ginger, stand as pivotal keystones that have unequivocally transformed the agricultural landscape. These mega-varieties, each serving as a catalyst, have metamorphosed traditional spice cultivation into dynamic, high-yielding enterprises. From *Panniyur*-1, the world's first hybrid black pepper, occupies approximately 70% areas of

Panniyur-1

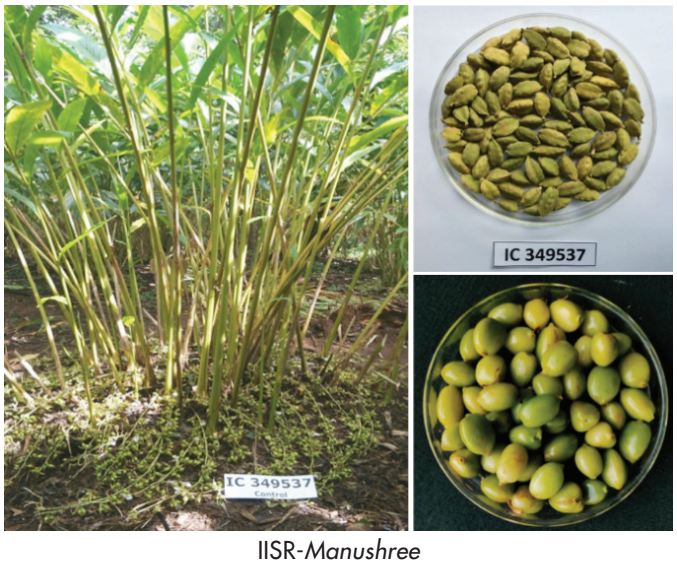
ICRI-5

Genetic goldmine: Crop-wise accession holdings in ICAR-AICRPS centres

Crop	Accessions
Black Pepper	476
Cardamom	284
Large cardamom	66
Ginger	459
Turmeric	1,767
Mango Ginger	10
Black Turmeric	8
Tree spices	164
Coriander	1,226
Cumin	975
Fennel	731
Fenugreek	1,221
Ajwain	90
Nigella	16
Saffron	247
Kalazeera	22
Total	7,762

black pepper production. Its success is mainly due to the high yield, input responsiveness. *Panniyur*-1 contributed significantly to export earnings (₹527 crore-annum). Its popularity led to the expansion of its cultivation even in remote countries such as Sri Lanka, Vietnam, Indonesia, the Philippines, and Brazil. Similarly, ICRI-5, India's first intervarietal cardamom hybrid, features early flowering, a high percentage of bold capsules (~70%), dark green capsule colour, and drought tolerance marked the major milestone, with ICAR-AICRPS steering the nation toward the development and adoption of high-yielding varieties. *Appangala*-2 represents a major breakthrough as the first Katte mosaic virus-resistant cardamom variety, IISR *Manushree* and IISR *Kaveri* as the first extreme moisture tolerant cardamom varieties with bold capsules.

A major scientific breakthrough led by ICAR-AICRPS was the exploitation of seed development in turmeric, a crop traditionally propagated through rhizomes. The release of IISR *Prabha* and IISR *Prathibha* as the world's first seed-derived turmeric varieties was a global first, both possessing high yield potential and high curcumin content. These varieties are gaining wide popularity in turmeric-growing regions for their superior agronomic and quality traits. IISR *Pragathi,* a short-duration variety, addresses the need for early harvest and flexibility in cropping systems. Other regionally adapted turmeric varieties released



IISR-*Manushree*


Prabha

Prathibha


IISR *Amrit*

Gujarat Cumin-4 (GC-4)

Shalimar Kesar-1

through ICAR-AICRPS include *Suroma, Roma,* and *Rashmi* from Odisha, which exhibit excellent adaptability to hilly and rainfed areas. In the Indo-Gangetic plains, NDH series turmeric varieties such as NDH-98 and NDH-8 have gained prominence, producing up to 37 t/ha with moderate resistance to rhizome rot and foliar diseases. IISR *Amrit* marks a milestone as a mango ginger variety suitable for cultivation across India. In nutmeg, the release of *Konkan Sanyuktha,* a monoecious high-yielding variety, eliminated the need for maintaining male trees, thereby enhancing plantation efficiency. *Konkan Sugandha,* another notable variety, features high oil content in nut and mace. IISR *Keralashree,* the first nutmeg variety developed through farmer participatory breeding, combines high nut yield, high mace recovery, and tolerance to Diplodia rot, making it suitable for disease-prone areas. In clove, PPI(CL)1 was the first variety released under ICAR-AICRPS, known for its high essential oil content (6%) and superior bud quality. In cinnamon, both true cinnamon and cassia types have been developed with reduced coumarin levels, making them safe for consumption and compliant with international standards.

Seed spices have seen equally transformational developments. The cumin variety GC-4 alone occupies nearly 70% of India's cumin-growing area, a testament to its superior performance and adaptability. Its success is mainly due to the wilt resistance GC4 led to substantial increases in export earnings (₹4,251 cr annum) for the nation. Mutation-bred coriander varieties like RCR 684, that exhibits bold seeds and resistance to stem gall disease. Several coriander varieties bred at Lam, Guntur, such as *Susthira, Suguna,* and *Sudha,* now occupy around 70% of the coriander area in Andhra Pradesh and Telangana. These varieties are known for their high oil content, dual-purpose utility (leaf and seed), and adaptability to both rainfed and irrigated conditions. *Rajendra Dhania*-3, released for cultivation in Bihar and eastern India, is climate-resilient and has a high essential oil content (0.52%). In fenugreek, ICAR-AICRPS has released multiple varieties with distinct agronomic advantages. HM 425, HM 257, and HM 273 are resistant to both downy mildew and powdery mildew, while *Narendra Richa* shows tolerance to alkaline soils. Gujarat *Methi* 3 and 4 and Lam *Mehti*-2 are high-yielding and climate-resilient varieties that have gained significant farmer acceptance. *Ajwain* breeding under ICAR-AICRPS has led to the release of high-yielding and root rot-resistant varieties like Ajmer *Ajwain*-73, Lam *Ajowain*-2 and 3, Chhattisgarh *Ajwain*-1, and Gujarat *Ajwain*-2 and 3. These varieties are also rich in thymol and are early maturing, aligning with both agronomic and industrial requirements. In nigella (*kalonji*), varieties such as Ajmer Nigella-1, CG *Karayat*-1, and *Hisar Kalonji*-12 have been released with high volatile oil content (>0.9%), robust disease resistance, and high productivity. For high-altitude and temperate conditions, saffron and *kalazeera* improvement programmes under ICAR-AICRPS have yielded *Shalimar* Saffron-1, which offers high stigma yield and early flowering, and Shalimar *Kalazeera*-1, which combines high volatile oil with enhanced aroma, suitable for the unique agroecology of Kashmir and Ladakh, directly aligning with sustainable agricultural goals by promoting responsible consumption and production (SDG 12). Beyond the agricultural realm, their impact resonates in the broader economic narrative, significantly contributing to the upliftment of the Indian economy. They are rightfully acknowledged as 'Game changer varieties.'

Smart farming, greener and safer fields: Technological interventions for sustainability

ICAR-AICRPS, with its avant-garde approach, has pioneered the development of 194 crop-specific technologies. These innovations span moisture and nutrient conservation and enhancing its availability to crop, organic management practices, evolving the cropping or farm system approaches to maximise yield and returns, rapid multiplication methods of planting materials, and sophisticated plant health management across diverse spice crops. These cutting-edge technologies, meticulously popularized through impactful demonstrations, find swift adoption within the concerned states, disseminated through the conduits of state agricultural departments.

One of the most game-changing innovations to come from ICAR-AICRPS is the Single Bud Protray Technology. By using 5-6 g rhizome bits for propagating ginger and turmeric, this technique reduced planting

material requirement by 75%, cut seed costs by 60%, and ensured uniform, disease-free planting stock with a field establishment rate above 98%. This not only makes cultivation more economical and efficient but also supports local employment and income opportunities, especially among women in tribal regions, contributing to gender equality (SDG 5) and decent work and economic growth (SDG 8).

Turmeric protray

With moto, "More crop per drop for efficient utilization of water," in water-scarce regions, ICAR-AICRPS introduced location-specific drip irrigation and fertigation schedules. In black pepper through drip irrigation from December to April @ 2 L/day increased the green berry yield of black pepper and could withstand the severity of drought. In cardamom, drip irrigation increased yields by over 60%, with BC ratios exceeding 3.0. Application of water through drip system at 80% pan evaporation (once in a day for 45 min) increases 10-15 % yield in turmeric. Seed spices like coriander, cumin, fenugreek and fennel saw 25% water and 20% fertilizer savings alongside yield gains of 30–50%. These innovations directly support SDG-6 (Clean Water and Sanitation) and SDG-13 (Climate Action) by promoting efficient resource utilization and reducing the environmental footprint of spice cultivation.

Drip irrigation layout in fenugreek

ICAR-AICRPS has made significant strides in promoting balanced nutrition through micronutrient supplementation for various spices, directly contributing to several SDGs. Foliar application of 0.25% Zn twice (June, August) or basal soil application of 6 kg Zn and 1.0 kg Mo is recommended for black pepper, increasing yield and quality, thus supporting SDG 2 (Zero Hunger). Small cardamom benefits from boron (20 kg/ha) or molybdenum (0.25 kg/ha) mixed with FYM, while ginger yield in West Bengal increases with 5 kg/ha borax, enhancing productivity and farmer livelihoods (SDG 8). For iron-deficient soils in Bihar, 0.5% foliar ferrous sulphate for turmeric at 60 and 90 days after planting improves yield with a 1:2.54 C:B ratio. Similarly, two sprays of 0.5% zinc sulphate for zinc-deficient saline coriander soils in Tamil Nadu boost seed yield to 772.44 kg/ha with a 2.10 B:C ratio. Furthermore, applying $ZnSO_4$ (0.50%), FeSO4 (0.25%) + 0.125%, and MnSO4 (12.5 kg/ha + 0.25%) increases fennel yield, and crop-specific micronutrient mixtures sprayed twice yearly increase black pepper, ginger, and turmeric yields by 15-25% and improve quality, leading to responsible consumption and production (SDG 12) through efficient nutrient use and reduced waste.

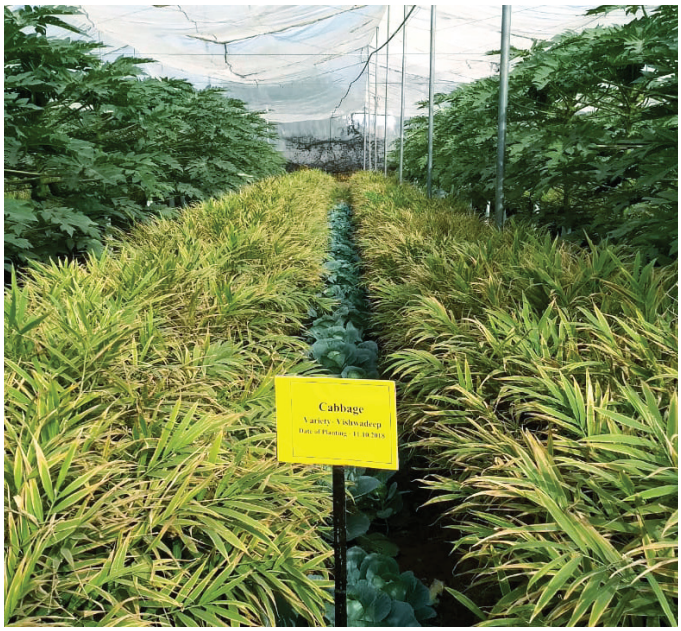
ICAR-AICRPS achieved a significant breakthrough by grafting black pepper onto Phytophthora-resistant Piper colubrinum rootstock. This eco-friendly innovation sustainably manages devastating foot rot disease, particularly in high-rainfall regions, by eliminating the need for excessive fungicide use. This directly contributes to SDG 3 (Good Health and Well-being) by reducing chemical exposure, SDG 12 (Responsible Consumption and Production) through sustainable agricultural practices, and SDG 15 (Life on Land) by fostering healthier ecosystems.

Black pepper: Colubrinum graft

The project also committed with development of comprehensive suite of eco-friendly technologies for organic nutrient management, directly contributing to food-safe spice production. Soil health restoration and biological disease suppression are now key pillars of ICAR-AICRPS interventions. By prioritizing organic nutrient management and biological disease suppression, the project ensures safer, more nutritious food (SDG 2) and promotes responsible consumption and production (SDG 12). Practices like mulching in black pepper mulching the basins of vines with sawdust, coconut husk, dry leaves, or polythene sheets has proven highly effective, reducing vine casualty, minimizing spike shedding, and

increasing yield by a significant 30-70%, while improving soil moisture retention and reducing water usage (SDG 13, 15). Turmeric cultivation using FYM (30 t/ha), vermicompost (20 q/ha), and neem cake (8 q/ha) boosts yields by 68% and farmer income with a beneficial B:C ratio of 3.64 (SDG 2, 8, 12). Similar organic methods for coriander yield 753.25 kg with a 2.05 B:C ratio, and for cumin, 320 kg/ha with optimized nutrient use (SDG 8, 12). Furthermore, across various seed spices, an environment-friendly seed coating technology using PGPR FK 14 and FL 18 isolates has resulted in increased yield (10-30%), enhanced seed germination and quality, and reduced storage pests. (SDG 2, 12), while biocontrol agents and bio-fumigation ensure a healthier food chain by reducing chemical reliance (SDG 3, 15).

Furthermore, ICAR-AICRPS promotes sustainable cropping systems: mixed cropping with chillies, colocasia, brinjal, cereals (maize and *ragi*), papaya, banana, and citrus is recommended for Andhra Pradesh, with K2 chillies as border crops in Tamil Nadu. Crop rotation practices, such as turmeric and maize (Tamil Nadu), turmeric rotated with maize or paddy (Andhra Pradesh, and Odisha), and turmeric and radish (Maharashtra), are also key recommendations. Another instance, the black pepper–elephant foot yam mixed cropping system boasts a 3.21 benefit-cost ratio, enhancing resilience and productivity Sequential cropping involving turmeric-banana-sugarcane-turmeric or turmeric-banana-paddy-turmeric has proven beneficial under Tamil Nadu conditions, enhancing soil fertility and pest management. Intercropping coriander and fennel with garlic in states like Uttar Pradesh and Madhya Pradesh also demonstrates higher aggregate yields and improved income stability for smallholders (SDG 8), while offering pest deterrence. These diversified farming systems align with SDG 2 (Zero Hunger) by enhancing resilience and productivity, SDG 15 (Life on Land) by promoting biodiversity and healthy ecosystems, and SDG 13 (Climate Action) by reducing reliance on monoculture and its associated environmental impacts.



Ginger-Cabbage-Pappaya intercropping system


Turmeric-Shallot Intercropping system

From lab-to-land to fork: Crop protection for a safer food chain

AICRPS's approach to crop protection emphasizes integrated, eco-safe solutions. For black pepper, protocols to manage Phytophthora foot rot using grafting on Piper colubrinum, organic manures, and biologicals have reduced chemical use and sustained yields. The practice of biofumigation using mustard and cabbage residues has proven effective for managing rhizome rot in ginger, when combined with rhizome treatment using Metalaxyl + Mancozeb (1.25 g/l for 15–20 min)**.** This sustainable method enhances soil health while mitigating pathogen load without harming beneficial microbiota, promoting climate-smart agriculture and contributing to SDG 13 (Climate Action) and SDG 15 (Life on Land) by reducing dependency on synthetic soil fumigants.

Biological control has been effectively harnessed for managing major spice diseases. Application of Trichoderma viride @ 150 g/vine along with 5 kg FYM during June significantly reduced *Phytophthora* foot rot in black pepper, while solarized potting mixtures fortified with T. harzianum (1g/kg) and VAM (100 cc/kg) were successful in nurseries. For mangement of soil borne pathogens in black pepper, Soil application of Trichoderma harzianum and Pochonia chlamydosporia at 50g/vine (twice) during the months of May/June and Auguest/September along with the foliar spray with Bordeaux mixture (1%) found effective. For stem gall in coriander**,** seed treatment and foliar sprays with IISR Pseudomonas talc formulation (0.4%) were effective in susceptible variety *Rajendra Swati*. Similarly, pseudostem rot in small cardamom was effectively managed by T. harzianum (50 g + 1 kg neem cake) combined with Pseudomonas fluorescens (2% spray). Eco-friendly control of powdery mildew in coriander was achieved using 5% NSKE sprayed thrice at 15-day intervals. These low-residue solutions support sustainable agriculture (SDG 2) and reduce chemical load, promoting ecosystem resilience (SDG 15).

ICAR-AICRPS has developed comprehensive IPDM modules combining phytosanitation, chemical, and biological interventions. For slow decline in black pepper, the integration of Bordeaux mixture spray (1%), copper oxychloride (0.2%) drenching, and neem cake @ 2 kg/

Demonstration of quality planting material production in tribal lands of Chintappalle, Andhra Pradesh

vine proved effective. In large cardamom**,** phytosanitation paired with bio-agent application reduced pest and disease prevalence. In Coriander, two foliar sprays of *Lecanicillium lecanii* 1.15WP (1×109 cfu/g) (40g/10 L) + spray of Propiconazole 25 EC @ 0.05% (first spray) + Carbendazim @ 0.1% (second spray) is recommended for the control of stemgall and aphid. These strategies, through synergistic use of eco-friendly inputs and chemicals, provide holistic protection while aligning with SDG 3 (Good Health) by minimizing toxic residues and SDG 12 (Responsible Consumption and Production).

New-generation fungitoxicants have been introduced for effective disease management with improved safety. For black pepper, the combination of Fenamidone (10%) + Mancozeb (50%) applied as foliar spray (2 l/vine) and drenching (3 l/vine) alongside *T. harzianum* (50 g) and 1 kg neem cake in June and August reduced leaf infection, yellowing, and vine mortality. In ginger, Hexaconazole (0.1%) and Propiconazole (0.1%) sprays at disease appearance and 20-day intervals in Solan and Pundibari achieved 60–78% control of Phyllosticta leaf spot, with B:C ratios up to 1:2.07. In turmeric, rhizome treatments and foliar sprays with Propiconazole (0.1%) at 90, 105, and 120 DAP managed *Colletotrichum* leaf spot (18.34%) and *Taphrina* blotch (21.67%) in Bihar. At Chhattisgarh, a combined rhizome and foliar treatment with Carbendazim + Mancozeb (0.1%) reduced *Colletotrichum* intensity to 13.64% (B:C ratio 1:2.8), while Azoxystrobin (0.1%) effectively checked *Taphrina* blotch (15.48% intensity, B:C 1:2.8). For cumin wilt, seed and soil application of *T. harzianum*, coupled with Topsin (0.07%), Mancozeb (0.3%), and neem oil sprays, delivered promising results. These newer molecules, with lower environmental persistence, contribute to climate-resilient agriculture (SDG 13).

Tailored Good Agricultural Packages (GAPs) based on regional disease dynamics have been implemented for spices such as black pepper, ginger, turmeric, small cardamom, large cardamom, and tree spices. These practices

Demonstration plot for the singe bud propagated ginger for the tribal farmers of Koraput, Odisha

Demonstrations of saffron technologies, Pampore Centre

enhance resilience, productivity, and profitability–directly supporting SDG 2 and SDG 9 (Industry, Innovation and Infrastructure).

Empowering the margins: Tribal and North eastern outreach

The ICAR-All India Coordinated Research Project on Spices (AICRPS) has been a transformative force in fostering social benefits across India, particularly in tribal and marginalized regions, directly aligning with UN Sustainable Development Goals (SDGs). Through targeted interventions, through Govt. of India's projects like Tribal Sub Plan (TSP), Schedule Caste Subplan (SCSP) and North Eastern Hill (NEH) region programmes, it has transformed agriculture in some of India's most underserved regions.

ICAR-AICRPS centres have significantly uplifted socio-economic statuses by promoting high-yielding varieties and scientific practices. At Koraput, Pottangi, in Odisha, the introduction of Roma turmeric and Suprabha ginger, coupled with raised bed cultivation and single-bud protray propagation, doubled yields, increasing net returns to ₹2.25 lakh/ha for ginger and ₹1 lakh/ha for turmeric. Over 3 lakh black pepper cuttings were disseminated, creating income and employment, especially for tribal women in nursery raising and processing. These efforts directly contribute to SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 5 (Gender Equality), and SDG 13 (Climate Action)**.** Similarly, the Chintapalle centre in Visakhapatnam transformed tribal farming by introducing improved turmeric (*Roma,* IISR-*Pragathi*) and black pepper varieties, boosting turmeric yields from 3.5 t/ha to 8-10 t/ha and net returns from ₹1.65 lakh to ₹4.2 lakh/ha. Over 9800 tribal farmers were mobilized into FPOs, bringing 800 ha under organic turmeric, securing buy-back agreements at ₹113/kg. This work reinforces SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 5 (Gender

Konkan Sanyuktha

Equality), and SDG 12 (Responsible Consumption and Production).

Across the North Eastern Hill (NEH) region, ICAR-AICRPS introduced high-yielding and organic-compatible varieties of turmeric, ginger, large cardamom, and chilli. Technologies like raised bed planting, turmeric boilers, and value-added products (e.g., ginger candy) empowered women and tribal farmers, enabling them to move beyond subsistence farming and enter the market economy. ICAR-AICRPS centres distributed over 4.2 lakh disease-free planting materials over five years and demonstrated improved varieties, leading to 30-50% productivity increases, with turmeric yields reaching 7-9 t/ha (from 3.5-4 t/ha) and curcumin content exceeding 6%. Establishment of spice processing units benefited over 200 tribal households, and 300+ SHG/FPO members were trained in entrepreneurship. These interventions have elevated net returns for ginger and turmeric to ₹1.5-2.5 lakh/ha (from under ₹80,000/ha), strengthening rural economies and furthering SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 5 (Gender Equality), SDG 9 (Industry, Innovation and Infrastructure), and SDG 12 (Responsible Consumption and Production).

Recognitions and the Road Ahead

The impact of AICRPS has not gone unnoticed. In 2017, it was awarded the Chaudhary Devi Lal Outstanding ICAR-AICRP Award, followed by the Fakhruddin Ali Ahmed Award in 2019 for tribal farming research. These accolades validate the project's multifaceted contribution to science, society, and sustainability.

As ICAR-AICRPS steps into the next 50 years, the future beckons with challenges like climate volatility, export compliance, and youth disengagement from farming. However, armed with a legacy of scientific rigor

Distribution of Spices technologies for NEH development, Centre: ICAR-Gangtok

and social commitment, ICAR-AICRPS is well-positioned to address these frontiers. With increased focus on digital agriculture, bio-inputs, and precision farming, the project aims to usher in a new era of spice cultivation that is smart, sustainable, and inclusive. This forward-looking approach will be vital for ensuring the continued prosperity of India's spice sector and the well-being of its farming communities.

In conclusion, ICAR-AICRPS stands as a testimony to how coordinated agricultural research can serve as a backbone for national development. It shows that the spice of life, when nurtured with science and empathy, can become a beacon for sustainable agriculture and social justice. The journey of ICAR-AICRPS is not just about spices; it's about nurturing livelihoods, empowering communities, and building a more sustainable and equitable future for all.

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