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GOOD PRACTICE NOTES ON INSTITUTIONAL INNOVATIONS

CATALYSING GRASSROOT ENTREPRENEURSHIP THROUGH SATELLITE INCUBATION CENTRES IN INDIA | 6

Agribusiness incubation plays a key role in creating and nurturing viable agricultural entrepreneurships involving diverse stakeholders. Currently, agribusiness incubation is campus bound, offering cohort-based pre-incubation and other incubation services. This strategy has an inherent limitation of leaving out grassroot incubation, something that has always been associated with agricultural value chains. With this in mind the Agri-Business Incubator of the ICAR-Central Tuber Crops Research Institute (ICAR-CTCRI ABI) has developed the concept of Satellite Incubation Centres – a collaborative system for decentralising incubation services to the grassroot level. From 2021, the ICAR-CTCRI ABI has built a strong network of Satellite Incubation Centres (SIC) for serving agripreneurs, farmers' collectives, startups and Micro, Small and Medium Enterprises in the southern, eastern and north-eastern Indian states. The SICs were developed in collaboration with agricultural and veterinary universities and established in states or district level units.

Apart from enhancing the income of agripreneurs and startups and generating jobs and agricultural person days, the SICs have successfully created innovative value chains, such as the biofortified sweet potato value chain for combating malnutrition. In this Good Practice Note the authors – P Sethuraman Sivakumar, M Nedunchezhiyan, Mahesh B Tengli, D Thirunavukkarasu, B Shanmugasundaram, Saravanan Raju, C Sharmila Bharathi, Ashok Chhetri, CR Sasikumar, G Byju, Gayathri BR and Athira Krishnan LR – reflect on their experience with conceptualising and implementing SICs with diverse stakeholders in different regions of India. They highlight the need to decentralise the agribusiness incubation process to directly address value chain-based problems through pluralistic institutional innovations, such as SICs.

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Cover photo: Satellite Incubation Centre of Lembucherra, Tripura. All photos © ICAR-CTCRI-ABI

CONTEXT

Agribusiness incubation is an 'entrepreneurial intervention' for creating viable agri-businesses by providing direction and mentoring to aspiring entrepreneurs through various stages of the business development cycle. These incubators stimulate the growth of early-stage businesses by creating an entrepreneurial ecosystem conducive to business creation and growth (Humala et al. 2014). These incubators' specific incubation-support services include providing access to or developing commercially stable agricultural technologies, seed funds, co-working spaces, as well as technical and business mentoring. India has a strong network of 138 business incubators hosted by centres under the Indian Council of Agricultural Research (ICAR), agricultural and general universities, and private sector agencies that are nurturing agricultural entrepreneurship in the country. Based on their objectives, these agribusiness incubators are of three different types (see Box 1).

NEED FOR VALUE CHAIN-BASED INCUBATION

Agricultural entrepreneurship is predominantly a 'value chain-based intervention' designed to address the technological and process-related needs of agricultural value chains. Smallholder farms, which occupy 89.4% of India's total agricultural land, depend on value chains to generate income and manage farm households. Currently, agribusiness incubation is campus-based and follows a strategy of sourcing ideas from aspiring entrepreneurs and developing technologies through onsite or offsite incubation. Technical and business mentoring are cohort-based and channelled through pre-incubation and incubation programs targeted mostly at startups.

Box 1: Types of agribusiness incubators

An agribusiness incubator may be (i) an agribusiness sector or value chain incubator; (ii) an agricultural research commercialization incubator; or (iii) a technology transfer incubator (ACI and ETG 2011).

While value chain incubators are engaged in developing and sustaining agricultural value chains to provide market access to small-scale farmers, the agricultural commercialization and technology transfer incubators create new businesses from the technological innovations developed by the universities and research institutions. The technology commercialization and transfer incubators hosted by academic and research institutions are often campus based and engage in extending the incubation services to startups or MSMEs on the technologies they develop.

Performance of an agri-business incubator is judged by the startups created or mentored, pre-incubation and Entrepreneurship Development programs organized, funds attracted by the incubated companies, and jobs created by them. Many farm-oriented and value-chain-focused businesses of agripreneurs, self-help groups, and farmer producer organizations need greater access to the services of these incubators.

This strategy has the inherent limitation of disconnection from value chains and often develop solutions in an expensive way. Local knowledge systems associated with the value chains represented by stakeholders are often left out of this entrepreneurial gambit. In most cases, the grassroot entrepreneurship development involving Self-Help Groups and Farmer Producer Companies are assigned to Krishi Vigyan Kendras, who have little or no expertise in business creation and growth. Studies indicated that entrepreneurial intervention at the value chain level increases the smallholder producers' share in the consumer's rupee by 15-20% (Asha et al. 2019; Dabbadi et al. 2021). A World Bank study showed that agribusiness incubators are more successful when engaging with the entire agricultural value chain, and not simply with individual businesses (InfoDev and World Bank 2014).

In India, tuber crops are cultivated primarily for human consumption as boiled tubers or in processed forms such as chips, fries, and other fried products. Among tubers, cassava is cultivated as an industrial crop in Tamil Nadu and Andhra Pradesh to meet the raw material needs of starch and sago industries. Sweet potato is a popular snack food in several parts of India. With the entry of multinationals, it is emerging as an industrial crop in Karnataka, Odisha, and Andhra Pradesh. The transition of tuber crops from secondary food staples to industrial crops is mainly attributed to the changes in lifestyles, food consumption behavior, and the emergence of lifestyle diseases. In states such as Tamil Nadu, Andhra Pradesh, Meghalaya, Tripura, Mizoram and Manipur, tuber crops are increasingly used as animal food for cattle, goats, and pigs. Changes in the utilization patterns of tuber crops in these states lead to the emergence of new value chains, which warrant the technical and business mentoring of agripreneurs, farmer collectives, and startups.

The ICAR-Central Tuber Crops Research Institute (ICAR-CTCRI), located at Thiruvananthapuram, Kerala, and its Regional Station at Bhubaneswar, Odisha, has strong agribusiness incubation facilities and provides incubation services such as technology provision, credit and market facilitation, and business networking to both current and aspiring entrepreneurs from southern and eastern India. Extending the incubation services to the entrepreneurs in the emerging value chains in other regions of India has become a challenge due to inadequacy of funds, increased workload of scientists, and lack of quality expertise to nurture entrepreneurship among scientific institutions in those regions.

SATELLITE INCUBATION CENTRES

To address the entrepreneurial needs in the emerging value chains of cassava and sweet potato in India, the ICAR-CTCRI Agri-Business Incubator has developed the 'Satellite Incubation Centres' (SIC) concept. The SICs are essentially 'miniature business incubators' created by scientific institutions in the regions near the tuber crops value chains (Box 2). The SICs are designed to serve as a 'single window system' for providing technology and incubation services to agripreneurs, Self-Help Groups (SHG), Farmer Producer Organisations (FPO), startups, and MSMEs (Micro Small and Medium Enterprises) to address location-specific and value chain problems. Built on the principles of pluralistic extension, the SICs integrate the efforts and resources of ICAR-CTCRI and the host institution to deliver sustainable incubation services to needy farmers and other entrepreneurs in the value chain.

Box 2: Establishment of Satellite Incubation Centres

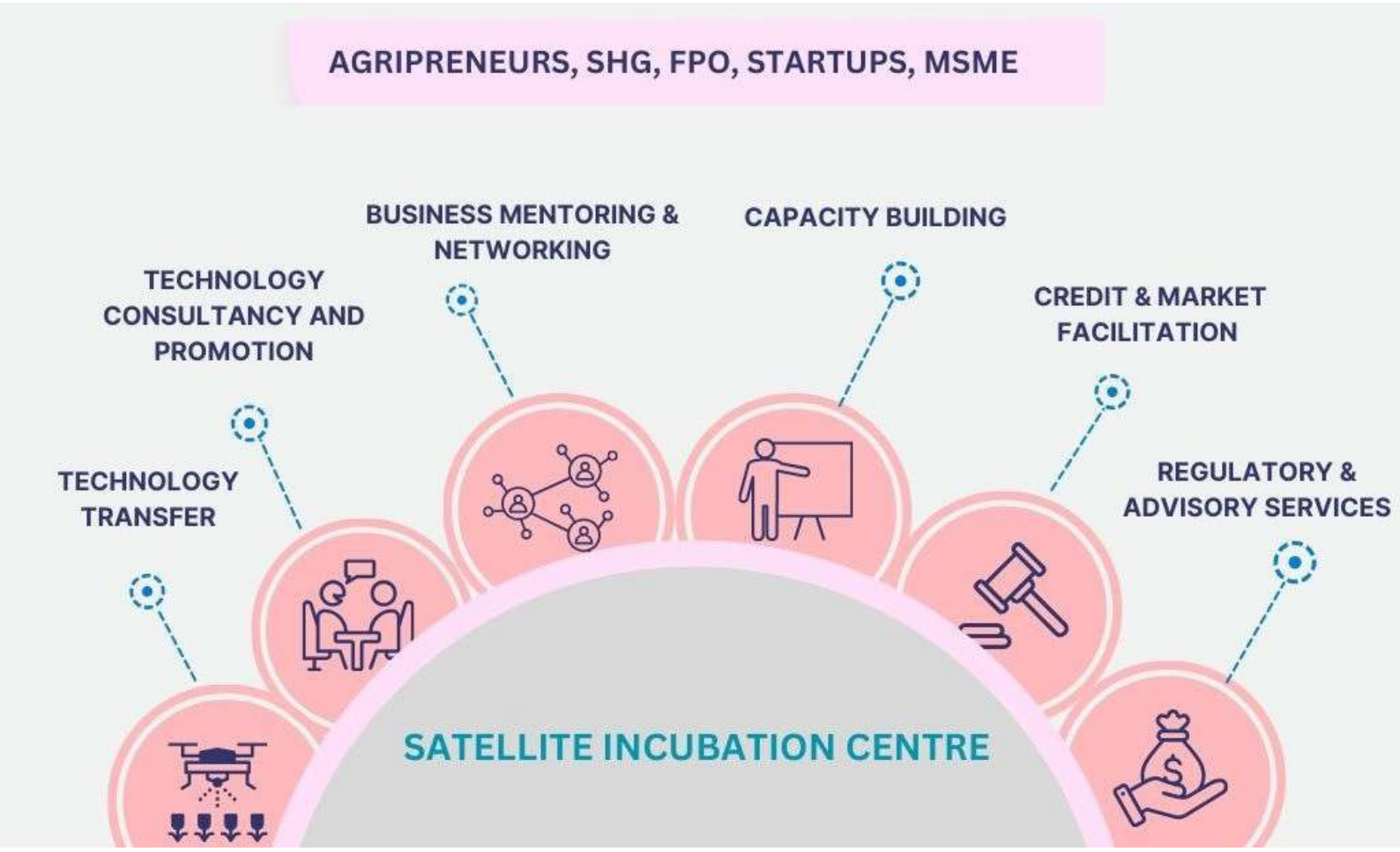
Satellite Incubation Centres are established through a formal collaboration with scientific institutions or organisations near tuber crop value chains. The institutions are identified through a critical assessment of the entrepreneurial needs and investment analysis in the tuber crops value chains and their willingness to collaborate in the SIC model. After selection, ICAR-CTCRI and the host institutions enter into a formal collaboration by signing an agreement for three to five years on the below mentioned terms and conditions.

- **Physical space:** The host institution will provide physical space for the SIC, i.e., one or two rooms in their building. All SICs must have a tuber crops technology showcasing area, client interaction space, and essential product development or demonstration facilities. The ICAR-CTCRI will meet the expenditures for the initial establishment and strengthen the infrastructure based on fund availability. Regarding technology development incubation, the host institution will provide incubatees access to labs and other infrastructure.
- **Central seed production and demonstration farm:** ICAR-CTCRI will establish a Central Seed Production and demonstration farm on land provided by the host Institution. The scientific staff are trained in the production of quality seed/planting material, and the breeder seeds produced at the farm are distributed to seed farmers.
- **Scientific expertise and staff:** The host institution will allot a scientist to manage the SIC, and ICAR-CTCRI will provide contractual staff to carry out operations at the Centre. There is continuous interaction between SIC staff and ICAR-CTCRI-ABI on aspects related to implementing the programs.
- **Funding:** The SICs are developed based on a pluralistic approach where the expertise and resources from multiple institutions are integrated to provide incubation services. The funds for managing the SIC operations are drawn from existing projects of the ICAR-CTCRI and the host institutions. ICAR-CTCRI directly releases no funds to the host institution for managing the SIC. The host institution and ICAR-CTCRI submit joint proposals to obtain specialized funds from external agencies for entrepreneurship development

The ICAR-CTCRI Agri-Business Incubator will equip the staff of the SIC on technical, business, and incubator management competencies and other skills required for implementing the incubation programs. The ICAR-CTCRI-ABI will provide modalities for implementing various incubation programs and services, and the host institutions will retain the revenue generated through these services.

Since the SICs are specialised business development centres, the entrepreneurship-specific activities of current projects of ICAR-CTCRI and host institutions are implemented through SICs. Even though the SICs were designed initially for tuber crops' value chains, later, other crops and systems were included to address region-specific needs.

Currently, the ICAR-CTCRI has three SICs in Odisha, Tripura and Tamil Nadu. While the Odisha SIC is in the Regional Centre of ICAR-CTCRI, Bhubaneswar, the Tripura Centre was established in 2021 at the Multi-Technology Testing & Vocational Training Centre (MTTC& VTC), College of Fisheries, Lembucherra, under the Central Agricultural University (I), Imphal. Another SIC was established in the Krishi Vigyan Kendra (KVK), Kallakurichi, Tamil Nadu, in 2022, under the Tamil Nadu Veterinary and Animal Sciences University, Chennai. Apart from these ICAR-CTCRI ABI has two upcoming SICs in – (i) Regional Agricultural Research Station (RARS), Kerala Agricultural University, Pattambi, Kerala; (ii) College of Postgraduate Studies in Agricultural Sciences, Central Agricultural University (Imphal), Umiam, Meghalaya. All the SIC activities are planned by ICAR-CTCRI Agri-Business Incubator in consultation with the host agency and mentored by the ICAR-CTCRI-ABI office at Thiruvananthapuram, India.



Incubation services offered by SICs

INCUBATION PROGRAM AND SERVICES PROVIDED BY SIC

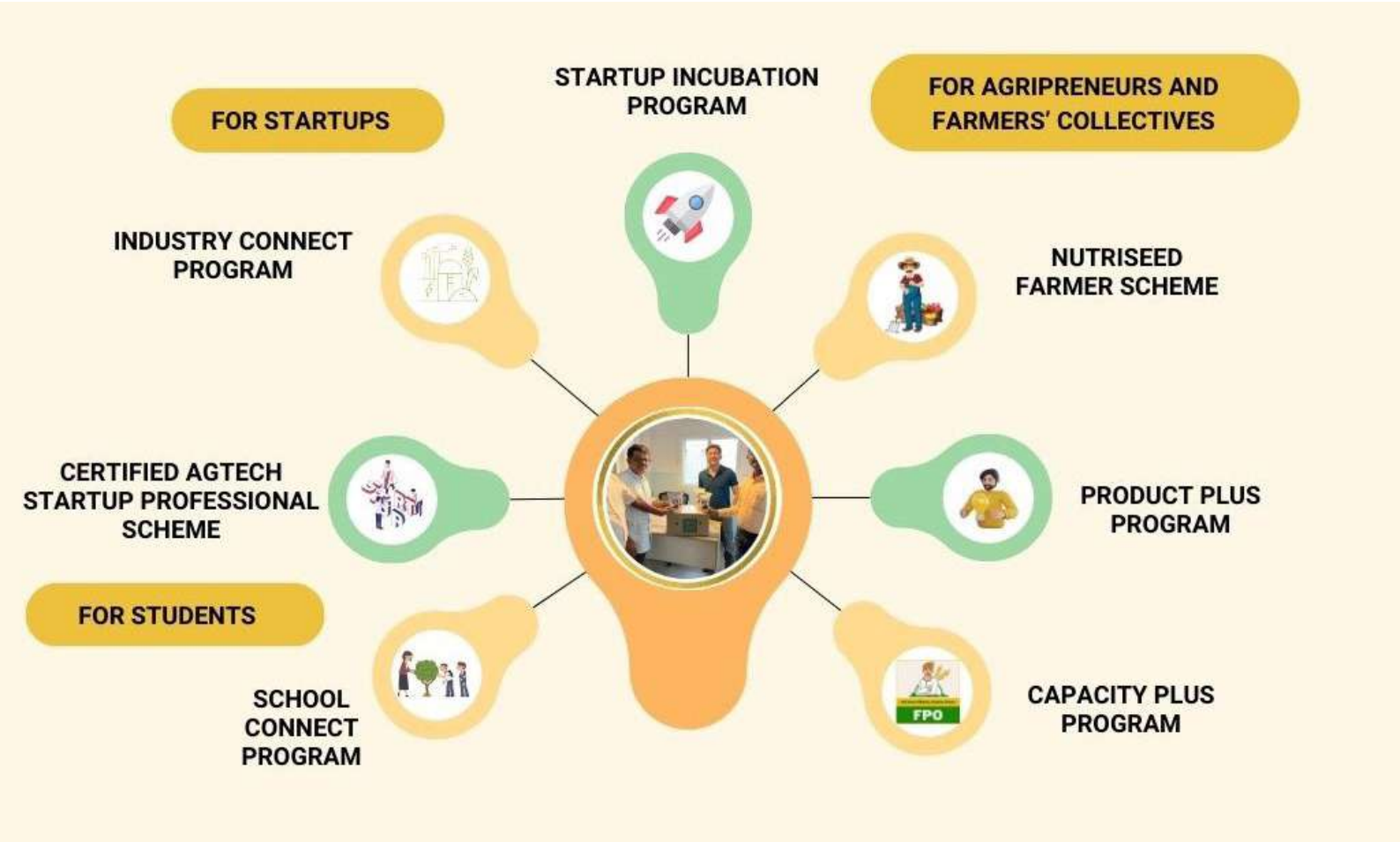
The SICs provide incubation support to agripreneurs, FPOs, startups, MSMEs, SHGs, and other aspiring entrepreneurs based on tuber crops' value chain-based problems. Specific services provided include accessing or developing technology, business planning, business mentoring and networking, working space and lab facilities, market and credit facilitation, and technical and business capacity building. The SICs are coordinated and mentored by the ICAR-CTCRI Agri-Business Incubator through onsite and virtual programs.

The incubation services of SICs are designed to address specific issues in value chains by involving various stakeholders at different levels of these chains. Currently, the SICs are implementing programs associated with two value chains of tuber crops:

i. Creation of new biofortified sweet potato value chains in multiple states; and

ii. Addressing value chain problems in the industrial cassava value chain in Tamil Nadu.

The SIC concept assumes that value chain problems can be addressed by creating entrepreneurships involving various stakeholders such as startups, agripreneurs, SHGs, FPOs, and students. Currently, seven major incubation programs are being implemented through ICAR-CTCRI-ABI, Thiruvananthapuram, and its SICs to address value chain issues.



Incubation programs implemented through SICs

The Startup incubation program is designed for early-stage startups and aspiring entrepreneurs in order to enable them to convert their business ideas into viable business ventures through business incubation. Through the incubation program, a reformulated version of a traditional food product from Odisha, *Palua ladoo* (arrowroot ladoo) was developed. During 2021-22, the incubated startups created eight new jobs and generated USD 4812 revenue from the products developed through incubation (Box 3).

Arrowroot laddoo

Box 3: Mati Farms – A leader in vacuum-fried chips made from biofortified sweet potato

M/s Mati Farms Private Limited, Cuttack, is a food production and processing company that was started by Mr Sanjog Sahu in 2018 with a vision to make locally grown vegetables more profitable for the farmers of Odisha through sustainable value addition of the perishables while also bringing into the market healthier snacking options for consumers. It is commercially producing vacuum-fried chips and powder from biofortified sweet potatoes (purple and orange). As an ICAR-CTCRI SIC incubator at Bhubaneswar, they received technical guidance for sweet potato flour making, and their products are promoted through ICAR-CTCRI outreach programs.

Mati Farms

The PRODUCT PLUS program aims to document, validate, and commercialize potential farmer innovations through the agribusiness incubation process. Traditional foods from tuber crops were documented through COOKATHON (for recipes developed by blending traditional foods with biofortified or nutritionally enhanced varieties), and RECIPE Contests (traditional food recipes), and are refined and reformulated as commercial products. During 2021-23, ten ethnic recipes using cassava from Tamil Nadu and five millet and biofortified sweet potato blended recipes from Meghalaya were documented for validation.

The Nutriseed Villages are specialized seed production units for large-scale multiplication of biofortified sweet potato varieties, rice, millets, wheat, vegetables, and other nutritionally enhanced crops, for combating malnutrition. From each Nutriseed village, the SICs selected ten Nutriseed farmers for the incubation program. The SIC will supply the seed/ planting materials produced at their Central Seed Production facility, 'free-of-cost', to the Nutriseed farmers and arrange 'buy back' by linking them with incubated startups of ICAR-CTCRI-ABI and its SICs. The Nutriseed Village scheme focusing on biofortified sweet potato is implemented in all SICs, and 56 farmers are enrolled (Box 4). During 2022-23, the Nutriseed villages created USD 1204 revenue for Nutriseed farmers, created three jobs, and also generated 760 labor person days.

Documentation of Cassava recipes and sweet potato-millet products

Mr. Masanan, nutriseed farmer from Attapady, Kerala

Box 4: Tribal entrepreneurship developed through the Nutriseed Village scheme

Mr. Masanan, a tribal farmer from Gonjiyur village in the Attapadi region of Kerala, enrolled in the Nutriseed Village scheme of ICAR-CTCRI-ABI through the RARS, KAU, Pattambi center in 2022. In 2023, an on-farm trial of five biofortified sweet potato varieties was conducted in his field on a 0.04 ha area to identify suitable varieties for his production system. Even though the biofortified varieties yielded poorly under Kerala conditions, Mr Masanan obtained an excellent tuber yield and generated an income of USD 230. Successful tuberization of biofortified sweet potato, especially var. Bhu Sona, which has the highest β-Carotene content (a precursor of Vitamin A), has created a new avenue for creating entrepreneurship through biofortified sweet potatoes. The success of ICAR-CTCRI varieties was highlighted widely in the media and published on the first page of seven editions of The Hindu, a leading English daily in India.

The 3M-SP students of Attapadi, Kerala with their homegrown produce

The SCHOOL CONNECT program is designed to develop health and nutritional awareness and nurture students' entrepreneurial skills by involving them in cultivating biofortified varieties and nutritionally enhanced crops in school nutrition gardens. Under the Three Musketeers Sweet Potato (3M-SP) program, the students are provided with three vines of biofortified sweet potato (yellow-, orange-, and purple-fleshed) and asked to cultivate them in their homesteads and bring back the tubers after 100 days. The students with better harvests and higher consumption at home are designated as 'Nutrition warriors'.

Under **the INDUSTRY CONNECT program**, the tuber crops' raw material supply chains for startups and industries involved in food processing and value addition are being strengthened through the introduction of improved varieties. Under this program, various seed business models for industry-friendly cassava mosaic disease-resistant and high starch varieties were developed.

During 2022-2023, the six seed entrepreneurs generated a revenue of USD 1200 by selling planting materials of industrial cassava varieties.

The Certified Agritech Startup Professional (CAgtSP) is a student-focused entrepreneurship certification program designed to create a group of competent student professionals enrolled in agricultural universities in India, who will serve as 'ambassadors of change' so as to inculcate the entrepreneurial spirit among fellow students. The selected candidates are enrolled in the Agri-Business Incubator as 'CAgtSP incubatees' and provided hands-on experience in incubator operations for 30 days. Currently, 77 students from Kerala Agricultural University are enrolled in this program.

Under the **Capacity PLUS program**, the Nutriseed farmers, SHGs, FPOs, aspiring and current entrepreneurs, startup professionals, and MSMEs are provided with customized and need-based technical and business management competency-

building programs. Under the Capacity PLUS program, the ICAR-CTCRI-ABI and its Satellite Incubation Centres trained 520 entrepreneurs, 1245 farmers, 245 scientists/extension workers, and 570 students during 2021-2023.

CHALLENGES FACED

The Satellite Incubation Centres are 'Institutional interventions' implemented by collaborating with an external agricultural research and development agency. Since 2021–when the 'Tuber Crops Information and Facilitation Centre', the first SIC was established in the MTTC&VTC, College of Fisheries, CAU-I, Lembucherra, Tripura – there have been challenges in establishing and managing SICs at different tuber crops value chain zones in the country. A few critical challenges faced while implementing SICs, and the strategies adopted to address these are given in Table 1.

Table 1. Challenges faced in implementing SICs and strategies followed

No.	Challenges	Strategies followed to overcome challenges
1.	Many host agencies needed help with understanding the concept of Satellite Incubation Centres.	Interactive workshops were organized with key officials and scientists from the host institutions to explain the structure and process of SICs.
2	The host agencies were reluctant to accept the 'pooled funding approach' and demanded 'project-based funding' for managing the SIC.	The ICAR-CTCRI has assured initial funding for establishing the SIC from two regional and sector-specific projects. The SICs in the North-Eastern Hill region were fully funded through the ICAR-CTCRI NEH project. However, no direct transfer of funds to the host institution was made, as it violates the principles of pluralism.
3.	Monitoring of crop growth and yield under the Nutriseed village and School Connect programs operating in remote areas.	The expenditure incurred in monitoring remote location programs was reimbursed to the SICs' host institutions. One skilled labor is provided to a few SICs on a regular basis, which will be expanded to other SICs.
4	Difficulties in the sale of harvested tubers of biofortified sweet potato by Nutriseed farmers enrolled in SICs.	Startups enrolled as incubatees in the ICAR-CTCRI-ABI SIC at Bhubaneswar were linked to the Nutriseed farmers to buy the tubers at a price fixed by the SIC. A few Nutriseed farmers were enrolled in the 'Decentralised Seed Multiplier' scheme of ICAR-CTCRI, enabling them to sell the harvested produce and planting materials for ICAR-CTCRI Outreach programs.
5	Startups are reluctant to enroll as 'incubators' as agribusiness incubators do not provide seed funds.	Without seed funds, the ICAR-CTCRI-ABI SIC at Bhubaneswar has offered 'resident incubation' for product development at a nominal fee, and monthly room rent was waived. The startup products are sold through ICAR-CTCRI-ABI sales outlets and are showcased at various exhibitions. Due to our sustained efforts in promoting incubated products, the startups agreed to procure tubers from SIC's Nutriseed village and School Connect programs, thereby providing assured income for the Nutriseed farmers.

LESSONS LEARNED

The Satellite Incubation Centres are designed as 'miniature incubators' for addressing tuber crops value chain problems through entrepreneurship. The ICAR-CTCRI ABI experience shows that the SICs will serve as viable options for nurturing value chain-based entrepreneurship, however, there is need for structural and process-related interventions to make this model sustainable. These include the following:

- ***Need for expanding scope of SIC incubation*** – The SICs were originally designed to address the value chain needs of tuber crops. However, the host institutions have a diverse mandate with crops, livestock, poultry and fisheries, and expressed a need to broad base the incubation programs and services.
- ***Fund provision for routine activities*** – The SICs are institutional innovations built on the 'pooled funding approach' for implementing value chain interventions. Though the funds are mobilised from various projects for implementing these interventions, there is a need to have separate funds available to manage routine activities, for example, hiring of skilled staff, provision of TA/DA for scientific staff from host institutions, and hiring of vehicles for field visits.
- ***Facilities for in situ processing and storage –*** During harvesting season, the SICs face problems with storage of harvested tubers and lack of essential facilities for minimally processing the produce to extend their shelf life. For maximising the efficiency of value chain-oriented businesses, it is essential for an SIC to have adequate facilities for storing the produce and also for minimal processing of the tubers.

WAY FORWARD

Developing and sustaining vibrant agricultural value chains is the key to maximising farm income and diversifying rural food systems. Agribusiness incubation through SICs has become an effective institutional innovation which is useful for nurturing grassroot entrepreneurship involving value chain stakeholders. SICs are uniquely set up to be advantageous for agribusiness incubation as it helps in reaching the last mile to create value chain-based entrepreneurship in a systematic way. They provide viable options for linking startups and MSMEs directly into the value chains to enable them to generate income, while benefitting the farmers. SICs represent a significant departure from the incubation services offered by on-campus agribusiness incubators, as it enables stakeholders to develop entrepreneurships directly in the value chains, rather than through the ad hoc process currently followed in these incubators. Decentralising agribusiness incubation is the key to unlocking the knowledge hidden in the local innovation systems and nurturing them into viable entrepreneurships.

It is vital to transition from campus-based agribusiness incubation to grassroot level value chain-based mentoring. COVID-19 has demonstrated the value of farmer-managed businesses for achieving household food security under risky and difficult conditions. When agriculture is faced with challenges of climate change and associated problems, it is essential to scale up institutional innovations, such as Satellite Incubation Centres, to strengthen local capacities for developing viable agricultural value chain-based businesses.

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There is a growing recognition on the importance of institutional innovations in promoting more efficient and productive collaboration among the various actors in AIS. The publication of this series of Good Practice Notes by APIRAS and APAARI is an attempt to document cases of institutional innovations that are currently transforming agri-food systems.

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