



and giant swamp taro, arrowroot, Chinese potato, canna, winged bean and yam bean, among others. These crops are particularly valuable to tribal communities and resource-poor farmers because they fit low-input systems, thrive in diverse ecologies, and offer substantial economic and nutritional returns.

#### **Core functions and major activities**

**Conservation and use of germplasm:** Collection from tribal and hilly regions and conservation in field genebanks to safeguard genetic diversity and enable longterm crop improvement.

**Varietal evaluation and sharing:** Identification and evaluation for yield, earliness, cooking quality and resistance to biotic and abiotic stresses; exchange of promising lines across centres.

**Regionspecific trials:** Multilocation validation to recommend varieties tailored to specific agroclimatic zones.

**Agrotechnique standardization:** Regionwise cultivation practices, cropping systems and fertilizer schedules to raise productivity and sustainability.

**Integrated pest and disease management (IPM/IDM):** Ecofriendly protection strategies that minimise reliance on synthetic chemicals while safeguarding yield and quality.

**Awareness and popularization:** Outreach on nutritional, medicinal and commercial values of tuber crops for farmers, school children, entrepreneurs and policymakers.

**Production and supply of quality planting materials:** Coordinated production and supply of diseasefree planting material with KVKs, NGOs and State Departments to accelerate varietal replacement.

#### **Biodiversity, breeding and varietal release**

Over five decades, the network has consolidated one of the world's most diverse living repositories of tropical tuber crops. Across the 21 centres, 4,448 accessions are conserved, forming the genetic bedrock for breeding programmes. This effort has translated into substantial genetic gains on farms: 152 varieties of 12 tuber crops have been recommended for different agro-ecological regions, and a total of 100 varieties have been formally released at the central or state level after coordinated evaluation. The portfolio spans table and industrial types, early and high-yielding cultivars, and entries with improved cooking quality and stress resilience.

Representative examples include cassava varieties such as *Sree Sahya*, *Sree Sakthi*, *Sree Reksha* and *Aditya* (adapted across the South, Maharashtra, Assam and the North-East); sweet potato lines from the Rajendra series alongside *Kiran*, *Sree Bhadra* and *Kalinga* (suited to Bihar, Jharkhand, Odisha, Andhra Pradesh, Maharashtra and Tamil Nadu); taro varieties including *Sree Swathy*, *Satamukhi*, *Narendra Arvi-2*, *Megha Taro-2* and *Bidhan Bijaya* (with adaptation footprints from Kerala and Tamil Nadu to Meghalaya and the Andaman & Nicobar Islands); yams such as IGDa-2 (greater yam) and *Sree Shilpa*; elephant foot yam *Gajendra* and *Sree Padma* for the peninsular and eastern plains; and specialized crops like Chinese potato (*Sree Dhara*), yam bean (*Rajendra Mishrikand-1/3*), *tannia* (*Konkan Haritparni*) and aerial yam (*CG Dang Kanda-I*).

#### **Production technologies: Raising productivity responsibly**

AICRP's agronomy and production-system research has produced a pipeline of adaptable, field-tested technologies. Across zones, centres have standardised ecoregional agro-techniques that reduce cost while lifting yields, optimized planting geometry, timely irrigation and mulching, residue recycling, and climate-smart scheduling. Cropping and Integrated Farming System models (IFS) interlock tuber crops with cereals, pulses, vegetables, fodder and small livestock to improve resource use efficiency, even out cash flows and improve dietary diversity. Organic packages have been developed for selected crops and rotations, complemented by precision nutrient and water management tools. The programme has also advanced customised fertiliser blends and micronutrient formulations aligned to local soil constraints and crop demand, and evaluated natural-farming/nano-fertiliser options where appropriate.

A notable operational innovation is the establishment of seed collages and decentralised seed multipliers that speed up varietal dissemination. By leveraging progressive farmers, SHGs and local entrepreneurs, these networks place clean, true-to-type planting material within easy reach, cutting transaction costs and shortening the supply chain. This approach has demonstrably improved the timeliness of planting, the uniformity of crop stands and the rate of varietal turnover.



### Plant protection: Integrated and eco-friendly

Tuber crops face a complex of insects, mites, nematodes, pathogens and weeds whose impacts vary by region and season. The network's plant protection work emphasises integrated pest and disease management: surveillance and early warning; clean seed systems; resistant/tolerant varieties; cultural measures (sanitation, drainage, residue and water management); biologicals and botanicals; and rational, need-based use of chemicals when indispensable. Specialised modules have been developed for major syndromes such as cassava stem and root rots, elephant foot yam collar and post-harvest rots, and vectors that spread viruses in vegetatively propagated crops. Complementary research on bioactive molecules from cassava residues adds value while expanding the bio-control toolbox.

### Extension, inclusion and entrepreneurial ecosystems

Beyond research plots, AICRP centres operate as hubs for hands-on learning and enterprise development. Dedicated programmes under the Tribal Sub-Plan (TSP), Scheduled Caste Sub-Plan (SCSP) and North-Eastern Hill (NEH) initiatives have targeted nutrition and livelihood security among vulnerable communities. A rich calendar of training programmes, demonstrations, farmer field schools, *Kisan Melas*, food festivals, webinars, media features and scientist-farmer interfaces forms the backbone of technology transfer. These activities showcase improved varieties, affordable machinery and value-addition options—chips, flour, pasta, fermented products and region-specific snacks—opening pathways for women and rural youth to enter tuber-based micro-enterprises.

### Seed systems and planting material production

Reliable access to quality planting material is the single biggest lever to close yield gaps in vegetatively propagated crops. Coordinated production at AICRP centres, supplemented by decentralised multipliers, has scaled up supply over the past decade. In the last nine years, the network collectively produced and distributed approximately 1,598,083 cassava stems; 19,777,741 vine cuttings of sweet potato; 247.2 tonnes of elephant foot yam corms/cormels; 83.5 tonnes of taro seed corms; 6.45 tonnes of dasheen taro; and 108.10 tonnes of greater yam planting material. These volumes have enabled rapid spread of newly released varieties, stabilised yields and improved resilience at farm scale.

### Documented impact and system-level benefits

The cumulative effect of coordinated varietal improvement, adaptive agronomy, clean seed systems and inclusive extension is visible across the network's geographies. Farmers report higher and more stable yields, better tuber quality and market acceptance, and improved returns from diversified tuber-based cropping sequences. By shortening supply chains for planting material and anchoring production closer to consumption centres, the programme has also reduced transportation footprints and post-harvest losses contributing to lower carbon intensity and safer, fresher food. Importantly, the network's focus on underutilised crops has expanded dietary choices and micronutrient access in marginal ecologies.

### Selected portfolio of released varieties

**Cassava:** *Sree Sahya, Sree Visakhm, Sree Harsha, Sree Jaya, Sree Vijaya, Sree Prabha, Sree Kaveri, Sree Sakthi, Sree Reksha, Sree Padmanabha, Sree Rekha, Aditya*; and state releases including CO 1, CO 2, CO 3, CO (TP) 4, Tapioca YTP-1, *Sree Athulya, Sree Apoorva, Sree Swarna, Chhattisgarh Cassava-1* and PDP CMR-1.

**Sweet potato:** *Rajendra Sakarkand-5/35/43/47, Kiran, Sree Bhadra, Kalinga, Indira Priya* and *Indira Narangi*; state releases such as CO 1/2/3/5, *Varsha, Sree Nandhini, Sree Vardhini, Samrat, Sree Rethna, Gouri, Sankar, COCIP-1, Konkan Ashwini, Narendra Shakarkand-9, Rajendra Sakarkand-92, Goutam, Kishan, Sourin, Indira Naveen, Indira Nandini, Kamala Sundari*, and the Odisha 'Bhu' series (*Bhu Kanti, Bhu Ja, Bhu Swami, Bhu Sona, and Bhu Krishna*).

**Yams and aroids:** Greater yam *IGDa-2, Sree Shilpa* and CO 1; lesser yam *Konkan Kanchan* and *Sree Kala (DE-55)*; taro *Sree Swathy, Satamukhi, Narendra Arvi-2, Muktakeshi, Indira Arvi-1, Rajendra Arvi-1, Megha Taro-2, Bidhan Bijaya*, and state releases such as *Sree Pallavi, Sree Rashmi, CO 1, Narendra Arvi-1, Bidhan Chaitanya, PaniSaru-I/II, Chhattisgarh Arvi-2, Bhu Kripa, Bhu Sree, Godavari Chema* and *Bidhan Kachu-9*; elephant foot yam *Gajendra, Sree Padma, Bidhan Kusum, Bidhan Oal-3, and Bidhan Ghat Kachu*; and *tannia Konkan Haritparni*.

**Chinese potato:** *Sree Dhara*

**Yam bean:** *Rajendra Mishrikand-1/3*

**Aerial yam:** *CG Dang Kanda-I*



## What enables scale: Coordination, standards and partnerships

Three features underpin AICRP's ability to deliver impact at scale. First, the validation in different agroclimatic regions ensures development of stable varieties with high yield, with abiotic and biotic stress tolerance and having excellent nutritional qualities. Second, its seed and quality-planting-material system reduces the typical lag between varietal release and farmer adoption, a persistent challenge in vegetatively propagated crops. Third, the partnership model linking SAUs, CAUs and ICAR institutes, KVKS, State Departments, NGOs, and progressive growers, anchors research and helps in dissemination and feedback.

## Priorities for the next decade

**Climate resilient and nutritionally important varieties:** Fast-track breeding for tolerance to heat, drought, flood, and salinity; enhance biofortification for vitamins and minerals; and align traits with fresh, processing, and feed markets.

**Clean seed systems:** Institutionalize the nucleus-breeder-foundation-certified pathway for clonal crops; strengthen phytosanitary diagnostics; and expand decentralized multipliers with digital traceability.

**Precision management:** Scale up soil and crop-specific nutrient advisories, sensor-guided irrigation, residue mulching, and conservation agriculture to boost productivity and resilience.

**IPM/IDM at scale:** Combine resistant varieties and

clean seed with community surveillance, biologicals, and threshold-based chemical use; encourage on-farm bio-agent production and safe storage to lower costs.

**Markets and enterprises:** Promote MSMEs for tuber processing, storage, and logistics; build regional value chains (flours, chips, pasta, animal feed, starches); and strengthen standards and branding that reward farmers.

## CONCLUSION

For more than five decades, AICRP on Tuber Crops has functioned as a nationwide platform, linking SAUs, Central Universities, ICAR Institutes in development and validation of varieties and agro-techniques for Tuber Crops across diverse agro-climatic regions, a strong portfolio of climate-resilient cultivars, proven crop management and protection technologies, inclusive extension models, and a steadily strengthening seed system. The next priority is to speed up to reach every district suited to tuber cultivation gains timely access to improved varieties, clean planting material, and locally relevant know-how. With sustained coordination and research tuber crops can play an even larger role in advancing India's nutrition security, livelihood diversification, and green growth.

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## SUCCESS STORY

### Geetha's Home to Home, Thrissur, Kerala

A woman, Smt Geetha Saleesh, entrepreneur from Thrissur, Kerala, being disabled never stopped her from achieving her goals. She started Geetha's Home to Home during the pandemic time of 2020. In her own brand developed a 'superfood supplement' Curcumeal using turmeric blended with other healthy ingredients. This product was the output of her two years research in turmeric value addition. During the course, she understood the value of high *curcumin* turmeric varieties from ICAR-Indian Institute of Spice Research (IISR), Calicut and developed curcumeal using IISR *Prathibha*. Smt Geetha availed license for large scale cultivation of turmeric variety IISR *Prathibha* during July 2022. This opened a new door to the turmeric value chain in front of Geetha's Home to Home and she started cultivation of IISR *Prathibha* in 10 acres comprising 47 farmers fields in Thrissur and Pathanamthitta. Other than curcumeal, Smt Geetha launched two more products from turmeric 'First Drink' using turmeric and other spices such as black pepper and cinnamon and high curcumin *Prathibha* turmeric powder.



When Smt Geetha thought of expanding the turmeric cultivation in farmers' fields, the major problem was the price instability of turmeric seeds. This was resolved by executing the MoU with the farmers by assuring a 100% buy back at a higher price than the market, benefiting both the farmers and the business. In 2023-24, the firm expanded the cultivation of IISR *Prathibha* into 54 acres including 315 farmers of 6 districts in Kerala, viz. Thrissur, Palakkad, Kollam, Idukki, Ernakulam and Pathanamthitta, with all scientific expertise from ICAR-IISR. Regular visits and instructions on good agricultural practices and quality agri inputs developed by ICAR-IISR yielded quality produce and quality value added products from this. Currently the firm is associated with 305 farmers including FPOs and 150 women farmers in 6 districts.

Geetha's Home to Home organized training and education to ensure the quality of turmeric with group of farmers direct/online. Within one year the products have reached Kerala, Karnataka, Maharashtra, New Delhi, Jammu and Kashmir. The firm could employ 30 people in production and marketing sector. Smt Geetha Saleesh has participated in more than 35 expos to exhibit and introduce her products to the customers.

Smt Geetha Saleesh was selected for exhibiting the products during 95<sup>th</sup> ICAR foundation day cum technology day celebrated during 16-18 July 2023.

