

भाकृअनुप - अखिल भारतीय समन्वित
कंद फसल अनुसंधान परियोजना

ICAR - ALL INDIA COORDINATED RESEARCH
PROJECT ON TUBER CROPS

वार्षिक प्रतिवेदन
ANNUAL REPORT
2023



भाकृअनुप-केन्द्रीय कंद फसल अनुसंधान संस्थान
(भारतीय कृषि अनुसंधान परिषद)
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Correct Citation:

ICAR-AICRP TC 2024, Annual Report 2023, ICAR-All India Coordinated Research Project on Tuber Crops, ICAR-CTCRI, Sreekariyam, Thiruvananthapuram - 695 017, Kerala, India. 115 p.

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Printed at:

Aden Digital Signage, Thiruvananthapuram

Mob: 9605206323 / www.adendigital.in

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PREFACE



Root and tuber crops occupy an important position as a source of food in the tropical and subtropical regions of the world. Apart from its popular use as a food for human beings, tubers also find an important space in cattle field and agro industries sector. Food security challenges brighten the prospects of tuber and root crops, both nationally and internationally. However, there is a significant decline or reduction in yield of various crops due to biotic and abiotic reasons. Hence evolving new varieties with bumper yield without sacrificing on quality parameters is paramount importance for achieving full potential from these crops. Established during 1968, All India Coordinated Research Project on Tuber crops is the largest national net work of tropical tuber and root Crops, other than potato, covers 18 States and one Union territory (Andaman & Nicobar Islands) of the country and hence has the ideal situation to conduct studies in

different agro climatic situations. The project work is spread over in 12 State Agricultural Universities, three ICAR Institutes and two Central Agricultural Universities.

The mandate of AICRP TC is for generating region-specific improved varieties with quality traits, agronomic interventions and production system technologies including disease and pest management along with creating awareness among the farming community, policy makers and researchers. Important tuber crops under the purview of AICRP TC are cassava, sweet potato, yams, elephant foot yam, taro, dasheen taro, swamp taro, arrow root, yam bean etc. During 2023, a total collection of 4359 germplasm of 19 different kinds of tuber crops were maintained in the various AICRP TC centres. The newly added germplasms are being characterized and details sent to NBPGR for obtaining IC numbers. The gene pool available at the various centres has helped in generating 15 new varieties, three in cassava, four in greater yam, four in taro, three in dasheen taro and one in elephant foot yam. New crop improvement, production and protection strategies were formulated, standardized and validated for different crops across the various agro-climatic zones. Efforts were made by the various centres in popularization of tuber crops by means of conducting farmer's seminars, awareness programmes, demonstrations, exhibitions and publication of brochures and pamphlets in vernacular languages. Value addition of tubers for additional income and employment generation, especially for women and youth empowerment was also attempted by various centres during the year. Major thrust was also given for quality planting material production and their distribution to farmers. Integrated farming system studies involving tuber crops in NEH and TSP programmes have become very popular for enhancing income and employment opportunities. Special funds under NEH and

SCSP were effectively utilized by concerned centres for conducting field demonstrations and popularizing tuber crops varieties and technologies.

The XXIII Annual Group Meeting for the year 2022-23 was held at BCKV, Kalyani, West Bengal during 10-12 May 2023. The DDG (Horticulture Sciences), ICAR, Dr. Anand Kumar Singh formally inaugurated the event. Dr. Sudhakar Pandey, Assistant Director General (FVS&MP), ICAR and scientists from different centres, external experts, Heads of divisions/sections, and scientists of ICAR-CTCRI and RS Bhubaneswar participated in the deliberations. The best centre award for 2022-2023 is shared by Dr.YSRHU, Peddapuram and Dr.YSRHU, Kovvur, the two AICRPTC centres of Dr YSRHU, Andhra Pradesh. Fifteen publications in different vernacular languages prepared by different centres were also released during the occasion.

I would like to record my deepest sense of gratitude to Dr. Anand Kumar Singh, DDG (HS) for his guidance, support and wise counsel given at various occasions during the year and specially for organizing the 23rd Annual Group Meeting of AICRP on Tuber Crops. Dr. Sudhakar Pandey, Assistant Director General (FVS&MP) is gratefully acknowledged for his kind help and unflinching support extended on various occasions. I thank all the heads of the divisions, scientists and other staffs of ICAR-CTCRI who have given full support and cooperation for the project. I also record my gratefulness to all colleagues at different AICRP TC centres for their sincere efforts and unstinted cooperation extended during the report period. I also appreciate my colleagues in the PC office, Dr. J. Sreekumar, Principal Scientist and Scientist-in-Charge, Dr. H. Kesava Kumar, Senior Scientist, Mr. P.S. Karthik, Computer Assistant, Mrs. Anuresmy R. Nair, Secretarial Assistant and Mrs. A. Rajalakshmi, Technical Assistant of AICRPTC Cell for their cooperation and sincere assistance for the functioning of AICRP TC, compiling the reports and bringing out the Annual Report on time.

G. Byju

**Director & Project Coordinator
(AICRP TC)**

31st March 2024

EXECUTIVE SUMMARY

Genetic resources of tuber crops

A total of 82 new germplasm collections were made by different centres during 2023. Altogether 4359 different accessions of root and tuber crops are being maintained in the gene bank at 19 centres for improvement of major crops including cassava, sweet potato, aroids, and yams and also in underutilized tuber crops. Among the centres, maximum number of accessions of twelve tuber crops (1346) are maintained at Dr. RPCAU, Dholi. IC numbers were obtained from NBPGR for a total of 2208 germplasm collections from different centres.

Varietal Development

Cassava

- In an IET on nutrient use efficient cassava, significantly higher tuber yield was recorded in TCaN21-7 at Yethapur and Thiruvananthapuram. At Peddapuram, TCaN21-8 followed by TCaN21-7 recorded significantly higher yield and at Jagdalpur TCaN21-9 followed by TCaN21-6 and TCaN21-7 recorded higher yield. In season 2 experiment at Jagdalpur significantly higher yield was observed in TCaN21-9 followed by national check Sree Pavithra.
- In IET on high starch cassava, highest tuber yield was recorded by TCa21-6 at Yethapur. At Thiruvananthapuram, TCa21-7 recorded highest yield and TCa21-2 at Barapani and TCa21-1 at Peddapuram. Highest starch content was also recorded in TCa21-1 (31.03 %) followed by TCa21-6 (30.42 %) and mean starch was recorded in TCa21-1 (27.95 %) followed by Sree Reksha (27.76 %).
- In URT on high starch cassava season 1, highest yield was recorded in TCa21-6 at Yethapur and TCa21-9 at Barapani.
- In MLT on cassava mosaic resistant entries, TCa16-5 recorded the highest tuber yield at Peddapuram, Imphal and Dapoli whereas highest starch content recorded in national check at Imphal, TCa16-4 at Dapoli. None of the entries except local check, H-226 showed mosaic symptoms.

Sweet potato

- In an IET on purple flesh sweet potato with 11 entries conducted at Imphal, maximum total and marketable yield was observed in TSpP23-10 (25.76 t ha⁻¹ and

21.36 t ha⁻¹, respectively). The trial is in progress at Peddapuram, Dharwad, Kalyani, Dholi, Ranchi, Rajendranagar, Jorhat, Thiruvananthapuram and Bhubaneswar.

- In an IET on orange flesh sweet potato with 12 entries, maximum tuber yield was recorded in TSp22-1 at Dharwad, TSp22-2 at Dholi, TSp22-6 at Imphal, TSp22-10 at Peddapuram, Kalyani, Rajendranagar and TSp22-12 at Coimbatore. β carotene content recorded highest in TSp22-10 at Peddapuram and Bhu Sona at Dharwad, Bhubaneswar, Kalyani, Rajendranagar and Imphal.
- In an IET on orange flesh sweet potato, the highest total tuber yield and marketable tuber yield was recorded in TSp22-1 at Dharwad, TSp22-2 at Barapani and TSp22-6 at Imphal. The trial is in progress at Thiruvananthapuram, Peddapuram, Dholi, Bhubaneswar, Rajendranagar, Kalyani and Coimbatore.
- In MLT on yellow flesh sweet potato, TSp16-7 recorded significantly higher total yield and marketable yield at Udaipur, Dharwad, Rajendranagar and Navsari. None of the test entries were found superior than local check Kamala Sundari at Dholi. The national check Bhu Sona recorded significantly higher total yield, marketable yield and β carotene content at Ranchi and Bhubaneswar, significantly higher total yield and marketable yield was recorded by TSp16-6 at Peddapuram and TSp16-10 at Kalyani.
- In MLT on yellow flesh sweet potato, highest marketable and total tuber yield was recorded by the entry TSp16-7 at Udaipur and Dharwad whereas TSp16-6 recorded highest marketable tuber yield at Coimbatore. The trial is in progress at Ranchi, Kalyani, Dholi, Peddapuram, Bhubaneswar, Jagdalpur, Navsari and Rajendranagar.

Greater Yam

- In an IET on purple flesh greater yam, TGy20-3 recorded the highest tuber yield of 32.04 t ha⁻¹ followed by TGy20-7 (29.66 t ha⁻¹) and Sree Neelima (28.37 t ha⁻¹) at Kovvur.
- In an IET on purple flesh greater yam, Sree Neelima recorded higher tuber yield (22.10 t ha⁻¹) followed by the entries TGy20-2 which was on par (20.61 t ha⁻¹) at

Port Blair and the trial is in progress at Palampur, Kovvur, Thiruvananthapuram, Udaipur and Navsari.

- In MLT on greater yam, the highest average tuber yield was recorded in local followed by Sree Karthika and TGy17-3 at Kovvur. At Kalyani, the highest average tuber yield was recorded in local entry followed by Sree Karthika and TGy17-6. At Udaipur, highest mean tuber yield was recorded by the entry TGy17-4.

Lesser Yam

- Under an IET on lesser yam, out of seven entries, TLy20-7 recorded significantly higher tuber yield at Dholi and TLy20-5 at Imphal.
- In an URT on lesser yam, the highest tuber yield was recorded by the entry TLy20-5 followed by TLy20-7 and Sree Kala at Kalyani, whereas the entry TLy20-5 recorded significantly higher yield followed by TLy20-2 at Imphal.

Colocasia (eddoe type)

- In an IET on colocasia, highest cormel yield and total yield was recorded in TTr22-8 followed by TTr22-2 at Kovvur whereas Sree Rashmi followed by TTr22-6 at Imphal.
- In IET on colocasia, out of nine entries, Sree Rashmi recorded significantly higher cormel yield and total yield followed by TTr22-6. TTr22-5 recorded maximum weight of cormel per plant, number of cormels per plant, cormel yield and total yield at Barapani. TTr22-9 recorded significantly higher cormel yield followed by TTr22-10, whereas TTr22-10 recorded higher total yield followed by TTr22-9 at Lembucherra. TTr22-9 recorded significantly higher cormel yield and total yield followed by TTr22-4 and TTr22-6 at Jagdalpur. The trial is in progress at Jorhat, Dapoli, Ranchi, Thiruvananthapuram and Kovvur.
- Under MLT on colocasia, out of four entries, TTr17-3 was found superior in terms of both cormel yield and total yield at Kalyani and Udaipur. The local check followed by Sree Rashmi performed better at Kovvur whereas Sree Rashmi followed by local check at Imphal and TTr17-8 at Coimbatore.

Colocasia (Dasheen type)

- Under MLT on dasheen taro, entries TBd17-3, TBd17-2 and TBd17-4 performed well in terms of corm yield, but were statistically on a par with the corm yield of check entry IGB-5 at Kalyani.

Elephant foot yam

- In an IET on elephant foot yam, TEy22-1 and TEy22-2 recorded highest corm yield at Dholi, TEy22-6 recorded highest corm yield followed by TEy22-4 at Coimbatore. Highest yield per plant was recorded in TEy22-9 followed by TEy22-11 at Kovvur. TEy22-1 gave higher tuber yield and found superior among the other entries at Navsari and TEy22-6 at Kalyani.
- In MLT on elephant foot yam, yield data showed that TEy17-1 recorded highest corm yield at Dholi, Kalyani and found superior to other test entries including Gajendra whereas Udaipur recorded highest corm yield in Gajendra followed by TEy17-1

Arrow root

- Under MLT on arrowroot, TAR18-14 recorded the highest rhizome yield at Coimbatore and Imphal, TAR18-12 at Ranchi, TTr18-10 at Dharwad and Thiruvananthapuram. TAR18-12 recorded maximum yield at Jagdalpur, TAR18-4 at Kalyani and TAR18-14 at Imphal.

Agro techniques

- Second year experiment on water saving techniques in cassava was conducted at Peddapuram. The performance of the crop in terms of growth parameters were found significantly superior under drip irrigation at 50% CPE + anti transpirant (kaolin spray) and drip irrigation at 50% CPE + pusa hydrogel @ 0.5 g per plant. Highest mean tuber yield was recorded with drip irrigation at 50% CPE + pusa hydrogel @ 0.5 g per plant) followed by drip irrigation at 50 % CPE+ ground cover sheet (120 gsm and drip irrigation at 50% CPE + synthetic SAP).
- The experiment on high density planting of cassava, elephant foot yam and greater yam were initiated at different centres.
- i. The trial on high density planting in cassava was conducted at nine centres with seven treatments of closer spacing. Among all the treatments, significantly higher number of plantable stems was recorded in 60 x 60 cm spacing at Jagdalpur, Imphal, Dapoli, Thiruvananthapuram, Barapani and Bhubaneswar whereas it was highest in 90 x 60 cm spacing at Peddapuram. Second year experiment conducted at Yethapur, Barapani and Kalyani with seven treatments. The spacing of 90 x 60 cm recorded maximum tuber yield at Barapani and Kalyani. The

B:C ratio was found highest with 90 x 90 cm at Yethapur, 90 x 60 cm at Barapani and 75 x 75 cm at Kalyani. The trial is in progress at Peddapuram, Jagdalpur, Imphal, Dapoli, Bhubaneswar and Thiruvananthapuram.

- ii. In elephant foot yam, seven treatments of closer spacings were tried at 8 centres. Among all the treatments, the treatment 60 x 60 cm was found producing significantly high seed tuber yield followed by 75 x 60 cm at Coimbatore, Dharwad, Bhubaneswar, Navsari, Jagdalpur and Thiruvananthapuram. The B:C ratio was found significantly higher with 90 x 90 cm at Kovvur, Dharwad, Navsari, and Bhubaneswar. Second year experiment tried at 3 centres. The yield parameters were found highest with 75 x 60 cm and 60 x 60 cm. The B:C ratio was found higher with 90 x 60 cm at Port Blair and Lembucherra. The trial is in progress at 11 centres.
- iii. In greater yam, seven treatments of closer spacing tried at seven centres where 60 x 60 cm found better performance at Jagdalpur, Navsari, Bhubaneswar and Thiruvananthapuram.
- The trial on natural farming in taro was conducted at seven centres. At Coimbatore and Bhubaneswar in the natural farming practices, the plant height, net income and B:C ratio were significantly higher than all other treatments. State recommended POP gave significantly higher yield and net income at Rajendranagar and Barapani. Second year experiment is in progress at Bhubaneswar, Dapoli, Kovvur, Coimbatore, Barapani and Rajendranagar centres. At Palampur, the highest plant height and B:C ratio was recorded with natural farming practices.
- A new trial on intercropping of millets in elephant foot yam was initiated at eleven centres. At Lembucherra, intercropping of elephant foot yam with sorghum performed significantly better with tuber equivalent yield followed by finger millet.
- A new trial on standardization of nano urea application in cassava was initiated with five treatments at three centres.
- The trial on standardization of nano urea application in elephant foot yam was conducted at Kalyani with 5 treatments. The significantly highest yield and net income was recorded under PoP + IFFCO nano urea

foliar spray. The trial is in progress at 10 centres.

- Second year experiment on integrated weed management in taro was conducted at Kovvur centre. Among all the weed control treatments, mulching with weed control ground cover mat recorded highest cormel yield and net returns.
- Second year experiment on validation of customized fertilizers in taro was conducted at different centres with 3 treatments. At Rajendranagar, among three treatments tried, significantly higher cormel yield, net income and B:C ratio was recorded with soil application of customized fertilizer and foliar application Micronol. The cormel yield, net income and B:C ratio was significantly higher at Kovvur under absolute control.
- The experiment on validation of customized fertilizers in cassava (season 2) was conducted at two centres. At Peddapuram, the total tuber yield per hectare was highest with application of customized fertilizer followed by present recommendation as per POP. The B:C ratio was highest for present POP recommendations followed by customized fertilizers. The total tuber yield per hectare was highest with customized fertilizer. Present recommendation as per POP recorded significantly higher increase in N and P content as compared to soil application of customized fertilizer and foliar application of Micronol.
- Second year experiment on validation of organic production technology in cassava were conducted at Peddapuram and Jagdalpur. At Peddapuram, tuber yield and B:C ratio was highest in present POP recommendations followed by POP as per centre. At Jagdalpur, the performance of growth and yield parameters was superior under traditional (farmers' practice). The B:C ratio was highest for organic practice.

Pest and Disease management

- Experiment on management of mealy bugs in cassava was conducted at Peddapuram with seven treatments in three replications with Sree Reksha variety. No incidence of mealy bug was observed.
- Second year experiment on yield loss assessment in cassava due to cassava mosaic disease was conducted at nine centres. At Jagdalpur, a yield loss of only 3.81 % was noticed in plants showed symptom in two months. At Yethapur, plants showing symptoms in 3-6

months recorded highest per plant yield and yield per hectare. In UHS, Dharwad, highest per plant yield and yield per hectare recorded in asymptomatic plants. At Jorhat, Ranchi, Imphal and Barapani, no incidence of cassava mosaic disease was observed.

- Yield loss assessment in elephant foot yam due to collar rot disease was conducted at ten centres. Minimum yield loss in elephant foot yam due to collar rot was recorded in 5th month at Coimbatore, Rajendranagar and Kalyani centres. Port Blair centre gave minimum yield loss at 6th month and Lembucherra at 10th month. Trial is in progress at Palampur, Udaipur and Navsari centre while Kovvur and Dholi centre had no incidence of collar rot
- Survey and surveillance of pests and diseases of tuber crops was undertaken by all the centres. Per cent incidence of important pests and diseases in different months were estimated. A solitary CMB specific parasitoid, *Anagyrus lopezi* imported from ICAR-National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru being maintained and mass multiplied at TCRS, Yethapur. Release of 100 parasitoids per acre in more than 650 farmers from 10 districts was done and the data revealed that there was more than 75% reduction in CMB population.

Planting material Production

- Planting materials of improved varieties of tuber crops were multiplied and distributed to farmers by all the centres. The centres produced a total of 137275 stems of cassava; 571770 vine cuttings of sweet potato; 29.00 tons of elephant foot yam; 8.00 tons of taro; 1.38 tons of dasheen taro; 2.00 tons of greater yam; 160 kg of lesser yam; 160 kg of aerial yam; 254 kg tannia; 310 kg arrow root, and 35 kg of yam bean and 7500 plants of swamp taro as part of planting material production programme and generated a revenue of ₹ 664472.

Research-Extension-Farmers-Linkage

- Tuber crops based integrated farming system in NEH region and tribal areas conducted at nine states and one union territory. Under the farming system studies different crop components, animal components and horticultural crops components have been tested in the fields of tribal farmers at Beyasi village of Chanhob block of Ranchi district in Bihar. Community based tuber crops-based farming system was demonstrated

in the farmer's field at Harminder Bay, Little Andaman during 2023. Prior to interventions, the net income of the Tuhet was ₹ 70000 with a B:C ratio of 1.22. After intervention of tuber crops-based farming system the net income increased to ₹ 203770 with a B:C ratio of 2.29.

- Tuber crops based integrated farming system studies were conducted in Nongdam, Imphal East and Kakching khunou, Kakching district of Imphal. After the intervention, farmers could get their income providing employment throughout the year. At Nongdam, due to intervention the employment generation could increase from 177 to 533. The B:C ratio also drastically increased from 1.04 to 2.41.
- Tuber crops based farming system studies were initiated at Lumdiengngan village of Barapani. Prior to farming system studies, the total area of 0.50 ha was used for farming by Banlumlang V.O. Lumdiengngan with a net income of ₹ 82078. After intervention, the total area of 1.50 ha, earning a net income of ₹ 478905.
- IFS model: Horti. with tuber crops + piggery + poultry + fishery + goat was introduced at Damdamia, West Tripura. After intervention of improved technologies in the integrated farming system based on high yielding vegetables and livestock, productivity of vegetable crops was increased to 25 t ha⁻¹ from 15 t ha⁻¹. Adoption of IFS technology increased his annual gross income to ₹ 304650 from ₹ 93500 with B:C ratio of 2.5.
- Under 'Research-extension-farmer linkage', eight different programmes were carried out by different centres. Training programmes, demonstrations, webinars, kisan melas, mass media programmes, scientist-farmer interfaces, farm advisory visits and distribution of farm inputs and implements were taken up on a regular basis by all the 21 centres. All centres also undertook special schemes such as TSP, SCSP and NEH for improving the food, nutrition and livelihood security of these special segments of our society.

Budget

During the reported year (2023-2024) AICRP TC received an amount of ₹ 572.58 Lakhs as ICAR share and was distributed to centres, under the heads of "Other than NEH (₹ 466.86 Lakhs), NEH (₹ 47.00 Lakhs), SCSP (₹ 49.91 Lakhs) and TSP (₹ 8.81 Lakhs).

कार्यकारी सारांश

कंदीय फसलों के आनुवंशिक संसाधन

- २०२३ के दौरान विभिन्न केंद्रों द्वारा कुल ८२ नए जर्मप्लाज्म संग्रह किए गए। कसावा, शकरकंद, एर्रोइडस और रतालू सहित प्रमुख फसलों और अमुख्य कंद फसलों के सुधार के लिए १९ केंद्रों के जीन बैंक में जड़ और कंद फसलों की कुल मिलाकर ४३५९ विभिन्न प्रविष्टियों का रखरखाव किया जा रहा है। केंद्रों में, बारह कंद फसलों (१३४६) की अधिकतम संख्या डॉ. आरपीसीएयू, ढोली में रखी गई है। विभिन्न केंद्रों से कुल २२०८ जर्मप्लाज्म संग्रह के लिए एनबीपीजीआर से आईसी नंबर प्राप्त किए गए थे।

किस्मों का विकास

कसावा

- पोषक तत्व उपयोग कुशल कसावा पर एक IET में, येथापुर और तिरुवनंतपुरम में TCaN21-7 में काफी अधिक कंद उपज दर्ज की गई। पेद्दापुरम में, TCaN21-8 के बाद TCaN21-7 में काफी अधिक उपज दर्ज की गई और जगदलपुर में TCaN21-9, उसके बाद TCaN21-6 और TCaN21-7 में अधिक उपज दर्ज की गई। जगदलपुर में दूसरा सीजन पर TCaN21-9 में काफी अधिक उपज देखी गई, जिसके बाद राष्ट्रीय जांच श्री पवित्रा हुई।
- उच्च स्टार्च कसावा पर IET में, येथापुर में TCa21-6 द्वारा उच्चतम कंद उपज दर्ज की गई। तिरुवनंतपुरम में TCa21-7 ने उच्चतम उपज दर्ज की और बारापानी में TCa21-2 और पेद्दापुरम में TCa21-1 ने दर्ज की। उच्चतम स्टार्च सामग्री TCa21-1 (31.03 %) के बाद TCa21-6 (30.42 %) में दर्ज की गई और मध्य स्टार्च TCa21-1 (27.95 %) के बाद श्री रेखा (27.76 %) में दर्ज की गई।
- उच्च स्टार्च कसावा पहला सीजन URT पर, येथापुर में TCa21-6 और बारापानी में TCa21-9 में सबसे अधिक उपज दर्ज की गई।
- कसावा मोजेक प्रतिरोधी प्रविष्टियों पर MLT में, TCa16-5 ने पेड्डापुरम, इंफाल और दापोली में सबसे अधिक कंद उपज दर्ज की, जबकि इंफाल में राष्ट्रीय जांच में उच्चतम स्टार्च सामग्री दर्ज की गई, TCa16-4 दापोली में। स्थानीय जांच, H-226 को छोड़कर किसी भी प्रविष्टि में मोजेक लक्षण नहीं दिखे।

शकरकंद

- इंफाल में आयोजित ११ प्रविष्टियों के साथ बैंगनी गूदेवाले शकरकंद पर एक IET में, अधिकतम कुल और विपणन योग्य उपज TSpP23-10 (क्रमशः 25.76 टन हेक्टेयर¹ और 21.36 टन हेक्टेयर¹) में देखी गई। पेद्दापुरम, धारवाड़, कल्याणी, ढोली, रांची, राजेंद्रनगर, जोरहाट, तिरुवनंतपुरम और भुवनेश्वर में परीक्षण जारी है।
- १२ प्रविष्टियों के साथ नारंगी गूदेवाले शकरकंद पर एक IET में,

धारवाड़ में TSp22-1, ढोली में TSp22-2, इंफाल में TSp22-6, पेद्दापुरम, कल्याणी, राजेंद्रनगर में TSp22-10 और कोयंबटूर में TSp22-12 में अधिकतम कंद उपज दर्ज की गई। β कैरोटीन की मात्रा पेद्दापुरम में TSp22-10 और धारवाड़, भुवनेश्वर, कल्याणी, राजेंद्रनगर और इंफाल में भु सोना में सबसे अधिक दर्ज की गई।

- नारंगी गूदेवाले शकरकंद पर एक IET में, धारवाड़ में TSp22-1, बारापानी में TSp22-2 और इम्फाल में TSp22-6 में सबसे अधिक कुल कंद उपज और विपणन योग्य कंद उपज दर्ज की गई। तिरुवनंतपुरम, पेद्दापुरम, ढोली, भुवनेश्वर, राजेंद्रनगर, कल्याणी और कोयंबटूर में परीक्षण जारी है।
- पीले गूदे वाले शकरकंद पर MLT में, TSp16-7 ने उदयपुर, धारवाड़, राजेंद्रनगर और नवसारी में काफी अधिक कुल उपज और विपणन योग्य उपज दर्ज की। परीक्षण प्रविष्टियों में से कोई भी ढोली में स्थानीय चेक कमला सुंदरी से बेहतर नहीं पाई गई। राष्ट्रीय जांच भु सोना ने रांची और भुवनेश्वर में काफी अधिक कुल उपज, विपणन योग्य उपज और β कैरोटीन सामग्री दर्ज की, पेड्डापुरम में TSp16-6 और कल्याणी में TSp16-10 ने काफी अधिक कुल उपज और विपणन योग्य उपज दर्ज की।
- पीले गूदे वाले शकरकंद पर MLT में, सबसे अधिक विपणन योग्य और कुल कंद उपज उदयपुर और धारवाड़ में प्रविष्टि TSp16-7 द्वारा दर्ज की गई, जबकि TSp16-6 ने कोयंबटूर में सबसे अधिक विपणन योग्य कंद उपज दर्ज की। रांची, कल्याणी, ढोली, पेद्दापुरम, भुवनेश्वर, जगदलपुर, नवसारी और राजेंद्रनगर में परीक्षण जारी है।

बड़ा रतालू

- बैंगनी गूदेवाले बड़े रतालू पर IET में, TGy20-3 ने 32.04 टन प्रति हेक्टेयर -की उच्चतम कंद उपज दर्ज की, इसके बाद कोव्वुर में TGy20-7 (29.66 टन प्रति हेक्टेयर) और श्री नीलिमा (28.37 टन प्रति हेक्टेयर) का स्थान रहा।
- बैंगनी गूदे वाले बड़े रतालू पर एक IET में, श्री नीलिमा ने उच्च कंद उपज (22.10 टन प्रति हेक्टेयर) दर्ज की, इसके बाद प्रविष्टियां TGy20-2 दर्ज की गईं जो पोर्ट ब्लेयर में बराबर (20.61 टन प्रति हेक्टेयर) पर थीं और पालमपुर, कोव्वुर, तिरुवनंतपुरम, उदयपुर और नवसारी में परीक्षण चल रहा है।
- बड़े रतालू पर MLT में, स्थानीय में सबसे अधिक औसत कंद उपज दर्ज की गई, इसके बाद कोव्वुर में श्री कार्तिका और TGy17-3 थे। कल्याणी में, स्थानीय प्रविष्टि में सबसे अधिक औसत कंद उपज दर्ज की गई, उसके बाद श्री कार्तिका और TGy17-6 थे। उदयपुर में, औसत अधिकतम उपज भी प्रविष्टि TGy17-4 में दर्ज की गई।

छोटा रतालू

- छोटे रतालू पर IET के तहत, सात प्रविष्टियों में से, TLY20-7 ने ढोली में और TLY20-5 ने इम्फाल में काफी अधिक कंद उपज दर्ज की।
- छोटे रतालू पर URT में, सबसे अधिक कंद उपज प्रविष्टि TLY20-5 में दर्ज की गई, उसके बाद TLY20-7 और श्री कला कल्याणी में, जबकि प्रविष्टि TLY20-5 में काफी अधिक उपज दर्ज की गई, उसके बाद इम्फाल में TLY20-2 में दर्ज की गई।

कोलोकेशिया (एंडो प्रकार)

- कोलोकेशिया पर IET में, उच्चतम कॉर्मेल् उपज और कुल उपज TTr22-8 में दर्ज की गई, उसके बाद कोच्चुर में TTr22-2, जबकि श्री रश्मि के बाद इम्फाल में TTr22-6 दर्ज की गई।
- कोलोकेशिया पर IET में, नौ केंद्रों में से, श्री रश्मि ने काफी अधिक कॉर्मेल् उपज और कुल उपज दर्ज की, जिसके बाद TTr22-6 रही। TTr22-5 में बारापानी में प्रति पौधा कॉर्मेल् का अधिकतम वजन, प्रति पौधा कॉर्मेल् की संख्या, कॉर्मेल् उपज और कुल उपज दर्ज की गई। TTr22-9 में काफी अधिक कॉर्मेल् उपज दर्ज की गई, जिसके बाद TTr22-10 का स्थान रहा, जबकि TTr22-10 में उच्च कुल उपज दर्ज की गई, जिसके बाद लेम्बुचेरा में TTr22-9 का स्थान रहा। TTr22-9 में काफी अधिक कॉर्मेल् उपज और कुल उपज दर्ज की गई, जिसके बाद जगदलपुर में TTr22-4 और TTr22-6 हैं। जोरहाट, दापोली, रांची, तिरुवनंतपुरम और कोच्चुर में परीक्षण जारी है।
- कोलोकेशिया पर MLT के तहत, चार प्रविष्टियों में से, TTr17-3 को कल्याणी और उदयपुर में कॉर्मेल् उपज और कुल उपज दोनों के मामले में बेहतर पाया गया। श्री रश्मि के बाद स्थानीय चेक ने कोच्चुर में बेहतर प्रदर्शन किया, जबकि श्री रश्मि ने इम्फाल में स्थानीय चेक और कोयंबदूर में TTr17-8 का प्रदर्शन किया।

कोलोकेशिया (दशीन प्रकार)

- दशीन तारो पर MLT के तहत, प्रविष्टियाँ TBd17-3, TBd17-2 और TBd17-4 ने कॉर्मेल् उपज के मामले में अच्छा प्रदर्शन किया, लेकिन सांख्यिकीय रूप से कल्याणी में चेक प्रविष्टि IGB-5 की कॉर्मेल् उपज के बराबर थीं।

जिमिकंद

- जिमिकंद पर IET में, TEy22-1 और TEy22-2 ने ढोली में सबसे अधिक कॉर्मेल् उपज दर्ज की, TEy22-6 ने सबसे अधिक कॉर्मेल् उपज दर्ज की, इसके बाद कोयंबदूर में TEy22-4 दर्ज की गई। प्रति पौधा सबसे अधिक उपज TEy22-9 में दर्ज की गई, उसके बाद कोच्चुर में TEy22-11 दर्ज की गई। TEy22-1 ने अधिक कंद उपज दी और नवसारी में अन्य प्रविष्टियों और कल्याणी में TEy22-6 से बेहतर पाई गई।

- जिमिकंद पर MLT में, उपज डेटा से पता चला है कि TEy17-1 ने ढोली, कल्याणी में सबसे अधिक कॉर्मेल् उपज दर्ज की और गजेंद्र सहित अन्य परीक्षण प्रविष्टियों से बेहतर पाया गया, जबकि उदयपुर में गजेंद्र में सबसे अधिक कॉर्मेल् उपज दर्ज की गई, उसके बाद TEy17-1 का स्थान रहा।

एरोरुट

- एरोरुट पर MLT के तहत, TAr18-14 ने कोयंबदूर और इम्फाल में, TAr18-12 ने रांची में, TAr18-10 ने धारवाड़ और तिरुवनंतपुरम में सबसे अधिक प्रकंद उपज दर्ज की। TAr18-12 ने जगदलपुर में, TAr18-4 ने कल्याणी में और TAr18-14 ने इम्फाल में अधिकतम उपज दर्ज की।

कृषि तकनीकें

- कसावा में जल बचत तकनीकों पर दूसरे वर्ष का प्रयोग पेद्दापुरम केंद्र में आयोजित किया गया। विकास मापदंडों के संदर्भ में फसल का प्रदर्शन 50% सीपीई + एंटी ट्रांसपिरेंट (काओलिन स्प्रे) पर ड्रिप सिंचाई और 50% सीपीई + पूसा हाइड्रोजेल @ 0.5 ग्राम प्रति पौधा पर ड्रिप सिंचाई के तहत काफी बेहतर पाया गया। उच्चतम औसत कंद उपज 50% सीपीई + पूसा हाइड्रोजेल @ 0.5 ग्राम प्रति पौधा पर ड्रिप सिंचाई के साथ दर्ज की गई, इसके बाद 50% सीपीई + ग्राउंड कवर शीट पर ड्रिप सिंचाई (50% सीपीई + सिंथेटिक एसएपी पर 120 जीएसमंड ड्रिप सिंचाई) दर्ज की गई।
- कसावा, हाथी पैर रतालू और ग्रेटर रतालू के उच्च घनत्व रोपण पर प्रयोग विभिन्न केंद्रों पर आयोजित किया गया। कसावा में उच्च घनत्व रोपण पर परीक्षण करीब दूरी के सात उपचारों के साथ नौ केंद्रों पर आयोजित किया गया था। सभी उपचारों के बीच, जगदलपुर, इम्फाल, दापोली, तिरुवनंतपुरम, बारापानी और भुवनेश्वर में 60x60 सेमी की दूरी में रोपण योग्य तनों की काफी अधिक संख्या दर्ज की गई, जबकि पेद्दापुरम में 90x60 सेमी की दूरी में यह सबसे अधिक थी। सात उपचारों के साथ येथापुर, बारापानी और कल्याणी में दूसरे वर्ष का प्रयोग किया गया। बारापानी और कल्याणी में 90 x 60 सेमी की दूरी पर अधिकतम कंद उपज दर्ज की गई। बी:सी अनुपात येथापुर में 90 x 90 सेमी, बारापानी में 90 x 60 सेमी और कल्याणी में 75 x 75 सेमी के साथ उच्चतम पाया गया। पेद्दापुरम, जगदलपुर, इम्फाल, दापोली, भुवनेश्वर और तिरुवनंतपुरम में परीक्षण जारी है।
- जिमिकंद में, 8 केंद्रों पर नजदीकी दूरी के सात उपचार आजमाए गए। सभी उपचारों के बीच, 60 x 60 सेमी उपचार में काफी अधिक बीज कंद उपज का उत्पादन पाया गया, इसके बाद कोयंबदूर, धारवाड़, भुवनेश्वर, नवसारी, जगदलपुर और

तिरुवनंतपुरम में 75 x 60 सेमी प्राप्त हुआ। कोव्वुर, धारवाड़, नवसारी और भुवनेश्वर में बी:सी अनुपात 90 x 90 सेमी के साथ काफी अधिक पाया गया। दूसरे वर्ष 3 केंद्रों पर प्रयोग किया गया। उपज पैरामीटर 75 x 60 सेमी और 60 x 60 सेमी के साथ उच्चतम पाए गए। पोर्ट ब्लेयर और लेम्बुचेरा में बी:सी अनुपात 90x60 सेमी के साथ अधिक पाया गया। 11 केंद्रों पर परीक्षण जारी है।

- बड़े रतालू में, करीब दूरी के सात उपचार सात केंद्रों पर आजमाए गए, जहां 60 x 60 सेमी में जगदलपुर, नवसारी, भुवनेश्वर और तिरुवनंतपुरम में बेहतर प्रदर्शन पाया गया।
- तारो में प्राकृतिक खेती पर परीक्षण सात केंद्रों पर आयोजित किया गया था। कोयंबटूर और भुवनेश्वर में प्राकृतिक खेती पद्धतियों में, पौधों की ऊंचाई, शुद्ध आय और बी:सी अनुपात अन्य सभी उपचारों की तुलना में काफी अधिक था। राज्य अनुशंसित पीओपी ने राजेंद्रनगर और बारापानी में काफी अधिक उपज और शुद्ध आय दी। भुवनेश्वर, दापोली, कोव्वुर, कोयंबटूर, बारापानी और राजेंद्रनगर केंद्रों पर दूसरे वर्ष का प्रयोग प्रगति पर है। पालमपुर में, प्राकृतिक खेती पद्धतियों के साथ पौधों की उच्चतम ऊंचाई और बी:सी अनुपात दर्ज किया गया।
- ग्यारह केंद्रों पर बाजरा हाथी पैर रतालू की अंतरफल पर एक नया परीक्षण शुरू किया गया था। लेम्बुचेरा में, ज्वार के साथ जिमिकंद की अंतःफलन ने कंद के बराबर उपज के साथ काफी बेहतर प्रदर्शन किया, इसके बाद फिंगर बाजरा का स्थान आया।
कसावा में नैनो यूरिया अनुप्रयोग के मानकीकरण पर एक नया परीक्षण तीन केंद्रों पर पांच उपचारों के साथ शुरू किया गया था। जिमिकंद में नैनो यूरिया अनुप्रयोग के मानकीकरण पर परीक्षण 5 उपचारों के साथ कल्याणी में आयोजित किया गया था। पीओपी + इफको नैनो यूरिया फोलियर स्प्रे के तहत सबसे अधिक उपज और शुद्ध आय दर्ज की गई थी। 10 केंद्रों पर ट्रायल चल रहा है।
- तारो में एकीकृत खरपतवार प्रबंधन पर दूसरे वर्ष का प्रयोग कोव्वुर सेंटर में आयोजित किया गया था। सभी खरपतवार नियंत्रण उपचारों के बीच, खरपतवार नियंत्रण ग्राउंड कवर मैट के साथ मल्लिंग ने उच्चतम कॉर्नेल उपज और निवल प्रतिफल दर्ज किया।
- तारो में अनुकूलित उर्वरकों के सत्यापन पर दूसरे वर्ष का प्रयोग 3 उपचारों के साथ विभिन्न केंद्रों पर आयोजित किया गया। राजेंद्रनगर में, आजमाए गए तीन उपचारों में से, मिट्टी में अनुकूलित उर्वरक और पते पर माइक्रोनोल के प्रयोग के साथ

कॉर्नेल की उपज, शुद्ध आय और बी:सी अनुपात काफी अधिक दर्ज किया गया। पूर्ण नियंत्रण के तहत कोव्वुर में कॉर्नेल उपज, शुद्ध आय और बी:सी अनुपात काफी अधिक था।

- कसावा (सीजन २) में अनुकूलित उर्वरकों के सत्यापन पर प्रयोग दो केंद्रों पर आयोजित किया गया था। पेद्दापुरम में, पीओपी के अनुसार वर्तमान अनुशंसा के बाद अनुकूलित उर्वरक के उपयोग के साथ प्रति हेक्टेयर कुल कंद की उपज सबसे अधिक थी। अनुकूलित उर्वरकों के बाद वर्तमान पीओपी अनुशंसाओं के लिए बी:सी अनुपात उच्चतम था। अनुकूलित उर्वरक के साथ प्रति हेक्टेयर कुल कंद उपज सबसे अधिक थी। पीओपी के अनुसार वर्तमान अनुशंसा में मिट्टी में अनुकूलित उर्वरक और माइक्रोनोल के पतेदार अनुप्रयोग की तुलना में एन और पी सामग्री में काफी अधिक वृद्धि दर्ज की गई है। कसावा में जैविक उत्पादन तकनीक के सत्यापन पर दूसरे वर्ष का प्रयोग पेद्दापुरम और जगदलपुर में आयोजित किया गया। पेद्दापुरम में, कंद की उपज और बी:सी अनुपात वर्तमान पीओपी अनुशंसाओं में उच्चतम था, जिसके बाद केंद्र के अनुसार पीओपी का स्थान था। जगदलपुर में, विकास और उपज मापदंडों का प्रदर्शन पारंपरिक (किसानों के अभ्यास) से बेहतर था। जैविक अभ्यास के लिए बी:सी अनुपात उच्चतम था।

कीट एवं रोग प्रबंधन

- कसावा में मीली बग के प्रबंधन पर प्रयोग पेद्दापुरम में श्रीरक्षा किस्म के साथ तीन प्रतिकृति में सात उपचारों के साथ आयोजित किया गया था। मीली बग का कोई प्रकोप नहीं देखा गया।
- कसावा मोजेक रोग के कारण कसावा में उपज हानि मूल्यांकन पर दूसरे वर्ष का प्रयोग नौ केंद्रों पर आयोजित किया गया था। जगदलपुर में, दो महीनों में पौधों में लक्षण दिखने पर केवल 3.81% की उपज हानि देखी गई। येथापुर में, 3-6 महीनों में लक्षण दिखाने वाले पौधों में प्रति पौधा उपज और प्रति हेक्टेयर उपज सबसे अधिक दर्ज की गई। यूएचएस, धारवाड़ में, प्रति पौधा उपज सबसे अधिक और असिम्प्टामाटिक पौधों में प्रति हेक्टेयर उपज दर्ज की गई। जोरहाट, रांची, इम्फाल और बारापानी में, कसावा मोजेक रोग की कोई घटना नहीं देखी गई।
- कॉलर रॉट रोग के कारण जिमिकंद में उपज हानि का आकलन दस केंद्रों पर किया गया। कोयंबटूर, राजेंद्रनगर और कल्याणी केंद्रों में कॉलर रॉट के कारण जिमिकंद की न्यूनतम उपज हानि 5 वें महीने में दर्ज की गई। पोर्ट ब्लेयर केंद्र ने छठे महीने में और लेम्बुचेरा ने दसवें महीने में न्यूनतम उपज हानि दी। पालमपुर, उदयपुर और नवसारी केंद्र में परीक्षण प्रगति पर है जबकि कोव्वुर और ढोली केंद्र में कॉलर रोट की कोई घटना नहीं थी।

सभी केन्द्रों द्वारा कंदीय फसलों के कीटों और रोगों का सर्वेक्षण और निगरानी की गई। विभिन्न महीनों में महत्वपूर्ण कीटों और बीमारियों की प्रतिशत घटना का अनुमान लगाया गया। सभी केन्द्रों द्वारा कंदीय फसलों के कीटों और रोगों का सर्वेक्षण और निगरानी की गई। विभिन्न महीनों में महत्वपूर्ण कीटों और बीमारियों की प्रतिशत घटना का अनुमान लगाया गया। आईसीएआर-नेशनल ब्यूरो ऑफ एग्रीकल्चरल कीट रिसोर्स (एनबीएआईआर), बंगालूरु से आयोजित एक एकल सीएमबी विशिष्ट परजीवी, एनागिरसलोपेजी को टीसीआरएस, येथापुर में बनाए रखा गया और बड़े पैमाने पर गुणा किया गया। 10 जिलों के 650 से अधिक किसानों को प्रति एकड़ 100 पैरासाइटोइड जारी किए गए और आंकड़ों से पता चला कि सीएमबी आबादी में 75% से अधिक की कमी आई है।

रोपण सामग्री उत्पादन

- सभी केन्द्रों द्वारा कंदीय फसलों की उन्नत किस्मों की रोपण सामग्री प्रवर्धित कर किसानों को वितरित की गई। केन्द्रों ने कसावा के कुल 137275 तने का उत्पादन किया; शकरकंद की 571770 बेल की कतरन; 29.00 टन हाथी पैर रतालू; 8.00 टन तारो; 1.38 टन दशीन तारो; 2.00 टन ग्रेटर रतालू; 160 किलो कम रतालू; 160 किलोग्राम एरियल रतालू; 254 किलोग्राम टैनिया; 310 किलोग्राम एरो रूट, और 35 किलोग्राम याम बीन और दलदल तारो के 7500 पौधरोपण सामग्री उत्पादन कार्यक्रम के हिस्से के रूप में और ₹ 664472 का राजस्व उत्पन्न हुआ।

अनुसंधान-विस्तार-किसान-लिकेज

- एनईएच क्षेत्र और जनजातीय क्षेत्रों में कंद फसलों पर आधारित एकीकृत कृषि प्रणाली नौ राज्यों और एक केंद्र शासित प्रदेश में आयोजित की गई। कृषि प्रणाली अध्ययन के तहत बिहार में रांची जिले के चान्हो ब्लॉक के बेयासी गांव में आदिवासी किसानों के खेतों में विभिन्न फसल घटकों, पशु घटकों और बागवानी फसलों के घटकों का परीक्षण किया गया है। 2023 के दौरान हरमिंदर बे, लिटिल अंडमान में किसानों के खेत में समुदाय आधारित कंद फसल आधारित कृषि प्रणाली का प्रदर्शन किया गया था। हस्तक्षेप से पहले, तुहेट की शुद्ध आय 1.22 के बी:सी अनुपात के साथ ₹ 70000 थी। कंद फसलों पर आधारित कृषि प्रणाली के हस्तक्षेप के बाद 2.29 के बी:सी अनुपात के साथ शुद्ध आय बढ़कर ₹ 203770 हो गई।
- कंद फसलों पर आधारित एकीकृत कृषि प्रणाली का अध्ययन

नॉगडैम, इम्फाल पूर्व और काकचिंगखुनौ, इम्फाल के काकचिंग जिले में आयोजित किया गया। हस्तक्षेप के बाद, किसानों को साल भर रोजगार प्रदान करके अपनी आय प्राप्त की जा सकती है। नॉगडैम में, हस्तक्षेप के कारण रोजगार सृजन 177 से बढ़कर 533 हो सकता है। बी:सी अनुपात भी 1.04 से बढ़कर 2.41 हो गया।

- कंद फसलों पर आधारित कृषि प्रणाली का अध्ययन बारापानी के लुमडिएनगन गांव में शुरू किया गया था। कृषि प्रणाली के अध्ययन से पहले, 0.50 हेक्टेयर के कुल क्षेत्र का उपयोग बन्लुमलांग वी.ओ. द्वारा खेती के लिए किया गया था। ₹ 82078 की शुद्ध आय के साथ लुमडिएनगन। हस्तक्षेप के बाद, 1.50 हेक्टेयर का कुल क्षेत्रफल, ₹ 478905 की निवल आय अर्जित करता है।
- आईएफएस मॉडल: हॉर्टी। कंदीय फसलों + सुअर पालन + मुर्गी पालन + मत्स्य पालन + बकरी के साथ दमदामिया, पश्चिम त्रिपुरा में शुरुआत की गई थी। उच्च उपज वाली सब्जियों और पशुधन पर आधारित एकीकृत कृषि प्रणाली में उन्नत प्रौद्योगिकियों के हस्तक्षेप के बाद, सब्जी फसलों की उत्पादकता 15 टन प्रति हेक्टेयर से बढ़कर 25 टन प्रति हेक्टेयर हो गई। आईएफएस प्रौद्योगिकी को अपनाने से उनकी वार्षिक सकल आय 2.5 के बी:सी अनुपात के साथ ₹ 93500 से बढ़कर ₹ 304650 हो गई।
- अनुसंधान-विस्तार-किसान लिकेज' के तहत, विभिन्न केंद्रों द्वारा आठ अलग-अलग कार्यक्रम चलाए गए। सभी केंद्र नियमित रूप से कंद फसल की किस्मों और प्रौद्योगिकियों को लोकप्रिय बनाने के लिए विस्तार गतिविधियां चलाते हैं। सभी 21 केन्द्रों द्वारा नियमित आधार पर प्रशिक्षण कार्यक्रम, प्रदर्शन, वेबिनार, किसान-मेल, मास मीडिया कार्यक्रम, वैज्ञानिक किसान संपर्क, कृषि सलाहकार दौरे और कृषि आदानों और उपकरणों का वितरण नियमित आधार पर किया गया था। सभी केंद्रों ने हमारे समाज के इन विशेष वर्गों की खाद्य, पोषण और आजीविका सुरक्षा में सुधार के लिए टीएसपी, एससीएसपी और एनईएच जैसी विशेष योजनाएं भी चलाई।

बजट

रिपोर्ट किए गए वर्ष (2023-2024) के दौरान AICRP TC को ICAR हिस्से के रूप में ₹ 572.58 लाख की राशि प्राप्त हुई और इसे केंद्रों में वितरित किया गया।, ONEH (₹ 466.86 लाख), NEH (₹ 47.00 लाख), SCSP (₹ 49.91 लाख) और TSP (₹ 8.81 लाख) शीर्षकों के तहत।

INTRODUCTION

All India Coordinated Research Project on Tuber Crops functioning since 1968 has twenty one centres spread over eighteen States and one Union Territory covering north-eastern, eastern, western and southern parts of India. The major tropical root and tuber crops covered under the project are cassava, sweet potato, taro, dasheen taro, swamp taro, elephant foot yam, giant taro, lesser yam, greater yam, aerial yam, yam bean, winged bean, arrow root, coleus etc. The main aim of the project is generating region specific value added varieties, agronomic and production system technologies, pest and disease management strategies and popularisation of tuber crops varieties and technologies for improving the productivity.

Mandate of the project

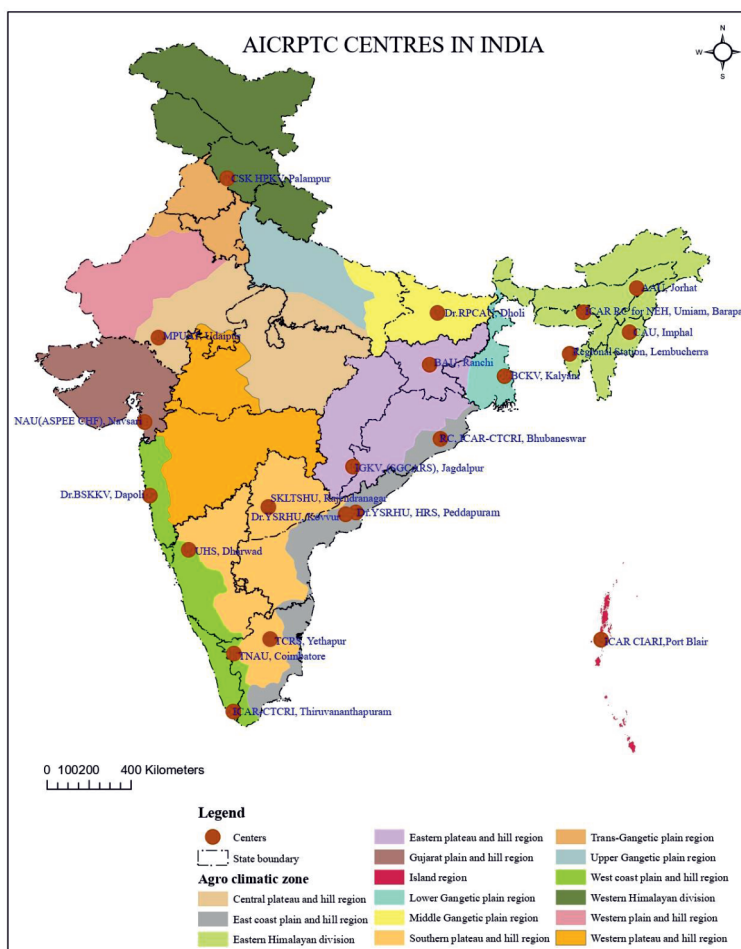
- Collection of germplasm of root and tuber crops from different regions of the country particularly from the tribal/ hilly areas and maintaining them in the field gene bank.
- Evaluation of germplasm for economically important traits including high yield, quality, short duration, tolerance/ resistance to biotic and abiotic stress and sharing of promising entries among the centres.
- Carrying out regional/ location specific trials to identify improved varieties suitable to different agro-climatic conditions.
- Standardization of suitable agro-techniques and cropping systems for improved varieties of different root and tuber crops in different regions, so as to enhance the productivity.
- Evolve suitable and effective management tactics for major pests and diseases of tuber crops.
- To popularize and create awareness on the importance and nutritional aspects of major tuber crops.
- To organize production and supply of healthy planting materials of major tuber crops in liaison with State Agri/ Horti. Departments and voluntary agencies like KVKs/ NGOs.

Mandate Crops

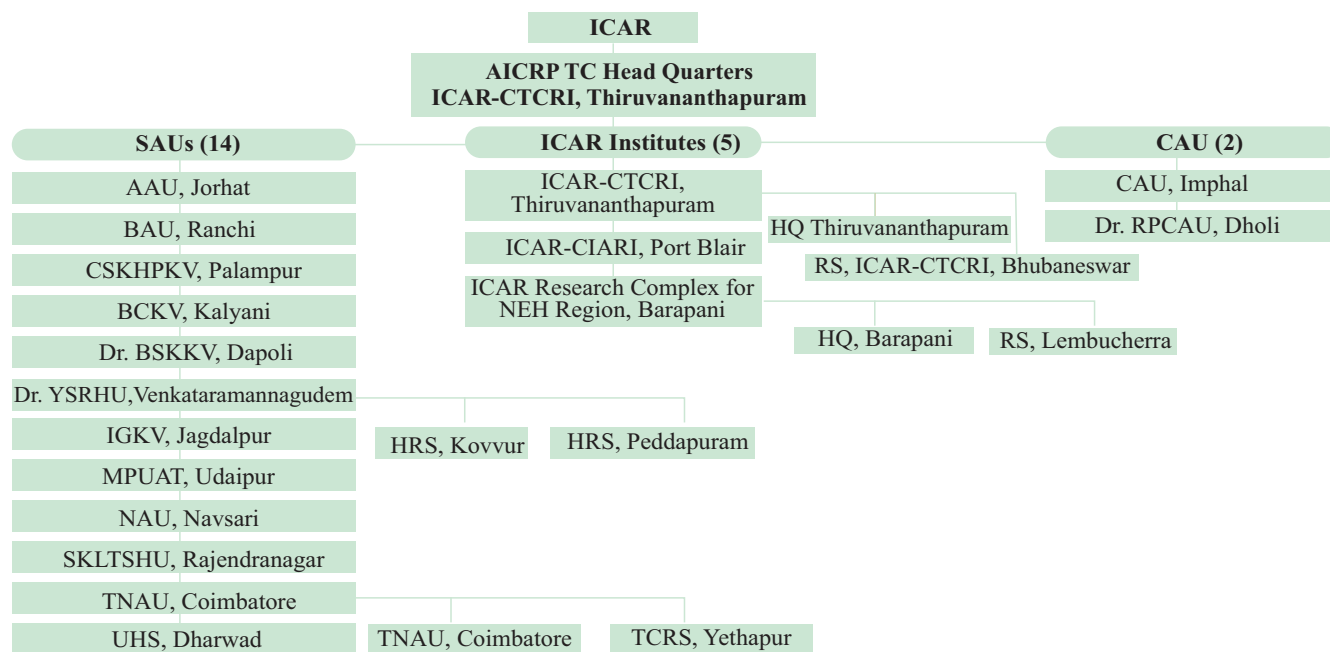
Crop	Scientific Name	Family
Cassava	<i>Manihot esculenta</i> Crantz	Euphorbiaceae
Sweet potato	<i>Ipomoea batatas</i> (L.) Lam.	Convolvulaceae
Greater yam	<i>Dioscorea alata</i> L.	Dioscoreaceae
White yam	<i>Dioscorea rotundata</i> Poir.	Dioscoreaceae
Lesser yam	<i>Dioscorea esculenta</i> (Lour.) Burk.	Dioscoreaceae
Aerial yam	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae
Other yams	<i>Dioscorea hispida</i> Dennst.	Dioscoreaceae
	<i>Dioscorea pentaphylla</i> L.	Dioscoreaceae
Taro / Arvi	<i>Colocasia esculenta</i> var. <i>antiquorum</i> (L.) Schott.	Araceae
Dasheen taro	<i>Colocasia esculenta</i> var. <i>esculenta</i> (L.) Schott.	Araceae
Swamp taro	<i>Colocasia stoloniferum</i> (L.) Schott.	Araceae
Tannia	<i>Xanthosoma sagittifolium</i> (L.) Schott.	Araceae
Elephant foot yam	<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Araceae
Giant taro	<i>Alocasia macrorrhizos</i> (L.) G.Don	Araceae
Giant swamp taro	<i>Cyrtosperma chamissionis</i> (Schott.) Merr.	Araceae
Chinese potato	<i>Plectranthus rotundifolius</i> (Poir.) Spreng.	Lamiaceae
Arrow root	<i>Maranta arundinacea</i> L.	Marantaceae
Canna	<i>Canna edulis</i> Ker-Gawler/ <i>Canna indica</i> L.	Cannaceae
Winged bean	<i>Psophocarpus tetragonolobus</i> (L.) DC.	Fabaceae
Yam bean	<i>Pachyrhizus erosus</i> (L.) Urb	Fabaceae
Vigna	<i>Vigna capensis</i> (L.) Walp.	Fabaceae
Typhonium	<i>Typhonium</i> spp.	Araceae
Costus	<i>Costus speciosus</i> (Koenig) Sm. (J. Konig) C. Specht.	Costaceae
Shoti	<i>Curcuma</i> spp.	Zingiberaceae

Centres under AICRP on Tuber Crops

S.No.	Name of the centre	Year of start	Mandate Crops
1	ICAR-Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala	1968	Cassava, Sweet potato, Yams, Elephant foot yam and Aroids
2	Dr. Rajendra Prasad Central Agricultural University, Dholi, Bihar	1968	Sweet potato, Colocasia, Elephant foot yam and Yam bean
3	Tapioca and Castor Research Station, TNAU, Yethapur, Tamil Nadu	1968	Cassava
4	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	1968	Sweet potato, Colocasia, Elephant foot yam and Yams
5	Horticultural Research Station, Peddapuram, Dr. YSRHU, Andhra Pradesh	1969	Cassava and Sweet potato
6	Horticultural Research Station, Kovvur, Dr. YSRHU, Andhra Pradesh	1969	Yams and Aroids
7	Assam Agricultural University, Jorhat, Assam	1971	Cassava, Sweet potato, Aroids and Yams
8	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra	1975	Cassava, Sweet potato, Colocasia, Elephant foot yam and Yams
9	ICAR Research Complex for NEH Region, Barapani, Meghalaya	1975	Sweet potato and Aroids
10	Bidhan Chandra Krishi Viswavidyalaya, Kalyani, West Bengal	1976	Sweet potato, Aroids, Yam bean, and Yams
11	Regional Station, ICAR-CTCRI, Bhubaneswar, Odisha	1983	Cassava, Sweet potato, Aroids, Yam bean and Yams
12	Birsa Agricultural University, Ranchi, Jharkhand	1987	Sweet potato, Colocasia, Elephant foot yam and Yam bean
13	Shaheed Gundadhar College of Agriculture and Research (SGCARS), Indira Gandhi Krishi Vishwavidyalaya, Jagdalpur, Chhattisgarh	1987	Cassava, Sweet potato, Yams and Aroids
14	ASPEE College of Horticulture and Forestry Navsari Agricultural University, Navsari, Gujarat	1994	Cassava, Sweet potato, Aroids and Yams
15	ICAR-Central Island Agricultural Research Institute, Port Blair, A & N Islands	2000	Cassava, Sweet potato, Yams and Elephant foot yam
16	Central Agricultural University, Imphal, Manipur	2006	Cassava, Sweet potato, Aroids and Yams
17	Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan	2006	Aroids and Sweet potato
18	University of Horticultural Sciences, Dharwad, Karnataka	2007	Sweet potato and Aroids
19	Chaudhary Sawan Kumar Himachal Pradesh Krishi Viswavidyalaya, Palampur, Himachal Pradesh	2014	Elephant foot yam and Taro
20	Sri Konda Laxman Telangana State Horticultural University, Rajendranagar, Telangana	2015	Sweet potato and Aroids
21	Regional Station, ICAR Research Complex for NEH Region, Lembucherra, Tripura	2015	Aroids and Yams



Organisational Setup



Background Information of the Centres under AICRP on Tuber Crops

S.No.	Name of the Centre	Agro-Climatic Region	Latitude / Longitude / Altitude (m)	Soil type/ pH	Mean Annual Rainfall (mm)
1	ICAR - CTCRI, Thiruvananthapuram	West Coast Plains and Hills	8°32'N, 76°54'E 10	Laterite soil; 5.0-5.5	1828
2	RS, ICAR- CTCRI, Bhubaneswar	East Coast Plains and Hills	20°14'N, 85°47'E 58	Laterite soil; 5.5-6.0	1505
3	TNAU, Coimbatore	Southern Plateau and Hills	11.01°N, 76.94°E 411	Red loam; 7.0-8.0	620
4	TNAU, Yethapur	Southern Plateau and Hills	11.35° N, 78.29°E 282	Red sandy loam soil; 7.6-7.8	898
5	UHS, Dharwad	West Coast Plains and Hills	15°16'N, 70°07'E 533	Shallow red with sand; 6.5-7.0	844
6	Dr. YSRHU, Kovvur	East Coast Plains and Hills	16°49'N, 81°30'E 9	Sandy loam; 7.8-8.0	1126
7	Dr. YSRHU, Peddapuram	East Coast Plains and Hills	17° 07'N, 82°14'E 35	Sandy loam; 6.5-7.2	1102
8	SKLTSHU, Rajendranagar	Southern Plateau and Hills	17°20'N, 78°30'E 573	Sandy loam; 7.5-7.7	797
9	Dr. BSKKV, Dapoli	West Coast Plains and Hills	17° 40'N, 73°16'E 240	Laterite soil; 5.6-6.5	3086
10	IGKV, Jagdalpur	Eastern Plateau and Hills	19°05'N, 82°02'E 553	Silty clay; 5.5-6.2	1236
11	NAU, Navsari	Gujarat Plains and Hills	20° 57'N, 72°54'E 10	Heavy black; 7.0-8.0	1237
12	BAU, Ranchi	Eastern Plateau and Hills	23°17'N, 85°19'E 651	Red yellow light grey catenary soils; 6.5-7.0	1272
13	BCKV, Kalyani	Lower Gangetic Plains	23° 5'N, 89° E 11	Alluvial soil; 5.5-6.0	1960
14	RS, ICAR RC NEH, Lembucherra	Eastern Himalayan Region	23°54'N, 91°18'E 52	Red and clay loam; 4.5-5	2178
15	CAU, Imphal	Eastern Himalayan Region	85° 24'N, 94°93'E 786	Clay loam; 6.0-7.0	1300
16	AAU, Jorhat	Eastern Himalayan Region	26° 47'N, 94°12'E 116	Sandy loam; 4.8-5.0	2486
17	ICAR Research Complex for NEH, Barapani	Eastern Himalayan Region	26°N, 92° E 891	Apatani plateau sandy loam-clay loam; 5.1-5.6	2529
18	Dr. RPCAU, Dholi	Middle Gangetic Plains	25° 5'N, 85°E 52.3	Sandy loam; 8.1-8.4	1320
19	MPUAT, Udaipur	Central Plateau and Hills	24°34'N, 73°42'E 600	Clay loam; 8.0-8.2	900
20	CSKHVKV, Palampur	Western Himalayan Region	32°10'N 76°30'E 1742	Fine loamy; 5.5-6.0	2493
21	ICAR-CIARI, Port Blair	Islands	6° 45'N, 92°57'E 16	Sandy gravel; 5.0-5.8	3070

RESEARCH ACHIEVEMENTS

I. COLLECTION, CONSERVATION, CATALOGUING AND EVALUATION OF GENETIC RESOURCES OF TUBER CROPS

Table 1a. Genetic resources of different tropical root and tuber crops under AICRP TC centres

Centres	Cassava	Sweet potato	Elephant foot yam	Greater yam	Lesser yam	Aerial yam	White yam	Other yams	Taro	Bunda	Swamp taro	Tannia	Arrow root	Yam bean	Giant taro	Country potato	Winged bean	Shola kachu	Others	Total
AAU, Jorhat	3	3	5	18	4				34	4	6				1					78
BAU, Ranchi		70	32	29	7				80	59										277
BCKV, Kalyani	10	161	28	29	2		4	1	92	21	42	11	3	1	8	1		2		416
CAU, Imphal	13	17	1	15		5			14		2	2					6			75
CSK HPKV, Palampur			7	9					38											54
Dr. BSKKV, Dapoli	1	7	5	25	15	43			21			5								122
Dr. RPCAU, Dholi		1054	23	10	5	2			68	29			2	140		1	10	2		1346
Dr. YSRHU, Kovvur			79	42					120											241
Dr. YSRHU, Peddapuram	52	20																		72
IGKV, Jagdalpur	38	50	35	63	4	66	1	12	134	12	1	2	1	2	1		2		39	463
MPUAT, Udaipur	12	67	3	36					24											142
NAU, Navsari	11	55	13	17	2	5			3			15								121
SKLTSHU, Rajendranagar		42	1	1					46											90
TNAU, Yethapur	378																			378
TNAU, Coimbatore		50	3			2			4							1			1	61
UHS, Bagalkot		82	2	8		2	2		7	4			1		4	2			4	118
ICAR-CIARI, Port Blair	5	8	6	47	1	7			39			5	1		2	1			17	139
ICAR-RC, NEH, Barapani	14	68	1						62		2									147
RS, ICAR-RC, NEH, Lembucherra		5	1	4					2		5								2	19
Total	537	1759	245	353	40	132	7	13	788	129	58	40	8	143	16	6	18	4	63	4359

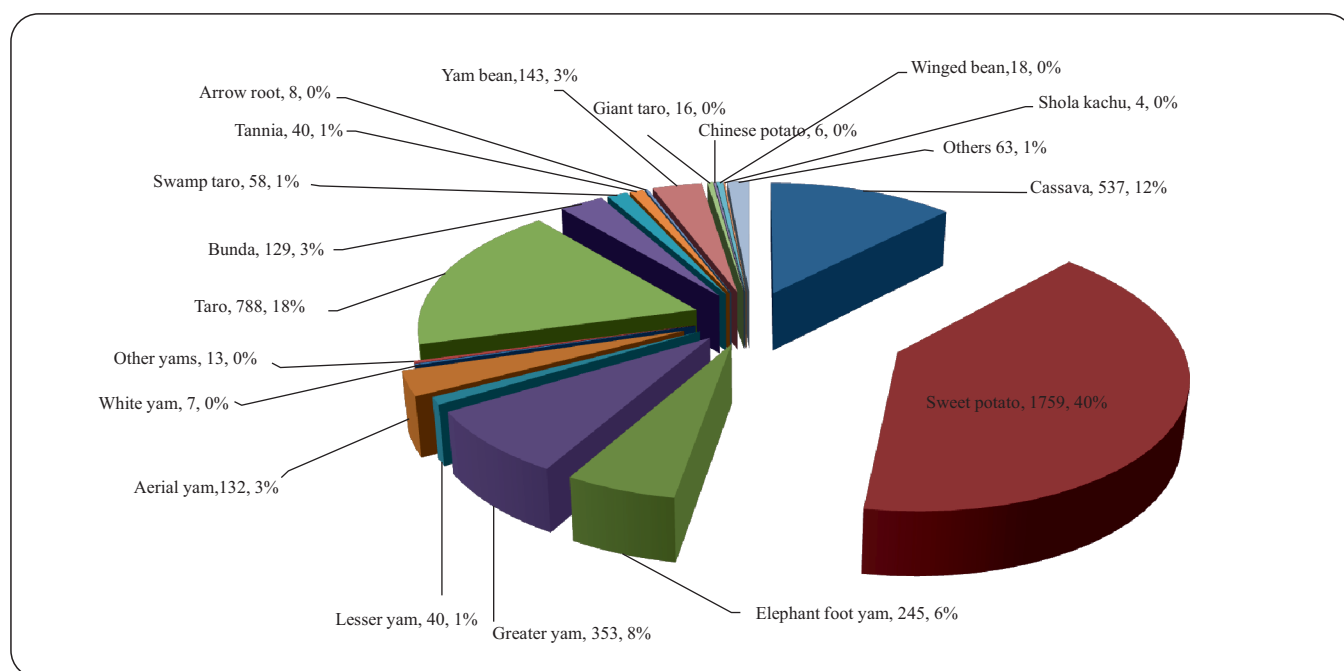


Fig. 1 Total germplasm collection of different tuber crops under different AICRP TC centres



Fig. 2 Field view of elephant foot yam and greater yam germplasm at Kovvur centre

A total of 4359 germplasms of 18 different tuber crops and other minor crops are being maintained at different AICRP TC centres. 1759 collections of sweet potato are being maintained and a major share is from Dr. RPCAU, Dholi (1054) centre followed by BCKV, Kalyani (161) and UHS, Bagalkot (82). At present, 17 centres of AICRP TC maintains sweet potato germplasm. A total of 537 collections of cassava is being maintained and nearly three fourth are at TNAU, Yethapur (378) followed by Dr. YSRHU, Peddapuram (50) and IGKV, Jagdalpur (38). A total of 685 collections of yams is being maintained, where Dr. RPCAU, Dholi (157) centre maintains the largest collection of germplasm followed by IGKV, Jagdalpur (148) and Dr. BSKKV, Dapoli (83), respectively. At present 16 centres maintain yam germplasm. A total of 991 collections of taro is being maintained and majority are at BCKV, Kalyani (163) centre followed by IGKV, Jagdalpur (148) and BAU, Ranchi (139). At present 17 centres maintain colocasia germplasm. A total of 247 collections of elephant foot

Table 1b. New germplasm collection of different tropical root and tuber crops in different AICRP TC centres

Centres	Cassava	Sweet potato	Elephant foot yam	Greater yam	Lesser yam	Aerial yam	Taro	Bunda	Swamp taro	Tannia	Giant taro	Others	Pidi karunai	Total
AAU, Jorhat				1			1							2
BAU, Ranchi		1	1				1	2						5
BCKV, Kalyani		1			1		1		1					4
CAU, Imphal							3							3
CSKHPKV, Palampur			2	1			1							4
Dr. BSKKV, Dapoli		1				1	2							4
Dr. RPCAU, Dholi		1	1											2
Dr. YSRHU, Kovvur				4		3	2			1		5		15
Dr. YSRHU, Peddapuram	4	5												9
IGKV, Jagdalpur											1			1
MPUAT, Udaipur		1					1							2
SKLTSHU, Rajendranagar				1			1							2
TNAU, Yethapur	2													2
TNAU, Coimbatore		3					2						1	6
UHS, Bagalkot		6		2		1								9
ICAR-CIARI, Port Blair				4			3					4		11
ICAR-RC, NEH, Barapani	3	1					1							5
RS, ICAR-RC, NEH, Lembucherra							1		1					2
Total	9	20	4	13	1	5	20	2	2	1	1	9	1	88

yam is being maintained and one third from Dr. YSRHU, Kovvur (81) centre, which followed by IGKV, Jagdalpur (35) and BAU, Ranchi (32), respectively. Seventeen centres maintain yams germplasm. A total of 8 collections of arrowroot is being maintained and three germplasms from BCKV, Kalyani, two from Dr. RPCAU, Dholi and one each from Jagdalpur, Dharwad and Port Blair centres. (Table 1a, Figure1).

A total of 88 new germplasm collection of various tuber crops were carried out at different centres, which includes twenty new collections of sweet potato and taro, nine new collections of cassava and thirteen new collections of greater yam. Altogether, 297 germplasm including 150 in sweet potato, 30 in yam bean, 68 in taro, 28 in dasheen and 21 in elephant foot yam were

characterized based on DUS descriptors. At Dharwad centre, among 82 sweet potato germplasms, 60 are characterized and IC numbers were received for 66 germplasms, IC-0639434 is orange flesh contains Beta carotene of 8.21 mg 100g⁻¹, IC-0639450, is identified as high yielding and having attractive pink skin colour with long elliptic tuber which have more demand in the market and IC-0639453 is having purple flesh.

ICAR-CIARI, Port Blair (11) collected maximum number of new germplasm followed by Dr. YSRHU, Kovvur (10) this year. A total of 20 new sweet potato germplasms were collected from nine different centres of AICRP TC is the maximum number of new germplasm collected followed by 19 germplasms of taro from 13 centres. (Table 1b).

Table 1c. Total accession numbers received from NBPGR of different tropical root and tuber crops under AICRP TC centres

Centres	Cassava	Sweet potato	Elephant foot yam	Greater yam	Lesser yam	Aerial yam	Other yams	Taro	Bunda	Swamp taro	Tannia	Arrow root	Yam bean	Winged bean	Shola kachu	Others	Total
AAU, Jorhat				16				30									46
BAU, Ranchi		29	7	9				30	25								100
BCKV, Kalyani		16	5	7				49	3								80
CAU, Imphal	1									1							2
CSKHPKV, Palampur			1														1
Dr. BSKKV, Dapoli				2	2	8		4			2						18
Dr. RPCAU, Dholi		1040	12	9	2			60	27				139	10	1		1300
Dr. YSRHU, Kovvur			57	23				68									148
Dr. YSRHU, Peddapuram	48	9															57
IGKV, Jagdalpur	16	39	23	38	3	60	5	117	3			1				29	334
MPUAT, Udaipur		20						10									30
NAU, Navsari		1	1	3	1	2					3						11
SKLTSHU, Rajendranagar								10									10
TNAU, Yethapur	1																1
TNAU, Coimbatore		1	1														2
UHS, Bagalkot																	0
ICAR-CIARI, Port Blair		2	4	36		1		12			2	1					58
ICAR-RC, NEH, Barapani																	0
RS, ICAR-RC, NEH, Lembucherra			1					2		5						2	10
Total	66	1157	112	143	8	71	5	392	58	6	7	2	139	10	1	31	2208

A total of 2208 germplasm accessions received accession number from NBPGR which includes 1157 of sweet potato, 66 cassava, 392 taro, 139 yam bean accessions. Dr. RPCAU Dholi received 1040 accession number out

of 1300 accessions of sweet potato. Dr. YSRHU Peddapuram received 48 accessions in cassava. In elephant foot yam, Dr. YSRHU, Kovvur received the accession numbers for 57 accessions. Total 1300

accession numbers has been taken so far from NBPGR, New Delhi for different tuber crops germplasm (Table 1c).

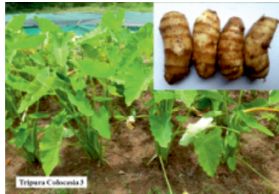
One new germplasm of sweet potato (white skinned) from West Champaran and one elephant foot yam entry from Nalanda district has been added to Dholi centre for their culinary properties. During this year, 15 germplasm accessions were collected and obtained IC numbers for 13 elephant foot yam and 3 *Dioscorea* lines at Kovvur centre. At Port Blair centre, 12 sweet potato varieties released from ICAR-CTCRI included in germplasm and 24 greater yam accessions and three accessions of colocasia passport data submitted to ICAR-NBPGR and

obtained IC numbers.

At Lembucherra, several minor tuber crops are being maintained for their ethnic food value. *Alocasia macrorrhizos* (L.) G. Don, *Steudnera colocasioides* Hook. f., *Xanthosoma violaceum* L., *Colocasia esculenta* var. *esculenta* L., *Typhonium trilobatum*, *Alocasia fornicata* (Roxb.) Schott., *A. odora* (Roxb.) Koch, *A. decipiens* Schott., *Dioscorea bulbifera* L., *D. hamiltonii* Hook. F., *D. oppositifolia* L. and *D. pentaphylla* L. and all other major tuber crops. All these are very much popular among the tribal and non-tribal communities in Tripura. Out of 463 total germplasm, 334 accession numbers were obtained at Jagdalpur.

Table 2. Brief description with photograph of trait-specific germplasms identified at Lembucherra centre

Sl. No.	Crop	Details of germplasm	Traits	Germplasm images
1	Swamp taro	TRC Swamp taro-1	Petioles are green, caudex with greenish brown scales. Colour of caudex after cross section is white, thick and greenish stolons. Non acrid type.	
2		TRC Swamp taro-2	Petioles are maroon burgundy coloured, caudex skin colour is maroon burgundy. Colour of caudex after cross section is creamy white, thick maroon burgundy-coloured stolons. Non acrid type.	
3		TRC Swamp taro-3	Petioles have brown scars and stripes on green base light green, caudex skin colour is light brown. Colour of caudex after cross section is creamy white, light green-brownish stolons. Non acrid type.	
4		TRC Swamp taro-4	Petioles are green with dark brown strip at petiole margin, produces thick and light green stolons. Non acrid type.	
5		TRC Swamp taro-5	Petioles are green, caudex small in size, produces thin and light green-brown stolons. Low-medium acidity.	

6	Taro	Tripura Colocasia-3	Petiole green, corm medium to large, non acrid type, consumable.	
7		Tripura Colocasia-4	Petiole reddish, medium to high leaf blight tolerant, consumable. Low in acidity.	
8	Giant arum (<i>Steudnera colocasioides</i> Hook. f.)	TRC Bish Kachu-1 (TRCBK-1)	Petioles are fleshy, green, 60-80 cm long. Leaves are 50-75 cm long and 45-75 cm in breadth, bifid and lobbed at base, prominent mid rib and veins. Around 4-6 leaves arise from single rhizome. Petioles sheathing at base. Rhizome length 0.50-1.0 m, girth 45-50.0 cm and weight 1.5-3.0 kg. High in calcium oxalate content. Rhizome is consumed.	
9	Elephant Ear taro/ Giant rooted taro (<i>Alocasia macrorrhizos</i> (L.) G. Don)	TRC Fen Kachu-1 (TRCFK-1)	Leaves are green, broad, 75-90 cm long and 60-80 cm in breadth, bifid and lobbed at base, prominent mid rib and veins. Around 4-6 leaves arise from single rhizome. Petioles are 70-90 cm long, sheathing at base. Rhizome length 0.90-1.5 m, girth 50-65.0 cm and weight 5.0-9.5 kg. Low - medium in calcium oxalate content. Rhizome is consumed.	
10	Wild elephant foot yam (<i>Amorphophallus sylvaticus</i> (Roxb.) Kunrth)	TRC Wild Batema-1	Leaf stalk is fleshy, speckled with light and dark green spots or blotches, 4-5 leaves arise on the stalk, each leaves contains 3-4 leaflets. Leaflets are narrow and tapering. Leaf stalk dia. is 30-35 mm, length 50.0-75 cm. Rachis spread: 0.5 m ² . Underground tubers sprout in the month of April-May and plants dries in November. Tubers are 300-600g in weight and 10.0-20.0 cm. Highly acrid.	

II. TESTING OF GENETIC RESOURCES AT VARIOUS AGRO CLIMATIC ENVIRONMENTS

II.1. CASSAVA

II.1.1. IET on nutrient use efficient cassava (Season 1)

The first year IET on nutrient use efficient cassava varieties was conducted with nine entries (TCaN21-1, TCaN21-2, TCaN21-3, TCaN21-4, TCaN21-5, TCaN21-6, TCaN21-7, TCaN21-8, TCaN21-9) and Sree Pavithra and local as control at four centres. Trial was already completed in 2022 at Jagdalpur and Thiruvananthapuram. The data on tuber yield recorded at Yethapur and Peddapuram is given in Table 3.

Table 3. Tuber yield (t ha⁻¹) of nutrient use efficient cassava entries in IET (Season 1) at Yethapur and Peddapuram

Entries	Yethapur	Peddapuram
TCaN21-1	38.56	25.92
TCaN21-2	36.77	14.69
TCaN21-3	35.55	26.79
TCaN21-4	36.66	14.28
TCaN21-5	38.56	14.24
TCaN21-6	43.04	22.51
TCaN21-7	48.84	31.97
TCaN21-8	40.58	32.34
TCaN21-9	46.01	16.5
Sree Pavithra	41.68	27.94
Local (YTP2)	40.91	22.76
SEm (±)	1.68	2.02
CD (0.05)	4.21	6.00
CV (%)	12.81	15.4

Significantly higher tuber yield was recorded in TCaN21-7 (48.84 t ha⁻¹) and the minimum tuber yield was observed in TCaN21-3 (35.55 t ha⁻¹) at Yethapur centre. The local checks viz., Sree Pavithra and YTP 2 recorded tuber yield of 41.68 t ha⁻¹ and 40.91 t ha⁻¹, respectively. Maximum tuber yield per hectare was recorded in TCaN21-8 (32.34 t ha⁻¹) followed by TCaN21-7 (31.97 t ha⁻¹) at Peddapuram centre.

II.1.2. IET on nutrient use efficient cassava (Season 2)

The second year IET on nutrient use efficient cassava varieties was conducted with nine entries (TCaN21-1, TCaN21-2, TCaN21-3, TCaN21-4, TCaN21-5, TCaN21-6, TCaN21-7, TCaN21-8, TCaN21-9) and Sree Pavithra and local as control at four centres. Jagdalpur

centre only could conduct the trial during 2023 and the results are given in Table 4. Trial is in progress at Yethapur, Peddapuram and Thiruvananthapuram.

Table 4. Tuber yield of nutrient use efficient cassava entries in IET (Season 2) at Jagdalpur

Entries	Tuber yield (t ha ⁻¹)
TCaN21-1	22.50
TCaN21-2	15.15
TCaN21-3	10.39
TCaN21-4	12.28
TCaN21-5	15.60
TCaN21-6	16.17
TCaN21-7	15.96
TCaN21-8	18.38
TCaN21-9	35.39
Sree Pavithra	32.15
Local (YTP2)	22.63
SEm (±)	1.34
CD (0.05)	3.95
CV (%)	11.83

The entry TCaN21-9 and Sree Pavithra recorded significantly higher tuber yield of 35.39 t ha⁻¹ and 32.15 t ha⁻¹, respectively.

II.1.3. IET on high starch cassava (Season 2)

Second year IET on high starch cassava was initiated in the 9 entries (TCa21-1, TCa21-2, TCa21-3, TCa21-4, TCa21-5, TCa21-6, TCa21-7, TCa21-8, TCa21-9, Sree Reksha and local as control) at 4 centres. Trial was already completed in 2022 at Thiruvananthapuram, Barapani and Yethapur and the pooled analysis result on yield and quality attributes at Peddapuram is given in Table 5.

At Peddapuram, in season 2, maximum tuber yield per hectare was recorded in TCa21-1 (50.20 t ha⁻¹) followed by TCa21-7 (36.62 t ha⁻¹) and TCa21-6 (36.01 t ha⁻¹). Highest starch content was also recorded in TCa21-1 (31.03 %) followed by TCa21-6 (30.42 %). Maximum pooled tuber yield per hectare was recorded in TCa21-1 (47.33 t ha⁻¹) followed by TCa21-6 (44.17 t ha⁻¹). Highest mean starch content over years was recorded in TCa21-1 (27.95 %) followed by Sree Reksha (27.76 %).

Table 5. Pooled tuber yield and quality attributes of high starch cassava entries in IET (Season 2) at Peddapuram

Entries	Tuber yield (t ha ⁻¹)			Starch (%)			CMD (Score)		
	2022	2023	Mean	2022	2023	Mean	2022	2023	Mean
TCa21-1	44.46	50.20	47.33	24.87	31.03	27.95	1.02	1.02	1.02
TCa21-2	28.93	35.35	32.14	23.89	26.69	25.29	1.01	1.04	1.02
TCa21-3	16.19	17.53	16.86	20.77	23.87	22.32	1.00	1.01	1.01
TCa21-4	14.18	29.71	21.95	25.24	28.47	26.86	1.00	1.01	1.01
TCa21-5	19.71	13.29	16.50	23.55	24.30	23.93	1.00	1.01	1.01
TCa21-6	52.33	36.01	44.17	23.41	30.42	26.92	1.00	1.04	1.03
TCa21-7	24.27	36.62	30.45	22.53	27.74	25.14	1.00	1.14	1.07
TCa21-8	30.21	33.62	31.91	21.39	27.94	24.67	1.00	1.03	1.02
TCa21-9	41.43	33.37	37.40	22.90	26.83	24.87	1.00	1.05	1.03
Sree Reksha	29.46	27.69	28.58	26.40	29.12	27.76	1.00	1.00	1.00
Local	24.82	25.31	25.07	23.73	26.30	25.02	3.30	3.12	3.21
SEm (±)	2.47	3.09	2.25	0.57	1.36	0.79	0.04	0.05	0.02
SEd	3.50	4.36	3.19	0.81	1.92	1.12	0.05	0.08	0.02
CD (0.05)	7.34	9.16	6.69	1.70	4.04	2.35	0.11	0.16	0.059
CV (%)	14.45	17.35	12.92	4.22	8.55	5.36	5.41	7.67	2.16

II.1.4. URT on high starch cassava (Season 1)

First year URT on high starch cassava was initiated with 9 entries (TCa21-1, TCa21-2, TCa21-3, TCa21-4, TCa21-5, TCa21-6, TCa21-7, TCa21-8, TCa21-9, Sree

Reksha and local as control) at four centres. Trial is in progress at Thiruvananthapuram and Peddapuram and results of Yethapur and Barapani are given in Table 6.

Table 6. Yield and yield attributes of high starch cassava entries in URT (Season 2)

Entries	Tuber yield (t ha ⁻¹)		Starch (%)		CMD (Score)	
	Yethapur	Barapani	Yethapur	Barapani	Yethapur	Barapani
TCa21-1	30.02	28.01	28.39	36.64	1.00	1.00
TCa21-2	28.49	31.68	26.63	33.69	1.00	1.00
TCa21-3	27.81	13.57	28.09	38.04	2.00	1.00
TCa21-4	31.15	25.11	29.09	37.09	1.00	1.00
TCa21-5	32.39	15.53	25.72	38.30	1.00	1.00
TCa21-6	45.10	11.52	30.45	35.97	1.00	1.00
TCa21-7	42.48	25.31	28.21	33.16	1.00	1.00
TCa21-8	26.78	29.37	27.97	37.92	1.00	1.00
TCa21-9	29.00	33.02	26.60	38.52	1.00	1.00
Sree Reksha	36.73	30.61	29.16	36.43	1.00	1.00
Local	37.10	28.25	28.05	35.71	1.00	1.00
SEm (±)	1.24	0.54	0.86	0.46	-	-
CD (0.05)	3.51	1.12	2.01	1.24	-	-
CV (%)	13.66	2.24	10.65	2.68	-	-

At Yethapur, maximum tuber yield (45.10 t ha⁻¹) was recorded in TCa21-6 which was statically on par with TCa21-7 (42.48 t ha⁻¹). Maximum starch content was registered in TCa21-6 (30.45 %) which was on par with Sree Reksha (29.16 %) and TCa21-4 (29.09 %). All the entries expressed the CMD score of 1.0 (no incidence) except TCa21-3. TCa21-9 recorded maximum tuber yield of 33.02 t ha⁻¹ at Barapani which was statically on par with TCa21-2 (31.68 t ha⁻¹).

II.1.5. MLT on cassava mosaic resistant varieties (Season 2)

The second year on MLT cassava mosaic resistant varieties was conducted with four selected entries and control (TCa16-3, TCa16-4, TCa16-5, TCa16-12, Sree Reksha, H-226) at 6 centres (Peddapuram, Dapoli, Imphal, Yethapur, Jagdalpur and Thiruvananthapuram). The experiment was completed in 2022 at Yethapur, Jagdalpur and Thiruvananthapuram centres.

A. Dr. YSRHU, Peddapuram

Table 7. Tuber yield and quality attributes of MLT on CMR varieties (Season 2) at Peddapuram

Entries	Tuber yield (t ha ⁻¹)						CMD (score)						Starch (%)					
	L ₁	L ₂	L ₃	L ₄	L ₅	Mean	L ₁	L ₂	L ₃	L ₄	L ₅	Mean	L ₁	L ₂	L ₃	L ₄	L ₅	Mean
TCa16-3	52.34	26.17	21.85	23.70	20.99	29.01	1.00	1.00	1.00	1.00	1.00	1.00	23.50	24.20	23.40	25.00	25.50	24.32
TCa16-4	19.51	23.83	24.32	16.05	19.75	20.69	1.00	1.00	1.00	1.00	1.00	1.00	25.00	21.40	25.00	21.40	21.40	22.84
TCa16-5	50.61	49.87	32.71	24.69	45.18	40.61	1.00	1.00	1.00	1.00	1.00	1.00	28.00	24.50	26.10	30.00	23.68	26.46
TCa16-12	39.13	31.85	22.22	19.63	30.86	28.74	1.00	1.00	1.00	1.00	1.00	1.00	30.00	25.00	25.30	23.00	25.00	25.66
Sree Reksha	50.00	37.78	28.02	30.99	22.96	33.95	1.00	1.00	1.00	1.00	1.00	1.00	23.60	23.00	24.30	24.50	22.40	23.56
H-226	17.16	22.59	12.96	13.83	19.88	17.28	3.01	3.10	3.14	3.07	3.12	3.09	22.40	23.60	25.10	23.60	26.47	24.23
Local	21.97	41.73	13.46	15.31	12.10	20.91	3.04	3.04	3.01	3.04	3.07	3.04	24.10	23.00	25.20	24.70	25.60	24.52
SEm (±)						3.29						0.01						0.81
CD (0.05)						9.66						0.03						NS
CV (%)						26.92						2.39						7.34

L₁: Peddapuram, L₂: R.B. Patnam, L₃: G. Ragampeta, L₄: Kattamuru, L₅: J. Thimmapuram

At Peddapuram significantly higher tuber yield was observed in TCa16-5 (40.61 t ha⁻¹) which was on par with Sree Reksha (33.95 t ha⁻¹) as shown in Table 7. Highest starch content was also recorded in TCa16-5 (26.46 %) followed by TCa16-12 (25.66 %). All the entries did not show a CMD infection except H-226 and Local.

Table 8. Pooled mean of tuber yield and quality attributes of MLT on CMR varieties (Season 2)

Entries	Tuber yield (t ha ⁻¹)			CMD (score)			Starch (%)		
	2022	2023	Mean	2022	2023	Mean	2022	2023	Mean
TCa16-3	23.30	31.02	27.16	1.00	1.00	1.00	25.35	24.03	24.69
TCa16-4	32.16	20.92	26.54	1.00	1.00	1.00	23.17	23.20	23.19
TCa16-5	38.52	39.47	39.00	1.00	1.00	1.00	29.66	27.15	28.41
TCa16-12	30.12	28.21	29.17	1.00	1.00	1.00	27.28	25.83	26.55
Sree Reksha	29.38	36.70	33.04	1.00	1.00	1.00	26.58	23.85	25.21
H-226	22.84	16.63	19.74	3.23	3.08	3.16	25.10	23.68	24.39
Local	20.80	23.12	21.96	2.95	3.03	2.99	25.53	24.25	24.89
SEm (±)	-	-	2.45	-	-	0.04	-	-	0.58
CD (0.05)	-	-	7.33	-	-	0.11	-	-	1.74
CV (%)	-	-	17.43	-	-	8.37	-	-	4.60

L₁: Peddapuram, L₂: R.B. Patnam, L₃: G. Ragampeta, L₄: Kattamuru, L₅: J. Thimmapuram

At Peddapuram, pooled mean over two years showed significantly higher tuber yield in TCa16-5 (39.00 t ha⁻¹) which was on par with Sree Reksha (33.04 t ha⁻¹) as shown in Table 8. A significantly higher mean starch content was also recorded in TCa16-5 (28.41 %) followed by TCa16-12 (26.55 %).

B. CAU, Imphal

Table 9. Tuber yield and quality attributes of MLT on CMR varieties (Season 2) at Imphal

Entries	Tuber yield (t ha ⁻¹)					Starch (%)
	L ₁	L ₂	L ₃	L ₄	Mean	
TCa16-3	23.00	24.04	18.71	16.43	20.54	22.01
TCa16-4	25.94	20.85	23.49	17.81	22.02	21.94
TCa16-5	28.49	25.94	22.90	23.04	25.09	24.71
TCa16-12	19.24	19.73	20.51	15.19	18.67	25.74
Sree Reksha	17.71	23.76	21.66	21.18	21.08	27.40
H-226	22.67	19.16	21.41	18.90	20.54	25.04
SEm (±)	1.05	0.83	0.90	0.73	1.18	0.74
CD (0.05)	3.18	2.50	2.70	2.22	3.56	2.23
CV (%)	9.23	7.41	7.41	7.84	11.07	6.04

L₁: Andro, L₂: Leimaram, L₃: Nongdam, L₄: Kakching Khunou

Table 10. Pooled mean of tuber yield of MLT on CMR varieties (Season 2) at Imphal

Entries	Tuber yield (t ha ⁻¹)		
	2022	2023	Pooled
TCa16-3	19.43	20.54	19.99
TCa16-4	18.18	22.02	20.10
TCa16-5	22.73	25.09	23.91
TCa16-12	18.55	18.67	18.61
Sree Reksha	20.76	21.08	20.92
H-226	19.99	20.54	20.26
SEm (±)	0.66	1.18	0.45
CD (0.05)	2.01	3.56	1.36
CV (%)	6.67	11.07	4.37

The experiment was conducted in four locations at Imphal. TCa16-5 recorded maximum yield in all the location except Nongdam. However, the highest starch content was observed in Sree Reksha (27.40 %) which was on par with TCa16-12 (25.74 %) as shown in Table 9. All the entries under the trial were resistant to CMD and no symptoms were recorded. Based on pooled data in Table 12, for two years TCa16-5 recorded maximum yield of 23.91 t ha⁻¹.

C. Dr. BSKKV, Dapoli

Table 11. Tuber yield and quality attributes of MLT on CMR varieties (Season 2) at Dapoli

Entries	Tuber yield (t ha ⁻¹)					Starch (%)
	L ₁	L ₂	L ₃	L ₄	Mean	
TCa16-3	40.75	36.56	37.24	35.79	37.58	26.82
TCa16-4	41.43	39.69	44.48	43.21	42.20	28.72
TCa16-5	42.56	41.78	42.11	43.98	42.61	28.65
TCa16-12	36.87	34.96	29.85	30.67	33.09	26.41
Sree Reksha	38.33	36.05	41.52	39.94	38.96	27.67
H-226	35.86	35.80	38.91	36.78	36.84	27.32
SEm (±)					1.121	0.387
CD (0.05)					3.378	1.165
CV (%)					5.820	2.800

L₁: Wakawali, L₂: Palghar, L₃: Guhagar, L₄: Dapoli

Among the six entries of cassava evaluated under MLT at four locations in Konkan region, TCa16-5 recorded highest tuber yield (42.61 t ha⁻¹) followed by TCa16-4 (42.20 t ha⁻¹) as shown in Table 11. There was no incidence of cassava mosaic disease in all four locations throughout the season.

Table 12. Pooled tuber yield of MLT on CMR varieties (Season 2) at Dapoli

Entries	Tuber yield (t ha ⁻¹)		
	2022	2023	Pooled
TCa16-3	36.82	37.58	37.20
TCa16-4	44.18	42.20	43.19
TCa16-5	42.52	42.61	42.56
TCa16-12	32.45	33.09	32.77
Sree Reksha	38.12	38.96	38.54
H-226	40.87	36.84	38.86
SEm (±)	1.641	1.121	1.263
CD (0.05)	4.944	3.378	3.807
CV (%)	8.380	5.820	6.500

The pooled analysis over two years revealed that the TCa16-4 has performed well with a yield of 43.19 t ha⁻¹ followed by TCa16-5 (42.56 t ha⁻¹) as shown in Table 12.

II.2. SWEET POTATO

II.2.1 IET on purple flesh sweet potato (Season 1)

Table 13. Tuber yield and quality attributes of IET on purple fleshed sweet potato (Season 1) at Imphal

Entries	Tuber yield (t ha ⁻¹)	Marketable yield (t ha ⁻¹)	Tuber flesh colour
TSpP23-1	16.30	13.32	Cream with purple tinge
TSpP23-2	16.99	12.76	Light purple
TSpP23-3	23.09	19.07	Light purple
TSpP23-4	16.93	14.53	Cream with purple tinge
TSpP23-5	17.24	15.47	Cream with purple tinge
TSpP23-6	19.24	15.33	Light purple
TSpP23-7	22.47	20.17	Light purple
TSpP23-8	12.95	10.50	Deep purple
TSpP23-9	21.25	17.75	Cream with purple tinge
TSpP23-10	26.20	21.36	Deep purple
TSpP23-11	15.30	13.25	Deep purple
Bhu Krishna	25.76	20.25	Deep purple
Local	24.87	21.06	Deep purple
SEm (±)	0.90	1.10	
CD (0.05)	2.63	3.22	-
CV (%)	7.80	11.49	-

Eleven entries (TSpP23-1, TSpP23-2, TSpP23-3, TSpP23-4, TSpP23-5, TSpP23-6, TSpP23-7, TSpP23-8,

TSpP23-9, TSpP23-10 and TSpP23-11) of purple flesh sweet potato received from different centres were coded and distributed to 10 centres for multiplication and initiating new IET on purple flesh sweet potato during 2022-23. The trial is in progress at Peddapuram, Dharwad, Kalyani, Dholi, Ranchi, Rajendranagar, Jorhat, Thiruvananthapuram and Bhubaneswar and the results at Imphal is given in Table 13.

TSpP23-10 recorded maximum total yield of 26.20 t ha⁻¹ in Imphal, which was on par with Bhu Krishna (25.76 t ha⁻¹) and Local line (24.87 t ha⁻¹). The marketable tuber yield was also recorded highest in TSpP23-10 (21.36 t ha⁻¹) which was on par with Local (21.06 t ha⁻¹) and Bhu Krishna (20.25 t ha⁻¹).

II.2.2. IET on orange flesh sweet potato (Season 1)

First year IET on orange flesh sweet potato was initiated to 10 centres with nine entries (TSpP22-1, TSpP22-2, TSpP22-3, TSpP22-4, TSpP22-5, TSpP22-6, TSpP22-8, TSpP22-10 and TSpP22-12) and Bhu Sona and Local as control during 2022. The trial has already completed in

2022 at Thiruvananthapuram and Barapani centres. The results on yield (marketable and total tuber yield), tuber characteristics and beta carotene contents obtained at various centres are given in Table 14 to Table 17.

Table 14. Tuber yield (t ha⁻¹) of IET on orange fleshed sweet potato (Season 1) at different centres

Entries	Peddapuram	Coimbatore	Dharwad	Dholi	Bhubaneswar	Kalyani	Rajendranagar	Imphal
TSp22-1	7.10	-	22.06	25.2	10.5	22.18	12.32	-
TSp22-2	9.10	14.12	11.53	26.1	13.4	23.48	9.11	12.88
TSp22-3	4.10	-	9.72	11.4	12.2	26.31	-	17.98
TSp22-4	11.76	-	17.01	15.3	13.8	32.47	10.51	18.83
TSp22-5	-	6.21	-	17.6	11.5	33.04	-	-
TSp22-6	11.34	-	-	24.3	12.6	25.62	9.15	24.47
TSp22-8	19.89	7.28	10.93	13.2	13.5	23.19	11.84	13.86
TSp22-10	26.28	11.25	11.08	12.3	14.5	34.36	14.70	20.65
TSp22-12	4.31	16.49	11.04	14.6	11.1	27.68	6.19	19.20
Bhu Sona	5.46	11.54	21.40	16.7	15.9	22.13	10.86	21.04
Local	3.18	8.24	17.65	21.1	11.9	19.34	8.63	19.70
SEm (±)	0.53	-	1.00	1.49	0.4	1.64	-	0.53
CD (0.05)	1.58	-	2.99	4.52	1.1	4.87	-	1.59
CV (%)	8.90	-	11.75	13.81	5.0	14.37	-	4.89

Table 15. Marketable tuber yield (t ha⁻¹) of IET on orange fleshed sweet potato (Season 1) at different centres

Entries	Peddapuram	Coimbatore	Dharwad	Dholi	Bhubaneswar	Kalyani	Rajendranagar	Imphal
TSp22-1	6.79	-	18.92	22.6	8.8	20.37	10.73	-
TSp22-2	7.97	13.81	9.05	23.3	10.6	21.51	7.85	10.14
TSp22-3	3.14	-	6.58	10.6	10.3	24.19	-	14.87
TSp22-4	11.08	5.12	13.87	13.4	12.1	29.68	8.23	15.23
TSp22-5	-	-	-	15.4	9.5	30.17	-	-
TSp22-6	8.45	6.44	-	21.1	10.9	23.72	7.21	21.41
TSp22-8	18.24	9.56	7.79	11.8	11.5	21.29	9.65	11.06
TSp22-10	25.50	15.31	7.94	10.7	12.3	31.43	12.85	17.43
TSp22-12	3.94	10.75	7.90	12.6	9.9	25.54	5.19	16.03
Bhu Sona	5.46	7.76	18.26	14.3	14.7	20.21	8.07	17.61
Local	2.37	-	14.51	19.2	9.3	17.47	6.24	16.94
SEm (±)	0.46	-	0.95	1.32	0.6	1.79	-	0.62
CD (0.05)	1.37	-	2.85	3.99	1.8	5.29	-	1.87
CV (%)	8.51	-	14.15	12.42	4.8	16.51	-	6.93



Fig. 3 Field view of IET on sweet potato at Bhubaneswar centre

At Peddapuram, the total tuber yield and marketable tuber yield per hectare was highest in TSp22-10 (26.28 t ha⁻¹ and 25.50 t ha⁻¹, respectively) followed by TSp22-8 (19.89 t ha⁻¹ and 18.24 t ha⁻¹). At Coimbatore, TSp22-12 recorded higher total yield and TSp22-10 recorded highest marketable yield of 16.49 t ha⁻¹ and 15.31 t ha⁻¹ followed by TSp22-2 (14.12 t ha⁻¹ & 13.81 t ha⁻¹, respectively). At Dholi, TSp22-2 recorded higher marketable tuber yield (23.3 t ha⁻¹) which was statistically on par with TSp22-1 (22.6 t ha⁻¹) and TSp22-6 (21.1 t ha⁻¹) and found significantly superior over both checks. At Kalyani, significantly higher total tuber yield

and marketable tuber yield of 34.36 t ha⁻¹ and 31.43 t ha⁻¹, respectively were recorded in TSp22-10 followed by 33.04 t ha⁻¹ and 30.17 t ha⁻¹, respectively in TSp22-5. Both total tuber yield and marketable tuber yield of TSp22-4 (32.47 t ha⁻¹ and 29.68 t ha⁻¹) and TSp22-5 were statistically on par with TSp22-10. At Imphal centre, TSp22-6 recorded maximum total tuber yield (24.47 t ha⁻¹) and maximum marketable yield (21.41 t ha⁻¹).

Table 16. Tuber flesh colour of IET on orange fleshed sweet potato (Season 1) at different centres

Entries	Peddapuram	Coimbatore	Dharwad	Dholi	Bhubaneswar	Kalyani	Rajendranagar	Imphal
TSp22-1	Light orange	-	Orange	Light orange	Orange	Yellow	Light orange	-
TSp22-2	Cream with orange spots	Creamy orange	Orange	Orange	Light orange	Yellowish orange	Orange	Orange
TSp22-3	Light orange	-	Light orange	Light orange	Orange	Light yellow	-	Deep orange
TSp22-4	Light orange	-	Light orange	Light orange	Orange	Dark orange	Light orange	Orange
TSp22-5	-	Dark orange	-	Orange	Orange	Creamy	-	-
TSp22-6	Cream with orange spots	-	-	Light orange	Light orange	Light yellow	Light orange	Light orange
TSp22-8	Orange	Light orange	Light orange	Light orange	Orange	Creamy	Light orange	Deep orange
TSp22-10	Dark orange	Creamy orange	Orange	Orange	Light orange	Light orange	Orange	Orange
TSp22-12	Cream with orange spots	Orange	Orange	Light orange	Light orange	Yellowish orange	Orange	Orange
Bhu Sona	Dark orange	Orange	Deep orange	Orange	Orange	Dark orange	Dark orange	Deep orange
Local	Light orange	Dark orange	-	Orange	Orange	Light yellow	Orange	Deep orange

At Kalyani, tuber flesh colour varied from light yellow to dark orange.

Table 17. β carotene content (mg 100g⁻¹ fw) of IET on orange fleshed sweet potato (Season 1)

Entries	Peddapuram	Dharwad	Bhubaneswar	Kalyani	Rajendranagar	Imphal
TSp22-1	6.76	9.60	5.4	4.82	5.6	-
TSp22-2	3.65	7.60	4.9	6.13	4.1	5.52
TSp22-3	6.39	6.45	8.4	4.61	-	6.20
TSp22-4	6.75	6.49	7.9	8.69	6.3	4.85
TSp22-5	-	-	7.1	4.41	-	-
TSp22-6	3.38	-	5.2	4.32	6.2	4.58
TSp22-8	7.34	6.52	7.6	4.14	4.2	5.92
TSp22-10	7.84	8.13	5.9	6.83	5.8	5.27
TSp22-12	3.46	8.40	5.1	5.27	5.6	4.89
Bhu Sona	7.57	10.58	11.1	9.92	9.5	7.45
Local	4.66	7.98	5.5	3.87	4.6	5.29
SEm ($\pm$)	0.07	0.13	0.3	0.57	-	0.17
CD (0.05)	0.20	0.38	0.9	1.62	-	0.50
CV (%)	1.84	2.75	3.5	8.28	-	5.19

At Peddapuram, highest beta carotene content was observed in TSp22-10 with 7.84 mg 100g⁻¹ followed by Bhu Sona (7.57 mg 100g⁻¹). At Kalyani significantly higher β -carotene content was recorded in Bhu Sona (9.92 mg 100g⁻¹) closely followed by TSp22-4 (8.69 mg 100g⁻¹), which was statistically on par with Bhu Sona. At Rajendranagar, TSp22-3 and TSp22-5 entries did not establish during the cropping season, and it was replanted.

At Dharwad, TSp22-1 documented highest total and

marketable tuber yield of 22.06 t ha⁻¹ and 18.92 t ha⁻¹, respectively and found on par with Bhu sona by recording total and marketable tuber yield of 21.40 and 18.26 t ha⁻¹, respectively. While lower total and marketable tuber yield of 9.72 t ha⁻¹ and 6.58 t ha⁻¹, respectively recorded in TSp22-3. Regarding the quality parameters significantly higher beta carotene of 10.58 mg 100g⁻¹, recorded in Bhu Sona and found to be on par with TSp22-1 (9.60 mg 100g⁻¹). While lower beta carotene of 6.45 mg 100g⁻¹ recorded in TSp22-3.

II.2.3. IET on orange flesh sweet potato (Season 2)

Second year IET on orange flesh sweet potato with nine entries (TSp22-1, TSp22-2, TSp22-3, TSp22-4, TSp22-5, TSp22-6, TSp22-8, TSp22-10 and TSp22-12) and Bhu

Sona and Local as control were conducted at ten centres. The trial is in progress at Thiruvananthapuram, Peddapuram, Dholi, Bhubaneswar, Rajendranagar, Kalyani and Coimbatore.

Table 18. Yield and yield attributes of IET on orange fleshed sweet potato (Season 2)

Entries	Total tuber yield (t ha ⁻¹)			Marketable tuber yield (t ha ⁻¹)			Tuber flesh colour		
	Dharwad	Barapani	Imphal	Dharwad	Barapani	Imphal	Dharwad	Barapani	Imphal
TSp22-1	24.50	13.98	-	21.08	8.78	-	Orange	Light orange	-
TSp22-2	17.14	25.44	20.40	15.42	20.24	16.04	Orange	Purplish orange	Orange
TSp22-3	12.51	23.48	21.86	10.99	18.28	17.59	Light orange	Orange	Deep orange
TSp22-4	20.56	15.51	19.12	18.63	10.31	16.20	Light orange	Orange	Orange
TSp22-5	13.22	19.93	-	12.08	14.73	-	Orange	Creamy orange	-
TSp22-6	14.61	20.33	25.16	13.30	15.13	21.54	Light orange	Light orange	Light orange
TSp22-8	12.22	14.00	18.50	11.05	8.80	14.51	Light orange	Orange	Deep orange
TSp22-10	14.70	18.48	23.02	13.14	13.28	19.28	Orange	Deep orange	Orange
TSp22-12	13.92	14.93	17.98	12.30	9.73	16.88	Orange	Light orange	Orange
Bhu Sona	23.75	14.52	26.75	20.27	11.28	23.32	Deep orange	Deep orange	Deep orange
Local	17.68	22.55	24.73	15.65	18.56	20.21	Orange	Deep orange	Deep orange
SEm (±)	1.44	0.32	1.20	1.39	0.20	0.88	-	-	-
CD (0.05)	4.23	0.75	3.59	4.11	0.58	2.65	-	-	-
CV (%)	14.80	2.84	9.51	16.19	2.04	8.47	-	-	-

At Dharwad, TSp22-1 documented highest total and marketable tuber yield of 24.50 t ha⁻¹ and 21.08 t ha⁻¹, respectively and found on par with Bhu Sona by recording total and marketable tuber yield of 23.75 t ha⁻¹ and 20.27 t ha⁻¹, respectively. While lower total and marketable tuber yield of 12.22 t ha⁻¹ and 11.05 t ha⁻¹,

respectively recorded in TSp22-8. At Imphal, Bhu Sona recorded maximum total yield of 26.75 t ha⁻¹ which was on par with TSp22-6 (25.16 t ha⁻¹). The marketable tuber yield was significantly higher in Bhu Sona (23.32 t ha⁻¹) which was on par with TSp22-6 (21.54 t ha⁻¹). The entries TSp22-1 and TSp22-5 could not be established at Imphal (Table 18).

II.2.4. IET on sweet potato (Season 2)

Table 19a. Pooled total tuber yield (t ha⁻¹) of IET on sweet potato (Season 2) at different centres

Entries	Peddapuram			Coimbatore			Dharwad			Dholi		
	Season 1	Season 2	Mean	Season 1	Season 2	Mean	Season 1	Season 2	Mean	Season 1	Season 2	Mean
TSp21-1	21.68	14.68	18.18	15.01	14.24	14.62	13.05	14.27	13.66	21.56	19.2	20.4
TSp21-2	36.31	20.85	28.58	14.54	12.98	13.76	22.48	24.50	23.49	14.34	13.9	14.1
TSp21-3	19.86	5.95	12.90	16.40	15.48	15.94	20.63	22.49	21.56	25.45	21.4	23.4
TSp21-4	10.90	4.15	7.53	6.23	6.14	6.185	10.60	23.19	16.89	14.36	12.6	13.5
TSp21-5	23.26	9.02	16.14	13.74	12.46	13.1	10.42	16.95	13.69	26.24	22.6	24.4
TSp21-8	14.67	5.06	9.86	7.76	7.54	7.65	9.20	10.02	9.61	18.63	16.4	17.5
TSp21-9		-	-	9.56	8.62	9.09	-	-	-	19.36	15.6	17.5
TSp21-11		-	-	6.44	6.20	6.32	-	-	-	19.26	13.6	16.4
TSp21-12		-	-	5.67	5.84	5.75	-	-	-	-	-	-
Sree Bhadra	10.55	8.70	9.62	-	-	-	18.51	20.22	19.37	20.84	18.6	19.7
Local	21.26	28.90	25.08	7.24	6.82	7.03	19.22	15.64	17.43	19.68	19.2	19.4
SEm (±)	1.29	0.65	1.14	0.19	0.67	0.41	1.07	1.44	0.94	1.21	1.32	-
CD (0.05)	3.84	1.93	3.37	0.41	0.58	0.51	3.24	4.37	2.84	3.62	3.99	-
CV (%)	12.99	10.77	14.20	2.12	3.56	2.91	11.91	13.55	9.58	10.49	11.62	-

Table 19b. Pooled total tuber yield (t ha⁻¹) of IET on sweet potato (Season 2) at different centres

Entries	Jagdalpur			Bhubaneswar			Kalyani			Imphal
	Season 1	Season 2	Mean	Season 1	Season 2	Mean	Season 1	Season 2	Mean	Season 1
TSp21-1	29.44	36.92	33.18	14.9	13.7	14.3	34.98	25.87	30.43	18.42
TSp21-2	-	47.06	-	15.9	14.5	15.2	-	-	-	19.30
TSp21-3	26.94	36.21	37.00	17.0	15.4	16.2	-	17.23	17.23	13.61
TSp21-4	24.78	42.22	30.49	16.8	14.2	15.5	19.80	24.26	22.03	-
TSp21-5	25.28	41.96	33.75	15.9	12.5	14.2	30.43	31.67	31.05	17.62
TSp21-8	-	17.94	-	16.6	14.8	15.7	26.40	28.53	27.47	-
TSp21-9	22.83	28.75	32.40	-	-	-	-	16.48	16.48	-
TSp21-11	21.39	22.83	22.11	-	-	-	25.38	18.12	21.75	-
TSp21-12	24.17	25.28	24.72	-	-	-	20.46	17.51	18.98	-
Sree Bhadra	-	44.06	-	20.2	18.6	19.4	27.63	25.39	26.51	26.52
Local	-	34.28	-	18.2	16.2	17.2	18.42	15.98	17.20	12.78
SEm (±)	0.87	1.48	0.69	0.51	0.64	0.4	1.42	1.56	1.49	0.65
CD (0.05)	2.68	4.36	2.11	0.64	1.34	2.1	4.27	4.57	4.31	2.02
CV (%)	6.04	7.48	3.89	3.42	3.67	4.1	11.23	18.24	16.44	6.21

Table 19c. Pooled marketable tuber yield (t ha⁻¹) of IET on sweet potato (Season 2) at different centres

Entries	Coimbatore			Dharwad			Dholi			Jagdalpur		
	Season 1	Season 2	Mean	Season 1	Season 2	Mean	Season 1	Season 2	Mean	Season 1	Season 2	Mean
TSp21-1	12.54	13.14	12.84	10.27	12.71	11.49	19.61	17.1	18.4	25.68	32.72	29.20
TSp21-2	11.81	11.24	11.52	18.89	20.14	19.51	12.78	11.8	12.3	-	42.56	-
TSp21-3	14.63	13.54	14.08	15.73	19.58	17.65	22.33	19.8	21.1	23.18	32.21	27.70
TSp21-4	5.12	5.21	5.165	7.62	20.21	13.91	12.46	10.8	11.6	21.01	38.72	29.87
TSp21-5	11.25	11.15	11.2	7.63	14.63	11.13	23.17	20.4	21.8	21.51	38.46	29.99
TSp21-8	5.97	6.57	6.27	6.38	8.44	7.41	16.61	14.6	15.6	-	14.44	-
TSp21-9	7.26	7.10	7.18	-	-	-	17.38	14.2	15.8	19.07	24.45	21.76
TSp21-11	5.14	5.10	5.12	-	-	-	17.64	12.1	14.9	17.62	18.83	18.23
TSp21-12	4.98	4.68	4.83	-	-	-	-	-	-	20.4	21.78	21.09
Sree Bhadra	6.12	5.20	5.66	15.91	18.48	17.19	18.65	16.3	17.5	-	42.86	-
Local	0.15	0.63	0.41	16.10	13.79	14.95	17.45	16.8	17.1	-	32.78	-
SEm (±)	0.30	0.38	0.43	0.90	1.07	0.69	1.16	1.06	-	1.24	1.47	1.36
CD (0.05)	3.02	2.71	2.80	2.72	3.25	2.08	3.47	3.21	-	2.69	4.33	3.51
CV (%)				12.59	11.61	8.40	11.30	12.46	-	7.15	8.25	7.70

Table 19d. Pooled marketable tuber yield (t ha⁻¹) of IET on sweet potato (Season 2) at different centres

Entries	Peddapuram	Bhubaneswar			Kalyani			Imphal
	Mean	Season 1	Season 2	Mean	Season 1	Season 2	Mean	Season 1
TSp21-1	15.46	13.2	11.4	12.3	31.54	23.38	27.46	14.58
TSp21-2	22.46	14.7	12.1	13.4	-	-	-	15.18
TSp21-3	12.34	15.0	13.3	14.2	-	15.47	15.47	10.29
TSp21-4	6.92	13.9	12.7	13.3	17.23	22.51	19.87	-
TSp21-5	15.42	13.8	10.5	12.1	26.52	28.84	27.53	14.41
TSp21-8	9.20	15.5	11.7	13.6	23.69	26.38	25.04	-
TSp21-9	-	-	-	-	-	14.71	14.71	-
TSp21-11	-	-	-	-	22.74	16.31	19.52	-
TSp21-12	-	-	-	-	17.83	15.73	16.78	-
Sree Bhadra	7.94	19.0	17.1	18.1	25.21	23.29	24.25	21.31
Local (RNSP-1)	22.63	16.9	15.1	16.0	15.77	14.32	15.05	9.53
SEm (±)	0.79	0.4	0.37	0.7	1.57	1.79	1.69	0.48
CD (0.05)	2.35	1.34	1.20	1.27	4.61	5.24	4.79	1.49
CV (%)	11.18	2.67	5.01	4.03	13.73	16.48	14.47	5.82

Second year IET on sweet potato was initiated at ten centres, with nine entries (TSp21-1, TSp21-2, TSp21-3, TSp21-4, TSp21-5, TSp21-8, TSp21-9, TSp21-11 and TSp21-12) and Sree Bhadra along with Local check as control during 2021. The trial was already completed in Thiruvananthapuram and Barapani. The results during the year is recorded in Table 19a-d.

At Peddapuram, the total tuber yield per hectare was highest in TSp21-2 (28.58 t ha⁻¹) followed by RNSP-1 (25.08 t ha⁻¹). Whereas, the marketable tuber yield per hectare was highest in RNSP-1 (22.63 t ha⁻¹) followed by TSp21-2 (22.46 t ha⁻¹). The entry TSp21-3 has recorded the highest total yield (15.94 t ha⁻¹) and marketable yield (14.08 t ha⁻¹), it is followed by the entry TSp21-1 with 14.62 and 12.84 t ha⁻¹, respectively at Coimbatore. At Dharwad, pooled analysis revealed that significantly higher total yield was obtained in TSp21-2 (23.49 t ha⁻¹), as compared to rest of the entries, but was found on par with TSp21-3 (21.56 t ha⁻¹). Also, significantly maximum marketable yield was recorded with TSp21-2 (19.51 t ha⁻¹), which was statistically at par with TSp21-3 (17.65 t ha⁻¹). At Dholi, TSp21-5 recorded highest marketable tuber yield (21.8 t ha⁻¹) which was followed with TSp21-3 (21.1 t ha⁻¹) and found superior over both checks and other test entries. At Kalyani, TSp21- 5 recorded the highest total tuber yield and marketable tuber yield of 31.67 t ha⁻¹ and 28.84 t ha⁻¹ respectively, which was on par with TSp21-8 with total tuber yield and

marketable tuber yield of 28.53 t ha⁻¹ and 26.38 t ha⁻¹ respectively, and was significantly higher than all other entries. Entry TSp21-5 recorded significantly higher marketable tuber yield (27.53 t ha⁻¹) over two years which was on par with TSp21-1, TSp21-8 and Sree Bhadra at Kalyani.

At Imphal, Sree Bhadra recorded maximum total yield of 26.52 t ha⁻¹ followed by TSp21-12 (19.30 t ha⁻¹) and TSp21-1 (18.42 t ha⁻¹).

Based on two years pooled mean, the entries TSp21-1, TSp21-2, TSp21-3, TSp21-4, TSp21-5 and TSp21-8 were promoted to URT for 2023-24 along with Sree Bhadra and local entry as national and local check respectively.

II.2.5. URT on sweet potato (Season 1)

First year URT on sweet potato was initiated to 10 centres with six entries (TSp21-1, TSp21-2, TSp21-3, TSp21-4, TSp21-5 and TSp21-8) and Sree Bhadra and Local as control. Trial is in progress at seven centres (Peddapuram, Coimbatore, Dholi, Jagdalpur, Thiruvananthapuram, Bhubaneswar and Kalyani). The results of Dharwad, Barapani and Imphal centre are given in Table 20.

TSp21-4 recorded higher total and marketable tuber yield of 22.32 t ha⁻¹ and 18.45 t ha⁻¹, respectively and found to be on par with TSp21-2 (20.84 t ha⁻¹ and 15.77 t ha⁻¹, respectively) at Dharwad. While lower total and

Table 20. Yield and yield attributes of URT on sweet potato (Season 1)

Entries	Total tuber yield (t ha ⁻¹)			Marketable tuber yield (t ha ⁻¹)			Tuber flesh colour		
	Dharwad	Barapani	Imphal	Dharwad	Barapani	Imphal	Dharwad	Barapani	Imphal
TSp21-1	16.04	17.50	22.48	12.27	14.25	18.22	Obovate	Obovoid	Ovate
TSp21-2	20.84	13.68	16.87	15.77	11.02	12.99	Round elliptic	Elliptical	Ovate
TSp21-3	19.80	15.07	21.32	15.01	12.50	18.73	Long irregular	Elongated	Elliptic
TSp21-4	22.32	16.25	17.72	18.45	12.15	15.46	Long elliptic	Obovoid	Irregular
TSp21-5	19.46	22.40	19.45	14.78	19.52	14.57	Elliptic	Compressed	Ovate
TSp21-8	14.67	13.15	20.37	11.23	10.05	17.05	Long elliptic	Elongated	Elliptic
Sree Bhadra	17.01	15.84	25.91	13.63	12.58	20.56	Round elliptic	Elongated	Obovate
Local	15.18	19.25	15.19	11.65	14.58	12.28	Long irregular	Elongated	Irregular
SEm (±)	1.76	0.20	1.17	1.23	0.18	0.66			
CD (0.05)	5.33	0.42	3.60	3.74	0.38	2.03			
CV (%)	16.76	2.56	10.21	15.13	2.20	7.07			



Fig. 4 Performance of entries of URT on sweet potato at Dharwad centre



Fig. 5 Field view of URT on sweet potato at Coimbatore centre

marketable tuber yield of 14.67 and 11.23 t ha⁻¹ respectively recorded in TSp21-8. Lowest weevil infestation was recorded in TSp21-4 and highest weevil infestation was noticed in Local and TSp21-5. Sree Bhadra recorded maximum total yield of 25.91 t ha⁻¹

which was on par with TSp21-1 (22.48 t ha⁻¹) at Imphal. The marketable tuber yield was significantly higher in Sree Bhadra (20.56 t ha⁻¹) which was on par with TSp21-3 (18.73 t ha⁻¹) and TSp21-1 (18.22 t ha⁻¹). TSp21-5 recorded significantly higher total tuber yield and marketable tuber yield of 22.40 t ha⁻¹ and 19.52 t ha⁻¹, respectively at Barapani.

II.2.6. MLT on yellow flesh sweet potato (Season 1)

The first year MLT on yellow flesh sweet potato was conducted with three entries (TSp16-6, TSp16-7, TSp16-10) and controls Bhu Sona and Local check at 11 centres. The trials were completed in Jagdalpur, Coimbatore and Udaipur during 2022.

A. BAU, Ranchi

Table 21. Yield attributes of MLT on yellow fleshed sweet potato entries at Ranchi

Entries	Yield of tuber (t ha ⁻¹)						Marketable tuber yield (t ha ⁻¹)	Tuber flesh colour	β carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	L ₃	L ₄	L ₅	Mean			
TSp16-6	12.18	8.89	11.49	9.87	10.65	10.62	11.17	Yellow with orange tinge	5.27
TSp16-7	9.59	7.36	10.12	8.13	8.87	8.81	8.97	Light orange	5.13
TSp16-10	14.12	10.73	13.32	11.59	12.47	12.44	12.35	Orange	5.62
Bhu Sona	19.47	16.51	20.13	18.57	17.19	18.37	16.61	Yellow	10.46
Kamla Sundari (LC)	16.42	13.91	15.29	14.32	15.63	15.11	14.56	Orange	8.12
SEm (±)						0.23	0.55		0.22
CD (0.05)						0.71	1.65		0.68
CV (%)						4.08	9.70		7.41

L₁: Ranchi, L₂: Dumka, L₃: Darisai, L₄: Chianki, L₅: Chatra

Bhu Sona recorded significantly higher total tuber yield (18.37 t ha⁻¹) and all the entries recorded significantly lower β carotene content than the check Bhu Sona which recorded 10.46 mg 100g⁻¹ fw at Ranchi.

B. BCKV, Kalyani

Significantly higher total tuber yield as well as marketable tuber yield were recorded in TSp16-10 (27.43 t ha⁻¹ and 25.06 t ha⁻¹, respectively) followed by TSp16-7 (22.91 t ha⁻¹ and 21.10 t ha⁻¹, respectively).

Tuber flesh/ colour variation among the entries ranged from light yellow to dark orange. The β- carotene content varied from 3.48 mg 100g⁻¹ to 10.45 mg 100g⁻¹. Bhu Sona recorded significantly superior β carotene content of 10.45 mg 100g fw⁻¹. Higher β- carotene was also recorded in TSp16-7 (6.54 mg 100g⁻¹) and TSp16-10 (5.60 mg 100g⁻¹). Entry TSp16-10 performed very well in all the locations and marketable tuber yield of this entry was found statistically superior over all the entries including the checks (Table 22).

Table 22. Yield attributes of MLT on yellow fleshed sweet potato at Kalyani

Entries	Total tuber yield (t ha ⁻¹)					Marketable tuber yield (t ha ⁻¹)					Flesh colour	β- carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean		
TSp16-6	19.79	21.57	19.21	20.88	20.36	18.11	19.76	17.87	19.33	18.77	Light yellow	4.66
TSp16-7	21.64	24.84	21.23	23.92	22.91	19.93	22.69	19.62	22.16	21.10	Yellowish orange	6.54
TSp16-10	25.96	28.39	26.31	29.07	27.43	23.74	25.84	24.17	26.47	25.06	Yellow	5.60
Bhu Sona	19.11	20.86	18.72	21.14	19.96	17.68	19.13	17.39	19.41	18.40	Dark orange	10.45
Local (BCSP-5)	18.03	19.51	17.79	18.92	18.56	16.54	18.07	16.36	17.49	17.12	Light yellow	3.48
SEm (±)	1.08	1.11	1.02	1.61	1.52	1.24	1.47	1.11	1.48	0.91		0.98
CD (0.05)	3.16	3.28	2.96	4.71	4.31	3.62	4.37	3.28	4.31	2.58		2.97
CV (%)	15.37	13.45	12.84	17.86	16.63	13.48	17.26	14.61	16.72	12.46		15.37

L₁: Shekhampur, Birbhum district; L₂: Chougacha, Nadia district; L₃: Nimpith- 24 Parganas (South) district; L₄: Purbasthali, Burdwan district.

C. Dr. RPCAU, Dholi

Table 23. Yield attributes of MLT on yellow fleshed sweet potato entries at Dholi

Entries	Total tuber yield (t ha ⁻¹)					Marketable tuber yield (t ha ⁻¹)					Flesh colour
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean	
TSp16-6	16.4	15.5	14.4	17.2	15.9	15.1	14.2	13.6	16.6	14.9	Yellow
TSp16-7	14.2	15.8	13.7	15.5	14.8	13.3	14.6	12.6	14.6	13.8	Yellow
TSp16-10	16.8	16.4	15.6	14.8	15.9	15.9	15.2	14.1	13.8	14.8	Light yellow
Bhu Sona	18.4	17.5	16.4	15.7	17.0	17.8	16.8	15.3	14.6	16.1	Orange
Kamla Sundari	20.8	19.3	17.8	18.9	19.2	19.8	18.4	16.6	17.6	18.1	Orange
SEm (±)					0.46					0.63	
CD (0.05)					1.44					1.92	
CV (%)					5.59					11.86	

L₁: Dholi, L₂: Vaishali, L₃: Samastipur, L₄: Darbhanga

None of the test entries were found superior to best check Kamala Sundari having marketable tuber yield (18.1 t ha⁻¹) and total tuber yield (19.2 t ha⁻¹) at Dholi.

D. Dr. YSRHU, Peddapuram

Table 24. Performance of yellow fleshed sweet potato entries at Peddapuram

Entries	Total tuber yield (t ha ⁻¹)					Marketable tuber yield (t ha ⁻¹)					Flesh colour	β- carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean		
TSp16-6	29.96	16.92	18.25	55.12	30.06	23.99	14.92	15.29	40.48	23.67	Orange	6.42
TSp16-7	18.77	27.44	11.46	20.00	19.42	15.79	24.67	11.46	17.17	17.27	Orange	6.58
TSp16-10	9.63	10.52	10.28	9.78	10.05	8.06	10.52	10.28	9.44	9.58	Light orange	4.83
Bhu Sona	7.65	17.00	27.82	5.75	14.56	4.13	14.11	24.82	3.33	11.60	Dark orange	7.52
Local (BCSP-5)	4.48	5.64	5.56	3.11	4.70	4.49	5.64	5.56	0.83	4.13	Light orange	4.56
SEm (±)	-	-	-	-	5.24	-	-	-	-	4.13	-	0.19
CD (0.05)	-	-	-	-	16.31	-	-	-	-	12.86	-	0.59
CV (%)	-	-	-	-	66.45	-	-	-	-	62.30	-	6.38

L₁: Peddapuram, L₂: Vajjireddypalem, L₃: Kothapatnam, L₄: J.Thimmapuram

At Peddapuram, significantly higher total tuber yield and marketable tuber yield were recorded in TSp16-6 (30.06 t ha⁻¹ and 23.67 t ha⁻¹, respectively) followed by TSp16-7 (19.42 t ha⁻¹ and 17.27 t ha⁻¹, respectively) during the

year. Highest beta carotene content was observed in Bhu Sona with 7.52 mg 100g⁻¹ followed by TSp16-7 (6.58 mg 100g⁻¹). The starch and dry matter were highest in Bhu Sona (32%).

E. MPUAT, Udaipur

Table 25. Yield attributes of MLT on yellow fleshed sweet potato at Udaipur

Entries	Total tuber yield (t ha ⁻¹)				Marketable tuber yield (t ha ⁻¹)				Flesh colour	β-carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	L ₃	Mean	L ₁	L ₂	L ₃	Mean		
TSp16-6	11.64	13.14	10.12	11.63	10.71	12.09	9.30	10.70	Light creamy yellow	4.57
TSp16-7	30.03	28.07	24.20	27.43	27.63	25.60	22.26	25.14	Light creamy yellow	5.74
TSp16-10	27.54	26.54	21.40	25.16	25.09	24.15	19.47	22.90	Light cream yellow	4.78
Bhu Sona	12.39	14.15	16.10	14.21	11.64	12.74	14.49	12.96	Orange	6.10
Local (BCSP-5)	23.35	21.28	19.75	21.46	21.16	19.37	18.17	19.57	Light orange yellow	5.10
SEm (±)	1.09	0.74	0.82	0.49	1.05	0.65	0.57	0.39		0.05
CD (0.05)	3.57	2.39	2.67	1.59	3.42	2.11	1.86	1.28		0.16
CV (%)	9.02	6.16	7.75	4.22	9.43	5.97	5.90	3.72		1.61

L₁: RCA Udaipur, L₂: Jaisamand, L₃: Dabok

At Udaipur, the entry TSp16-7 recorded significantly higher marketable and total tuber yield (25.14 t ha⁻¹ and 27.43 t ha⁻¹, respectively).

F. RS, ICAR-CTCRI, Bhubaneswar

Table 26. Yield attributes of MLT on orange fleshed sweet potato at Bhubaneswar

Entries	Total tuber yield (t ha ⁻¹)				Marketable tuber yield (t ha ⁻¹)				Flesh colour	β-carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	L ₃	Mean	L ₁	L ₂	L ₃	Mean		
TSp16-6	11.2	11.4	11.7	11.4	10.1	10.1	10.5	10.2	Light orange	5.3
TSp16-7	9.8	9.7	8.0	9.2	7.8	8.0	9.2	8.3	Orange	6.4
TSp16-10	11.5	12.5	11.4	11.8	9.8	10.0	9.7	9.8	Orange	5.9
Bhu Sona	14.8	14.7	14.2	14.6	13.0	15.0	12.4	13.5	Orange	10.6
Local (Gouri)	8.0	12.8	12.0	10.9	8.0	10.7	10.0	9.6	Orange	5.5
SEm (±)				0.7				0.5		0.2
CD (0.05)				2.4				1.7		0.8
CV (%)				4.2				3.9		5.7

L₁: Khordha, L₂: Gajapati, L₃: Jajpur

At Bhubaneswar, Bhu Sona recorded significantly higher marketable, total tuber yield and β carotene content (13.5 t ha⁻¹ 14.6 t ha⁻¹ and 10.6 mg 100g⁻¹ fw, respectively).

G. NAU, Navsari

Table 27. Yield attributes of MLT on orange fleshed sweet potato at Navsari

Entries	Total tuber yield (t ha ⁻¹)					Marketable tuber yield (t ha ⁻¹)					Flesh colour	β-carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean		
TSp16-6	28.18	28.86	29.43	28.51	28.75	21.75	22.80	23.78	22.10	22.61	Light yellow	4.53
TSp16-7	30.30	31.14	32.64	30.73	31.20	25.05	25.53	26.55	25.33	25.62	Medium orange	5.38
TSp16-10	25.48	26.04	26.46	25.80	25.95	16.30	17.11	18.27	16.63	17.08	Light orange	3.53
Bhu Sona	16.73	17.52	18.41	17.08	17.44	13.01	13.69	14.12	13.33	13.54	Dark orange	5.75
Local (Buhu Kanti)	11.51	12.20	12.93	12.18	12.21	10.71	11.52	12.36	11.08	11.42	Light yellow	4.03
SEm (±)	0.79	0.81	0.88	0.81	0.58	0.62	0.65	0.73	0.62	0.46	-	0.11
CD (0.05)	2.43	2.50	2.70	2.48	1.17	1.90	1.99	2.26	1.91	0.93	-	0.33
CV (%)	7.04	7.02	7.32	7.05	7.11	7.12	7.14	7.72	7.02	7.27	-	4.66

L₁: Navsari, L₂: Waghai, L₃: Paria, L₄: Moti pethan

At Navsari, TSp16-7 gave higher tuber yield (25.62 t ha⁻¹) and found significantly superior among the other entries in all locations which showed 89.22 % increase over Bhu

Sona and 124.34 % increase in yield over Local check. β carotene content was highest (5.75 mg 100g⁻¹ fw) in Bhu Sona.

H. UHS, Dharwad

Table 28. Yield attributes of MLT on yellow fleshed sweet potato at Dharwad

Entries	Total tuber yield (t ha ⁻¹)				Marketable tuber yield (t ha ⁻¹)				Flesh colour	β - carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃		
TSp16-6	17.09	12.33	15.11	14.84	14.28	10.58	13.05	12.64	Light orange	4.83
TSp16-7	28.11	22.44	25.21	25.25	24.24	19.78	20.78	21.60	Orange	5.52
TSp16-10	23.81	18.61	21.38	21.27	20.56	16.41	19.37	18.78	Orange	5.21
Bhu Sona	22.28	17.53	20.72	20.17	19.13	15.77	19.73	18.21	Deep orange	10.11
Local (Gouri)	21.96	17.20	19.97	19.71	18.82	14.99	16.32	16.71	Orange	8.21
SEm ($\pm$)	1.39	1.43	1.49	1.42	1.17	1.28	1.08	0.91	-	0.14
CD (0.05)	4.30	4.43	4.61	4.38	3.63	3.96	3.33	2.81	-	0.44
CV (%)	12.33	16.32	14.63	14.06	12.14	16.57	12.11	10.38	-	4.28

L₁: Dharwad, L₂: Bagalkot, L₃: Belagavi

At UHS, Dharwad, TSp16-7 recorded highest total and marketable tuber yield of 25.25 and 21.60 t ha⁻¹, respectively in their mean value across three locations.

With regard to the quality parameters significantly higher beta carotene of 10.11 mg 100g⁻¹, recorded in Bhu Sona. While lower beta carotene of 5.21 mg 100g⁻¹ recorded in TSp16-10.

I. SKLTSHU, Rajendranagar

Table 29. Yield attributes of MLT on yellow flesh sweet potato at Rajendranagar

Entries	Total tuber yield (t ha ⁻¹)				Marketable tuber yield (t ha ⁻¹)				Flesh colour	β - carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃		
TSp16-6	12.89	17.06	15.62	15.19	12.02	14.15	10.61	12.26	Whitish orange	4.3
TSp16-7	14.05	18.22	16.71	16.33	13.36	15.50	11.91	13.59	Dark orange	5.1
TSp16-10	12.03	16.55	14.08	14.22	11.30	13.73	9.35	11.46	Orange	4.8
Bhu Sona	13.53	16.69	14.66	14.96	12.59	15.59	10.70	12.96	Orange	7.8
Local (Kiran)	8.39	12.42	10.33	10.38	9.75	11.77	7.69	9.74	Light orange	-
SEm ($\pm$)	0.97	0.60	0.90	0.80	0.68	0.72	0.66	0.53		3.8
CD (0.05)	3.02	1.88	2.81	2.51	2.11	2.23	2.06	1.65		
CV (%)	16.19	7.37	12.64	10.99	11.44	10.11	13.18	8.55		

L₁: Laxmi thanda; L₂: VRS farm; L₃: Plant protection block

Among the tested entries of yellow fleshed sweet potato under MLT at SKLTSHU, Rajendranagar TSp-16-7 was recorded the highest total yield and marketable tuber yield (16.33 t ha⁻¹) and (13.59 t ha⁻¹), respectively.

II.2.7. MLT on yellow flesh sweet potato (Season 2)

The second year MLT on yellow flesh sweet potato was

conducted with three entries and controls (TSp16-6, TSp16-7, TSp16-10, Bhu Sona, Local check) at 11 centres. Trial is in progress at Ranchi, Kalyani, Dholi, Peddapuram, Bhubaneswar, Jagdalpur, Navsari and Rajendranagar, and the results of Udaipur, Coimbatore and Dharwad are given below.

A. MPUAT, Udaipur

Table 30. Yield attributes of MLT on yellow fleshed sweet potato (season 2) at Udaipur

Entries	Total tuber yield (t ha ⁻¹)	Marketable tuber yield (t ha ⁻¹)	β-Carotene content (mg 100g ⁻¹ Fresh Weight)	Tuber flesh colour
TSp-16-6	14.64	13.21	4.66	Light creamy yellow
TSp-16-7	30.94	26.86	5.65	Light creamy yellow
TSp16-10	28.54	25.49	5.01	Light cream yellow
Bhu Sona	12.19	10.85	5.76	Orange
Local	24.70	21.47	5.03	Light orange yellow
SEm (±)	1.04	0.81	0.22	
CD (0.05)	3.45	2.69	0.52	
CV (%)	8.16	7.21	5.24	

Among the entries tested at Udaipur, under MLT on yellow fleshed sweet potato (2nd year) highest marketable yield was recorded in entry TSp16-7 (26.86 t ha⁻¹) and lowest yield recorded by the entry Bhu Sona (10.85 t ha⁻¹).

Table 31. Pooled analysis of MLT on yellow fleshed sweet potato at Udaipur

Entries	Total tuber yield (t ha ⁻¹)			Marketable tuber yield (t ha ⁻¹)			β-carotene (mg 100g ⁻¹ fw)		
	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled
TSp-16-6	11.64	14.64	9.86	10.71	13.21	8.97	4.570	4.657	3.460
TSp-16-7	30.03	30.94	22.87	27.63	26.86	20.43	5.740	5.651	4.272
TSp16-10	27.54	28.54	21.03	25.06	25.49	18.96	4.780	5.012	3.672
Bhu Sona	12.39	12.19	9.22	11.64	10.85	8.44	6.103	5.757	4.448
Local	23.35	24.70	18.02	21.16	21.47	15.99	5.103	5.033	3.801
SEm (±)	0.990	1.041	0.627	1.039	0.815	0.578	0.049	0.158	0.065
CD (0.05)	3.229	3.396	1.880	3.389	2.658	1.732	0.160	0.516	0.196
CV (%)	8.17	8.12	9.18	9.36	7.21	9.41	1.61	5.25	3.95

Pooled mean tuber yield over the years was recorded in TSp16-7 (22.87 t ha⁻¹ and 20.43 t ha⁻¹ of total and marketable tuber yield) as shown in Table 31 at Udaipur.

B. TNAU, Coimbatore

Table 32. Yield attributes of MLT on yellow fleshed sweet potato at TNAU, Coimbatore

Entries	Total tuber yield (t ha ⁻¹)			Marketable tuber yield (t ha ⁻¹)			Flesh colour	β- carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	Mean	L ₁	L ₂	Mean		
TSp16-6	17.28	16.42	16.85	15.32	13.20	14.26	Dark orange	4.10
TSp16-7	13.25	11.54	12.39	12.46	11.31	11.88	Creamy orange	3.80
TSp16-10	15.21	14.84	15.02	13.10	12.54	12.82	Dark orange	5.41
Bhu Sona	15.24	14.28	14.76	13.57	10.84	12.20	Dark orange	5.60
Local (CO5)	14.24	13.24	13.74	13.36	11.98	12.67	Dark orange	6.21
SEm (±)	0.31	0.38	0.345	0.22	0.20	0.21		
CD (0.05)	1.19	1.41	1.3	0.82	0.84	0.83		
CV (%)	7.17	9.07	8.12	5.47	6.33	5.9		

L₁: Coimbatore, L₂: Yethapur

At Coimbatore, TSp16-6 recorded significantly higher mean total yield and marketable tuber yield of 16.85 t ha⁻¹ and 14.26 t ha⁻¹, respectively, followed by the entry TSp16-10 which recorded 15.02 t ha⁻¹ and 12.82 t ha⁻¹,

respectively. Highest β carotene content of 6.21 mg 100g⁻¹ fw was recorded in CO 5 (local) followed by Bhu Sona with 5.60 mg 100g⁻¹. (Table 32).

Table 33. Pooled analysis of MLT on yellow fleshed sweet potato at TNAU, Coimbatore

Entries	Total tuber yield (t ha ⁻¹)			Marketable tuber yield (t ha ⁻¹)		
	2022	2023	Mean	2022	2023	Mean
TSp-16-6	17.79	16.85	17.32	15.86	14.26	15.06
TSp-16-7	13.58	12.39	12.99	11.83	11.88	11.86
TSp16-10	16.10	14.76	15.43	13.71	12.20	12.96
Bhu Sona	15.84	15.02	15.43	13.17	12.67	12.92
Local	15.72	13.74	14.73	12.90	12.82	12.86
SEm ($\pm$)	0.36	0.345	0.35	0.21	0.21	0.21
CD (0.05)	0.83	1.3	1.07	0.43	0.83	0.63
CV (%)	2.90	8.12	5.51	2.66	5.9	4.28

In pooled analysis over two years at Coimbatore TSp16-6 recorded significantly higher mean total yield and marketable tuber yield of 17.32 t ha⁻¹ and 15.06 t ha⁻¹, respectively, followed by the entry TSp16-10 which recorded 15.43 t ha⁻¹ and 12.96 t ha⁻¹, respectively. (Table 33).

C. UHS, Dharwad

Table 34. Yield attributes of MLT on yellow fleshed sweet potato at Dharwad

Entries	Total tuber yield (t ha ⁻¹)				Marketable tuber yield (t ha ⁻¹)				Flesh colour	β - carotene content (mg 100g ⁻¹ fw)
	L ₁	L ₂	L ₃	Mean	L ₁	L ₂	L ₃	Mean		
TSp16-6	17.91	13.75	15.20	15.62	14.62	11.90	12.67	13.06	Light orange	<i>*Samples submitted for lab analysis</i>
TSp16-7	19.75	25.22	23.94	22.97	17.92	22.77	21.43	20.70	Orange	
TSp16-10	20.74	19.27	21.98	20.66	15.83	17.42	18.88	17.38	Orange	
Bhu Sona	19.98	22.30	20.27	20.85	16.30	19.56	17.22	17.70	Deep orange	
Local	22.27	18.25	18.99	19.84	16.28	15.90	14.86	15.68	Orange	
SEm ($\pm$)	0.74	1.38	0.99	0.70	0.84	1.28	1.08	0.60		
CD (0.05)	2.28	4.26	3.06	2.15	2.60	3.95	3.34	1.85		
CV (%)	7.35	14.01	9.90	7.00	10.44	14.64	12.77	7.13		

L₁: Dharwad, L₂: Bagalkot, L₃: Belagavi

Table 35. Pooled analysis of MLT on yellow fleshed sweet potato at Dharwad

Entries	Total tuber yield (t ha ⁻¹)			Marketable tuber yield (t ha ⁻¹)		
	2022	2023	Mean	2022	2023	Mean
TSp-16-6	14.84	15.62	15.23	12.64	13.06	12.85
TSp-16-7	25.25	22.97	24.11	21.60	20.70	21.15
TSp16-10	21.27	20.66	20.96	18.78	17.38	18.08
Bhu Sona	20.17	20.85	20.51	18.21	17.70	17.95
Local	19.71	19.84	19.77	16.71	15.68	16.19
SEm ($\pm$)	1.42	0.70	0.91	0.91	0.60	0.59
CD (0.05)	4.38	2.15	2.80	2.81	1.85	1.83
CV (%)	14.06	7.00	9.04	10.38	7.13	6.90

At UHS, Dharwad, significantly higher total tuber yield (25.25 and 22.97 t ha⁻¹, respectively during 2022 & 2023) and marketable tuber yield ha⁻¹ (21.60 and 20.70 t ha⁻¹, respectively during 2022 & 2023) was recorded in the TSp16-7 and mean total tuber yield (24.11 t ha⁻¹) and marketable tuber yield (21.15 t ha⁻¹). Whereas, TSp16-6 exhibited lowest total tuber yield of 14.84 and 15.62 t ha⁻¹, respectively and marketable tuber yield (12.64 and 13.06 t ha⁻¹, respectively). (Table 35).

II.3. YAMS

II.3.1. IET on purple flesh greater yam (Season 1)

First year IET on purple flesh greater yam, eight coded entries (TGy20-1, TGy20-2, TGy20-3, TGy20-4, TGy20-5, TGy20-6, TGy20-7 and TGy20-8) along with Sree Neelima and Local as check at six centres during 2022. All other centres except Kovvur harvested this experiment on 2022. The results at Kovvur during this year is given below in Table 36.

Table 36. Performance of IET on purple fleshed greater yam entries at Kovvur during 2023

Entries	Total yield (t ha ⁻¹)	Tuber flesh colour
TGy20-1	The tubers not established during 2022. Received the material during 2023 and planting was taken up.	
TGy20-2	16.25	Purple
TGy20-3	32.04	Light purple
TGy20-4	17.66	White with purple tinge
TGy20-5	The tubers not established during 2022. Received the material during 2023 and planting was taken up.	
TGy20-6	16.50	Purple
TGy20-7	29.66	Purple
TGy20-8	12.73	Purple
Sree Neelima	28.37	Purple
Local	-	
SEm (±)	2.06	
CD (0.05)	6.41	
CV (%)	16.27	

Among the seven entries of purple flesh greater yam under IET at Kovvur, TGy20-3 recorded the highest tuber yield of 32.04 t ha⁻¹ followed by TGy20-7 (29.66 t ha⁻¹) and Sree Neelima (28.37 t ha⁻¹).

II.3.2. IET on purple flesh greater yam (Season 2)

Second year IET on purple flesh greater yam was conducted with 8 entries (TGy20-1, TGy20-2, TGy20-3, TGy20-4, TGy20-5, TGy20-6, TGy20-7 and TGy20-8) along with Sree Neelima and Local as check at six centres. The results at Port Blair is given below and the trial is in progress at Palampur, Kovvur, Udaipur, Thiruvananthapuram and Navsari. (Table 37)

At Port Blair, Sree Neelima recorded higher tuber yield (22.10 t ha⁻¹) followed by the entries TGy20-2 which was

Table 37. Performance of IET on purple fleshed greater yam entries, Port Blair

Entries	Total yield (t ha ⁻¹)	Tuber shape	Tuber flesh colour
TGy20-1	17.39	Cylindrical	White with purple tinge
TGy20-2	20.61	Cylindrical and branched	Purple
TGy20-3	14.65	Round	White with purple tinge
TGy20-4	19.71	Cylindrical and long	White
TGy20-5	9.62	Oval/oblong	White
TGy20-6	12.08	Round	Light purple
TGy20-7	12.00	Round	Purple
TGy20-8	11.48	Round	White with purple tinge
Sree Neelima	22.10	Cylindrical	Light purple
Local	12.57	Cylindrical and branched	Purple
SEm (±)	0.332	-	-
CD (0.05)	0.988	-	-
CV (%)	3.78	-	-

on par (20.61 t ha⁻¹). Regarding flesh colour two entries viz., TGy20-4 and TGy20-5 were observed as white flesh.

II.3.3. MLT on greater yam (Season 2)

Second year MLT on greater yam with four selected entries of TGy17-3, TGy17-4, TGy17-6 and TGy17-8 was conducted at seven centres. Sree Karthika and one local variety were included as control. Jorhat, Dapoli, Jagdalpur and Thiruvananthapuram centres already harvested in 2022.



Fig. 6 Field view of MLT on greater yam entries at Kovvur centre

A. Dr. YSRHU, Kovvur

Table 38. Pooled analysis of MLT on greater yam (Season 2) at Kovvur

Entries	Tuber yield (t ha ⁻¹) 2022	Tuber yield (t ha ⁻¹)					Pooled (t ha ⁻¹)
		L ₁	L ₂	L ₃	L ₄	Mean	
TGy17-3	25.65	33.15	37.78	26.91	28.22	31.52	28.58
TGy17-4	11.52	7.35	12.90	12.04	13.33	11.41	11.46
TGy17-6	10.61	11.54	11.30	11.11	15.78	12.43	11.52
TGy17-8	16.25	14.57	7.65	15.00	20.44	14.42	15.33
Sree Karthika	26.70	24.94	15.43	45.43	42.78	32.15	29.42
Local	36.09	29.14	38.89	47.65	43.22	39.73	37.91
SEm (±)	5.93					10.76	5.97
CD (0.05)						3.54	
CV (%)						29.97	

L₁: Kovvur, L₂: Pasivedala, L₃: Peddapuram, L₄: Eluru

At Kovvur, the highest average tuber yield was recorded in local (37.91 t ha⁻¹) followed by Sree Karthika (29.42 t ha⁻¹), and TGy17-3 (28.58 t ha⁻¹). Fig. 5.

B. BCKV, Kalyani

In the second year MLT, the highest average tuber yield (28.85 t ha⁻¹) was recorded in local entry followed by Sree

Karthika (23.46 t ha⁻¹), and TGy 17-6 (16.49 t ha⁻¹). The local entry recorded the highest yield at all the locations, and was statistically superior over other entries. The pooled data for two years also showed the superiority of local entry in terms of tuber yield (28.67 t ha⁻¹) over other entries.

Table 39. Pooled analysis of MLT on greater yam (Season 2) at Kalyani

Entries	Tuber yield (t ha ⁻¹) 2022	Tuber yield (t ha ⁻¹)					Pooled (t ha ⁻¹)
		L ₁	L ₂	L ₃	L ₄	Mean	
TGy17-3	20.18	13.18	14.67	13.23	15.44	14.13	17.15
TGy17-4	22.61	12.12	13.51	11.47	12.69	12.45	17.52
TGy17-6	29.19	14.66	17.23	15.38	18.72	16.49	22.84
TGy17-8	21.44	13.29	12.15	11.43	12.76	12.41	16.92
Sree Karthika	23.11	22.78	25.12	21.32	24.62	23.46	23.29
Local	28.49	27.43	31.26	25.91	30.81	28.85	28.67
SEm (±)	0.64					1.34	1.11
CD (0.05)	1.87					4.12	3.36
CV (%)	11.17					17.48	14.78

L₁: Khatra, Bankura district; L₂: Chougacha, Nadia district; L₃: Nimpith- 24 Parganas (South) district; L₄: Purbasthali, Burdwan district.

C. MPUAT, Udaipur

Table 40. Pooled analysis of MLT on greater yam (Season 2) at Udaipur

Entries	Tuber yield (t ha ⁻¹) 2022	Tuber yield (t ha ⁻¹)				Pooled (t ha ⁻¹)
		L ₁	L ₂	L ₃	Mean	
TGy17-3	22.28	22.43	20.45	18.44	20.44	21.36
TGy17-4	24.54	30.46	28.3	25.75	28.17	26.36
TGy17-6	22.43	28.32	26.34	26.1	26.92	24.68
TGy17-8	19.17	26.02	22.4	21.5	23.31	21.24
Sree Karthika	14.57	17.84	19.25	18.2	18.43	16.50
Local	19.29	18.13	20.18	20.3	19.54	19.42
SEm (±)	0.47	2.89	1.26	1.31	0.89	0.51
CD (0.05)	1.35	9.21	4.00	4.18	2.84	1.49
CV (%)	6.38	20.95	9.54	10.45	6.75	5.74

L₁: RCA Udaipur, L₂: Jaisamand, L₃: Dabok

Among the 6 entries of greater yam evaluated during the second year MLT at three location, the mean maximum yield was recorded in entry TGy 17-4 (28.17 t ha⁻¹) and lowest in entry Sree Karthika (18.43 t ha⁻¹) and pooled mean maximum yield was also recorded in entry TGy 17-4 (26.36 t ha⁻¹).

II.3.4. IET on lesser yam (Season 2)

Second year IET on lesser yam was initiated with seven coded entries (TLy20-1, TLy20-2, TLy20-3, TLy20-4, TLy20-5, TLy20-6 and TLy20-7) and Sree Kala as control at six centres. Ranchi, Kalyani, Dapoli and Thiruvananthapuram already completed the trial in 2022.

Table 41. Pooled tuber yield (t ha⁻¹) of IET on lesser yam (Season 2)

Entries	Dholi			Imphal		
	2022	2023	Mean	2022	2023	Mean
TLy20-1	26.2	20.6	23.4	5.91	5.41	5.66
TLy20-2	21.2	22.2	21.7	8.25	6.16	7.20
TLy20-3	15.6	14.3	15.0	6.93	7.08	7.01
TLy20-4	14.5	15.5	15.0	6.84	5.40	6.12
TLy20-5	15.6	21.6	18.6	9.90	8.06	8.98
TLy20-6	12.6	11.8	12.2	9.00	6.11	7.55
TLy20-7	24.1	23.2	23.7	6.71	5.82	6.27
Sree Kala	13.8	13.6	13.7	6.46	6.15	6.30
Local	12.7	11.6	12.2	-	-	-
SEm (±)	1.20	1.67	-	0.26	0.36	0.27
CD (0.05)	3.63	5.21	-	0.80	1.08	0.83
CV (%)	11.98	14.53	-	6.07	9.86	6.91

During the second year at Imphal, the highest tuber yield was observed in TLy20-5 (8.06 t ha⁻¹) which was on par with TLy20-3 (7.08 t ha⁻¹). TLy20-5 recorded the maximum pooled yield of 8.98 t ha⁻¹ over the years.

II.3.5. URT on lesser yam (Season 1)

First year URT on lesser yam with seven entries (TLy20-1, TLy20-2, TLy20-5 and TLy20-7 and Sree Kala as control) was conducted at six centres. Trial is in progress at Dholi, Ranchi, Thiruvananthapuram and Dapoli centres. Kalyani and Imphal centres harvested the trial.

Table 42. Total tuber yield (t ha⁻¹) of URT (Season 1) on lesser yam entries

Entries	Kalyani	Imphal
TLy20-1	12.53	5.33
TLy20-2	11.48	6.72
TLy20-5	23.17	7.95
TLy20-7	16.34	5.67
Sree Kala	15.69	6.31
Local	13.12	-
SEm (±)	0.87	0.16
CD (0.05)	2.68	0.51
CV (%)	14.76	5.09

At Kalyani, the highest tuber yield was recorded in TLy20-5 (23.17 t ha⁻¹) followed by TLy20-7 (16.34 t ha⁻¹) and Sree Kala (15.69 t ha⁻¹), which was statistically on par with the yield of TLy20-7. At Imphal, TLy20-5 recorded maximum yield of 7.95 t ha⁻¹ followed by TLy20-2 (6.72 t ha⁻¹). (Table 42).

II.4. COLOCASIA

II.4.1. IET on colocasia (Season 1)

Twelve entries of colocasia (TTr22-1, TTr22-2, TTr22-3, TTr22-4, TTr22-5, TTr22-6, TTr22-7, TTr22-8, TTr22-9, TTr22-10, TTr22-11 and TTr22-12) to nine centres were tried in a new IET on colocasia during 2022 with

Sree Rashmi and local as national and local checks. Trials were already harvested by Jorhat, Barapani, Dapoli, Thiruvananthapuram, Ranchi, Lembucherra and Jagdalpur on 2022.

Table 43. Yield and yield attributes of colocasia in IET (Season 1) at Kovvur and Imphal

Entries	No. of cormels plant ⁻¹		Weight of corm plant ⁻¹ (g)		Weight of cormels plant ⁻¹ (g)		Total cormel yield (t ha ⁻¹)		Total yield (t ha ⁻¹) (corm+cormel yield)	
	Kovvur	Imphal	Kovvur	Imphal	Kovvur	Imphal	Kovvur	Imphal	Kovvur	Imphal
TTr22-1	22.67	12.87	308.33	98.18	281.67	237.37	13.21	8.79	27.68	12.43
TTr22-2	36.67	15.00	514.33	80.77	1128	299.41	52.92	11.09	69.85	14.08
TTr22-3	28.83	13.20	428.33	127.97	625	256.96	29.32	9.52	49.42	14.26
TTr22-4	48.33	9.93	541.67	69.12	766	253.79	35.94	9.40	61.35	11.96
TTr22-5	17.00	-	260.00	-	173.33	-	8.13	-	20.33	-
TTr22-6	22.00	12.50	356.67	97.75	678.33	306.71	31.82	11.36	48.56	14.98

TTr22-7	22.67	11.40	185.00	117.22	512.33	197.62	24.04	7.32	32.71	11.66
TTr22-8	28.00	-	274.67	-	1226	-	57.52	-	70.40	-
TTr22-9	32.00	-	268.33	-	771.67	-	36.20	-	48.79	-
TTr22-10	31.30	10.07	472.71	88.72	727.26	298.39	34.12	11.05	56.30	14.34
TTr22-11	35.57	10.40	579.33	66.03	659.53	260.61	30.94	9.65	58.12	12.10
TTr22-12	10.43	9.33	133.48	68.92	179.04	273.19	8.40	10.12	10.50	12.67
Sree Rashmi	3.51	15.47	44.93	122.72	60.27	327.57	2.83	12.13	3.54	16.68
Local	20.57	13.53	20.43	114.69	15.21	276.61	15.21	10.24	12.23	14.49
SEm (±)	22.67	0.95	308.33	4.30	281.67	10.62	13.21	0.39	27.68	0.37
CD (0.05)	36.67	2.81	514.33	12.7	1128	31.34	52.92	1.16	69.85	1.09
CV (%)	28.83	13.56	428.33	7.79	625	6.77	29.32	6.78	49.42	4.71

At Kovvur, highest cormel yield was recorded in TTr22-8 (57.52 t ha⁻¹) followed by TTr22-2 (52.92 t ha⁻¹). Similarly the total yield (corm+cormel) ranged from 20.33 t ha⁻¹ to 70.4 t ha⁻¹. The highest total yield was recorded in TTr22-8 (70.4 t ha⁻¹) followed by TTr22-2 (69.85 t ha⁻¹). At Imphal, the maximum number of cormel was observed in Sree Rashmi (15.47) which was on par with TTr22-2 (15). The maximum corm weight per plant was observed in TTr22-3 (127.97 g). The highest total yield was observed in Sree Rashmi (16.68 t ha⁻¹). (Table 43).

II.4.2. IET on colocasia (Season 2)

Second year IET on colocasia conducted with 12 coded entries (TTr22-1, TTr22-2, TTr22-3, TTr22-4, TTr22-5, TTr22-6, TTr22-7, TTr22-8, TTr22-9, TTr22-10, TTr22-11 and TTr22-12) and Sree Rashmi and local as national and local checks. Out of nine centres, trial was completed at Barapani, Imphal, Lembucherra and Jagdalpur. Trial is in progress at Jorhat, Dapoli, Thiruvananthapuram, Ranchi and Kovvur.

Table 44. Yield attributes of colocasia in IET (Season 2) at different centres

Entries	No. of cormels plant ⁻¹				Weight of corm plant ⁻¹ (g)				Weight of cormels plant ⁻¹ (g)			
	Imphal	Barapani	Lembucherra	Jagdalpur	Imphal	Barapani	Lembucherra	Jagdalpur	Imphal	Barapani	Lembucherra	Jagdalpur
TTr22-1	11.07	6.00	9.5	8.75	94.90	160.00	125.5	196.00	257.49	228.33	265.5	694.59
TTr22-2	14.47	14.67	7.5	8.08	81.91	150.00	122.6	111.67	280.67	382.50	245.6	614.00
TTr22-3	12.77	8.00	8.5	8.50	114.33	283.33	130.3	198.00	258.23	253.33	256.5	898.00
TTr22-4	11.40	9.67	7.5	9.09	69.83	253.33	114.2	185.78	247.88	328.33	235.5	1003.67
TTr22-5	-	17.33	13.5	7.44	-	125.00	225.7	164.17	-	478.00	375.5	846.78
TTr22-6	11.60	14.00	12.5	8.17	84.79	136.67	222.6	204.45	310.71	395.00	392.3	1002.00
TTr22-7	11.40	6.00	13.5	7.25	110.03	138.33	229.5	120.50	216.51	173.33	394.5	646.67
TTr22-8	10.20	8.67	9.5	7.25	79.16	115.00	113.4	104.48	273.03	380.00	215.5	589.17
TTr22-9	9.00	6.67	14.5	8.25	76.21	150.00	245.5	199.36	298.51	336.67	410.5	1002.67
TTr22-10	8.47	7.00	13.5	4.55	90.98	80.00	225.6	97.50	253.90	225.00	365.6	440.50
TTr22-11	11.93	13.00	10.5	5.50	87.91	115.00	216.4	57.25	283.72	346.67	335.5	459.58
TTr22-12	11.47	13.33	8.5	5.58	64.46	68.33	125.5	66.90	233.12	351.67	245.5	308.75
Sree Rashmi	13.27	15.42	9.5	6.59	117.90	233.62	129.3	95.30	315.10	228.33	225.5	542.92
Local	10.73	16.56	10.3	9.27	112.15	181.52	215.6	189.67	272.41	382.50	228.5	1003.20
SEm (±)	0.83	0.32	0.11	0.26	2.79	3.58	1.3	5.85	7.17	3.98	1.6	32.23
CD (0.05)	2.43	0.78	1.1	0.74	8.20	7.73	5.5	16.95	21.05	11.50	4.2	93.4
CV (%)	12.66	2.38	15.5	5.95	5.31	2.38	14.1	7.12	4.62	2.15	10.2	7.77

TTr22-2 recorded maximum number of cormel (14.47) at Imphal. Sree Rashmi recorded maximum cormel yield (11.67 t ha⁻¹) and maximum total yield of 16.04 t ha⁻¹ followed by TTr22-6 (11.51 and 14.65 t ha⁻¹). TTr22-5 recorded maximum weight of cormel per plant (478 g), number of cormel per plant (17.33), cormel yield (23.60 t

ha⁻¹) and maximum total yield (34.95 t ha⁻¹) at Barapani. TTr22-9 recorded maximum cormel yield (19.9 t ha⁻¹) followed by TTr22-10 (19.5 t ha⁻¹) and TTr22-10 recorded maximum total yield of 24.8 t ha⁻¹ followed by TTr22-9 (23.5 t ha⁻¹) at Lembucherra. TTr22-9 recorded maximum cormel yield (34.64 t ha⁻¹) and total yield

(41.93 t ha⁻¹) followed by TTr22-4 (34.47 t ha⁻¹ cormel yield) and TTr22-6 (41.56 t ha⁻¹ total yield) at Jagdalpur.

Table 45. Yield of colocasia in IET (Season 2) at different centres

Entries	Total cormels yield (t ha ⁻¹)				Total yield (t ha ⁻¹) (corm+cormel yield)			
	Imphal	Barapani	Lembucherra	Jagdalpur	Imphal	Barapani	Lembucherra	Jagdalpur
TTr22-1	9.54	11.28	13.2	24.89	13.05	21.23	14.5	31.75
TTr22-2	10.40	18.89	10.5	21.91	13.43	28.35	13.6	26.04
TTr22-3	9.56	12.51	13.8	31.76	13.80	26.50	15.2	38.72
TTr22-4	9.18	16.21	12.4	34.47	11.77	28.72	14.6	41.35
TTr22-5	-	23.60	17.8	30.53	-	34.95	20.2	36.61
TTr22-6	11.51	19.51	16.9	34.28	14.65	27.24	20.3	41.56
TTr22-7	8.02	8.56	16.7	23.12	12.09	16.87	19.5	27.58
TTr22-8	10.11	18.77	13.5	20.99	13.04	28.56	14.7	24.86
TTr22-9	11.06	16.63	19.9	34.64	13.88	24.03	23.5	41.93
TTr22-10	9.40	11.11	19.5	15.48	12.77	16.30	24.8	19.09
TTr22-11	10.51	17.12	17.6	16.19	13.76	28.48	19.3	18.31
TTr22-12	8.63	17.37	15.7	10.60	11.02	23.29	17.5	13.08
Sree Rashmi	11.67	20.25	14.9	19.27	16.04	23.16	18.8	22.80
Local	10.09	22.91	15.8	34.32	14.24	27.69	17.6	41.35
SEm (±)	0.27	0.18	0.13	1.53	0.31	0.29	0.12	1.52
CD (0.05)	0.78	0.53	0.9	4.42	0.92	0.84	1.2	4.41
CV (%)	4.61	2.18	16.3	10.5	4.06	2.32	14.5	8.68

II.4.3. MLT on colocasia (2nd Year)

Second year MLT on colocasia was laid out at fourteen centres with four coded enties (TTr17-3, TTr17-5, TTr17-8, TTr17-12 and Sree Rashmi and Local as checks. Trial was already conducted in Dholi, Jorhat, Dapoli, Jagdalpur, Ranchi, Thiruvananthapuram, Rajendranagar, Lembucherra and Barapani centres at 2022 and Kalyani, Coimbatore, Kovvur, Imphal and Udaipur harvested this year.

A. BCKV, Kalyani

The second-year MLT on colocasia was conducted at four locations in West Bengal with six entries including one national and one local check in 2023. The highest

average cormel yield of 15.18 t ha⁻¹ was recorded in TTr17-5 followed by 14.23 t ha⁻¹ in TTr17-8. Both the entries TTr17-5 and TTr17-8 performed well at all the locations under MLT in terms of total yield also recording 17.13 t ha⁻¹ and 16.24 t ha⁻¹, respectively. In spite of very low cormel yield of 5.16 t ha⁻¹, the entry TTr17-12 recorded the very high total yield of 15.23 t ha⁻¹ due to very high corm yield of 312.43 g plant⁻¹ resembling dasheen type. From the pooled data for two years, it is evident that the entry TTr17-5 performed very well in all the locations in West Bengal in terms of both cormel yield and total yield of 14.49 t ha⁻¹ and 16.54 t ha⁻¹, respectively.

Table 46. Performance of colocasia entries in 2nd year MLT at Kalyani (Cont.)

Entries	Weight of cormel per plant (g)					Cormel yield (t ha ⁻¹)					Total yield (corm + cormel) (t ha ⁻¹)				
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean
TTr17-3	361.43	382.51	356.11	373.62	368.42	10.84	11.47	10.68	11.21	11.05	12.44	13.18	12.56	13.11	12.82
TTr17-5	487.67	517.43	491.28	506.87	500.81	14.66	15.72	14.74	15.61	15.18	16.62	17.67	16.41	17.83	17.13
TTr17-8	471.47	501.27	482.29	497.77	488.20	13.64	14.84	13.71	14.73	14.23	15.69	16.78	15.46	17.03	16.24
TTr17-12	168.66	171.87	159.93	187.48	171.98	5.06	5.16	4.78	5.62	5.16	14.74	15.66	14.81	15.74	15.23
Sree Rashmi	421.54	451.23	436.21	448.69	439.42	12.75	13.24	12.88	13.46	13.08	14.36	14.72	14.19	14.91	14.54
Local	291.26	308.47	279.63	313.11	298.12	8.71	9.11	8.23	9.34	8.84	10.28	11.04	10.43	10.86	10.65
SEm (±)					32.83					0.61					0.59
CD (0.05)					98.43					1.87					1.76
CV (%)					20.76					17.26					12.17

L₁: Khatra, Bankura district; L₂: Chougacha, Nadia district; L₃: Nimpith- 24 Parganas (South) district; L₄: Purbasthali, Burdwan district

Table 47. Pooled analysis of MLT on colocasia at Kalyani

Entries	Cormel yield (t ha ⁻¹)			Total yield (t ha ⁻¹)		
	2022	2023	Pooled	2022	2023	Pooled
TTr17-3	10.52	11.05	10.78	12.52	12.82	12.67
TTr17-5	13.81	15.18	14.49	15.96	17.13	16.54
TTr17-8	14.52	14.23	14.37	16.61	16.24	16.42
TTr17-12	4.07	5.16	4.61	16.18	15.23	15.70
Sree Rashmi	13.41	13.08	13.24	15.40	14.54	14.97
Local	8.86	8.84	8.85	10.84	10.65	10.74
SEm (±)	1.03	0.61	0.39	0.71	0.59	0.63
CD (0.05)	3.11	1.87	1.21	2.17	1.76	1.94
CV (%)	16.98	17.26	17.12	14.68	12.17	13.47

B. TNAU, Coimbatore

In MLT on colocasia, six entries viz., TTr17-3, TTr17-5, TTr17-8, TTr17-12, Sree Reshmi and local has been evaluated in three different locations Coimbatore, Sattakkalpudur and Yethapur. The planting was taken up on 20 July 2022.

Table 48. Performance of colocasia entries in 2nd year MLT

Entries	Weight of cormels per plant (g)				Cormel yield (t ha ⁻¹)				Total yield (corm + cormel) (t ha ⁻¹)			
	L ₁	L ₂	L ₃	Mean	L ₁	L ₂	L ₃	Mean	L ₁	L ₂	L ₃	Mean
TTr17-3	277.2	282.2	284.2	281.20	13.39	12.63	12.10	12.71	15.96	14.15	13.16	15.06
TTr17-5	225.8	238.4	220.8	228.31	12.40	11.32	11.13	11.62	14.18	14.82	13.93	14.50
TTr17-8	335.9	337.7	342.4	338.65	15.12	15.27	14.75	15.05	17.08	17.27	16.49	17.18
TTr17-12	318.1	319.7	320.3	319.39	13.80	15.36	14.21	14.46	15.63	15.27	14.38	15.45
Sree Rashmi	294.6	298.5	308.2	300.43	13.03	14.10	13.32	13.48	14.41	14.89	13.01	14.65
Local	262.1	283.7	277.5	274.46	13.06	13.63	12.97	13.22	14.69	14.95	13.14	14.50
SEm (±)	10.33	25.51	25.63	25.36	0.18	0.27	0.20	0.30	0.48	0.28	0.28	0.57
CD (0.05)	31.14	11.16	10.36	8.32	0.55	0.83	0.61	0.97	1.46	0.86	0.86	1.71
CV (%)	7.11	3.65	3.40	2.75	2.7	4.06	3.13	3.98	6.36	3.77	4.03	3.70

L₁: Coimbatore, L₂: Yethapur, L₃: Sattakkalpudur

Table 49. Pooled analysis of MLT on colocasia at Coimbatore

Entries	Cormel yield (t ha ⁻¹)			Total yield (t ha ⁻¹)		
	2022	2023	Pooled	2022	2023	Pooled
TTr17-3	13.69	12.71	13.20	15.71	15.06	15.38
TTr17-5	16.10	11.62	13.86	18.60	14.50	16.55
TTr17-8	14.60	15.05	14.83	18.33	17.18	17.75
TTr17-12	16.13	14.46	15.30	20.52	15.45	17.98
Sree Rashmi	14.48	13.48	13.98	18.05	14.65	16.35
Local	13.56	13.22	13.39	17.82	14.50	16.16
SEm (±)	0.49	0.30	0.39	0.56	0.57	0.56
CD (0.05)	1.02	0.97	0.99	1.19	1.71	1.45
CV (%)	4.71	3.98	4.34	4.59	3.70	4.14

The entry TTr17-8 recorded significantly higher weight of cormel per plant (338.65 g), cormel yield (15.05 t ha⁻¹) and total yield (17.18 t ha⁻¹). From pooled analysis over two years, TTr17-12 recorded higher cormel yield (15.30 t ha⁻¹) and total yield (17.98 t ha⁻¹) which was on par with TTr17-8 (17.75 t ha⁻¹). (Table 49).

C. Dr. YSRHU, Kovvur

Table 50. Performance of colocasia entries in 2nd year MLT at Kovvur

Entries	Weight of cormels per plant (g)					Cormel yield (t ha ⁻¹)				
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean
TTr17-3	54.48	37.32	20.04	25.39	34.31	36.12	25.46	10.72	15.41	21.93
TTr17-5	33.38	37.26	25.40	31.26	31.83	24.71	23.39	15.43	19.74	20.82
TTr17-8	23.93	21.02	22.74	25.10	23.20	17.20	12.13	13.44	14.75	14.38
TTr17-12	31.62	32.94	27.02	21.65	28.31	20.98	18.28	18.13	14.67	18.02
Sree Rashmi	33.33	42.60	34.78	37.09	36.95	25.36	29.11	24.42	25.56	26.11
Local	49.71	43.07	48.74	47.27	47.20	29.54	24.79	33.80	29.50	29.41
SEm (±)					3.38					2.50
CD (0.05)					10.29					7.59
CV (%)					20.12					22.93

L₁: Kovvur, L₂: Vadapalli, L₃: Peddapuram, L₄: Eluru

Table 51. Pooled analysis of MLT colocasia at Kovvur

Entries	Cormel yield (t ha ⁻¹)			Total yield (t ha ⁻¹)		
	2022	2023	Pooled	2022	2023	Pooled
TTr17-3	11.88	21.93	16.90	18.44	34.31	26.37
TTr17-5	21.61	20.82	21.21	32.42	31.83	32.12
TTr17-8	15.49	14.38	14.94	20.08	23.20	21.64
TTr17-12	11.44	18.02	14.73	17.75	28.31	23.03
Sree Rashmi	15.62	26.11	20.86	24.16	36.95	30.56
Local	27.19	29.41	28.30	40.59	47.20	43.89
SEm (±)	2.07	2.50	3.21	2.38	3.38	3.12
CD (0.05)	6.28	7.59	8.89	7.25	10.29	11.36
CV (%)	21.01	22.93	22.1	18.63	20.12	19.87

At Kovvur centre, second year MLT on taro was conducted with 4 entries along with national check Sree Rashmi and local check Godavari chema in four locations. Among all the entries, local has recorded the highest cormel yield (29.41 t ha⁻¹) and total yield (47.20 t ha⁻¹) followed by Sree Rashmi (26.11 t ha⁻¹ and 36.95 t ha⁻¹). The two years pooled data also revealed that local variety *ie.*, Godavari chema has recorded the highest corm yield of 28.3 t ha⁻¹ and total yield of 43.89 t ha⁻¹. (Table 51).

D. CAU, Imphal

Table 52. Performance of colocasia entries in 2nd year MLT at Imphal

Entries	Weight of cormels per plant (g)					Cormel yield (t ha ⁻¹)				
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean
TTr17-3	15.42	13.79	15.74	12.51	14.37	18.96	17.74	19.83	16.83	18.34
TTr17-5	12.12	14.18	13.87	10.53	12.68	16.24	18.48	18.33	14.56	16.91
TTr17-8	11.56	12.52	13.17	9.98	11.81	15.98	17.12	17.72	14.52	16.34
TTr17-12	10.97	11.08	12.40	10.04	11.12	15.42	15.71	17.18	14.71	15.76
Sree Rashmi	14.67	15.34	17.15	14.05	15.30	18.71	19.84	21.58	18.78	19.73
Local	13.54	15.25	16.25	13.24	14.57	17.71	19.66	20.54	17.82	18.93
SEm (±)	0.19	0.29	0.39	0.42	0.33	0.17	0.37	0.50	0.49	0.33
CD (0.05)	0.58	0.88	1.18	1.27	0.99	0.53	1.13	1.51	1.49	1.00
CV (%)	2.99	4.26	5.32	7.21	4.92	2.04	4.14	5.22	6.11	3.77

L₁: Andro, L₂: Leimaram, L₃: Nongdam, L₄: Kakching Khunou

Table 53. Pooled analysis of MLT colocasia at Imphal centre

Entries	Cormel yield (t ha ⁻¹)			Total yield (t ha ⁻¹)		
	2022	2023	Pooled	2022	2023	Pooled
TTr17-3	15.99	14.37	15.18	20.18	18.34	19.26
TTr17-5	12.88	12.68	12.78	17.20	16.91	17.05
TTr17-8	14.01	11.81	12.91	18.85	16.34	17.59
TTr17-12	11.68	11.12	11.40	17.29	15.76	16.52
Sree Rashmi	18.52	15.30	16.91	23.10	19.73	21.41
Local	18.59	14.57	16.58	22.80	18.93	20.87
SEm ($\pm$)	0.73	0.33	0.36	0.75	0.33	0.39
CD (0.05)	2.12	0.99	1.08	2.25	1.00	1.17
CV (%)	9.21	4.92	5.02	7.50	3.77	4.14

In the experiment at Imphal, six entries were evaluated in four locations. During 2nd year trial maximum cormel yield (15.30 t ha⁻¹) and total yield (19.73 t ha⁻¹) was observed in Sree Rashmi (Table 52). Pooled data analysis

of two year revealed that, the highest cormel yield (16.91 t ha⁻¹) and total yield (21.41 t ha⁻¹) was also observed in Sree Reshmi which was on par with local line (16.58 t ha⁻¹ and 20.87 t ha⁻¹, respectively). (Table 53).

E. MPUAT, Udaipur

Table 54. Performance of colocasia entries in 2nd year MLT at Udaipur centre

Entries	Weight of cormel per plant (g)				Cormel yield (t ha ⁻¹)			
	L ₁	L ₂	L ₃	Mean	L ₁	L ₂	L ₃	Mean
TTr17-3	19.00	16.74	15.93	17.22	24.69	22.53	21.30	22.84
TTr17-5	16.14	14.78	15.00	15.31	20.37	19.49	19.48	19.78
TTr17-8	15.81	15.59	15.37	15.59	20.11	19.72	19.80	19.88
TTr17-12	17.69	15.83	15.48	16.33	23.16	20.96	20.74	21.62
Sree Rashmi	17.78	17.14	15.72	16.88	24.03	22.46	21.20	22.56
Local	14.85	15.41	15.11	15.12	19.93	21.41	20.88	20.74
SEm ($\pm$)	0.28	0.47	0.17	-	0.33	0.52	0.34	-
CD (0.05)	0.83	1.53	0.51	-	1.03	1.68	1.02	-
CV (%)	2.64	5.19	1.87	-	2.53	4.30	2.70	-

L₁: RCA Udaipur, L₂: Jaisamand, L₃: Dabok

The multi location trial in colocasia evaluated at three location during the 2nd year among the 6 entries under evaluation, TTr17-3 was recorded the mean highest total yield (22.56 t ha⁻¹) and mean lowest total yield was recorded in TTr17-5 entry (19.78 t ha⁻¹). (Table 54-55).

Table 55. Pooled analysis of MLT on colocasia, Udaipur centre

Entries	2022	2023	Mean
TTr17-3	20.41	22.56	21.49
TTr17-5	17.48	19.78	18.63
TTr17-8	17.83	19.88	18.86
TTr17-12	14.68	21.62	18.15
Muktakeshi	18.22	22.56	20.39
Local	18.52	20.74	19.63
SEm ($\pm$)	0.33	0.58	0.34
CD (0.05)	0.96	1.83	0.99
CV (%)	5.26	4.74	4.19

II.4.4. MLT on colocasia (Dasheen type) (2nd year)

Second year of multi location trials of colocasia dasheen type have 4 entries (TBd17-2, TBd17-3, TBd17-4, TBd17-8) and checks (IGB-5, Local) and were conducted at six centres. Dholi, Jorhat, Jagdalpur, Ranchi and Barapani already harvested the experiment on 2022.

A. BCKV, Kalyani

The second-year MLT on *Colocasia* (Dasheen type) was conducted in 2023 at four different locations in West Bengal with six entries including one national and one local check. Marked variations both in corm yield and total yield were recorded among the entries at different locations. There were also variations in weight of corms and cormels per plant among the entries. The highest

corm yield of 20.90 t ha⁻¹ and total yield of 23.06 t ha⁻¹ was recorded in TBd17-2 followed by 20.20 t ha⁻¹ and 22.30 t ha⁻¹, respectively in TBd17-3, which was statistically on par with the yield of TBd17-2. (Table 56). The pooled mean data for two years reveal that the entries TBd17-3

(20.33 t ha⁻¹), TBd17-2 (19.60 t ha⁻¹) and TBd17-4 (19.34 t ha⁻¹) performed well in terms of corm yield, but were statistically on par with the corm yield of check entry IGB-5 (19.13 t ha⁻¹).

Table 56. Performance of colocasia (Dasheen type) entries in MLT 2nd year at Kalyani (Cont.)

Entries	Weight of cormels per plant (g)					Cormel yield (t ha ⁻¹)				
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean
TBd17-2	20.43	21.76	20.03	21.37	20.90	22.54	23.73	22.12	23.87	23.06
TBd17-3	19.94	20.86	19.48	20.53	20.20	21.86	22.74	21.93	22.66	22.30
TBd17-4	18.17	19.03	18.35	19.26	18.70	20.04	21.11	20.42	21.36	20.73
TBd17-8	16.41	17.24	16.19	17.66	16.87	18.37	19.04	18.21	19.26	18.72
IGB-5	18.71	19.69	18.16	19.42	18.99	20.46	21.43	20.19	21.28	20.84
Local	16.32	16.96	16.73	17.64	16.91	18.31	18.92	18.46	19.37	18.76
SEm (±)					0.39					0.48
CD (0.05)					1.18					1.42
CV (%)					9.57					8.42

L₁: Khatra, Bankura district; L₂: Chougacha, Nadia district; L₃: Nimpith- 24 Parganas (South) district; L₄: Purbasthali, Burdwan district

Table 57. Pooled analysis of MLT colocasia (Dasheen type) at Kalyani centre

Entries	2020-21	2021-22	Pooled
TBd17-2	18.30	20.90	19.60
TBd17-3	20.45	20.20	20.33
TBd17-4	19.99	18.70	19.34
TBd17-8	17.05	16.87	16.96
IGB-5	19.26	18.99	19.13
Local	18.78	16.91	17.85
SEm (±)	0.74	0.39	0.43
CD (0.05)	2.12	1.18	1.27
CV (%)	13.62	9.57	11.41

II.5. ELEPHANT FOOT YAM

II.5.1. IET on elephant foot yam (Season 1)

A new IET on elephant foot yam was initiated with 11 entries (TEy22-1, TEy22-2, TEy22-3, TEy22-4, TEy22-5, TEy22-6, TEy22-7, TEy22-8, TEy22-9, TEy22-10 and TEy22-11) and Gajendra and local as control during 2022. The trial was already conducted in 2022 by Navsari, Thiruvananthapuram, Palampur and Kalyani centres.

TEy22-1 and TEy22-2 recorded highest tuber yield

(>51 t ha⁻¹) and found superior over other test entries alongwith check Gajendra (44.6 t ha⁻¹) in terms of corm yield at Dholi. TEy22-6 highest corm yield of 1.87 kg plant⁻¹, followed by TEy22-4 with 1.85 kg plant⁻¹. The lowest corm yield (0.50 kg plant⁻¹) was recorded in TEy22-8 at Coimbatore. Highest yield per hectare was recorded in TEy22-9 (43.35 t ha⁻¹) followed by TEy22-11 (42.58 t ha⁻¹) at Kovvur. (Table 58).

Table 58. Yield attributes of elephant foot yam entries in IET (Season 1)

Entries	Corm yield per plant (kg)			Corm yield (t ha ⁻¹)		
	Dholi	Coimbatore	Kovvur	Dholi	Coimbatore	Kovvur
TEy22-1	3.1	1.47	0.61	51.5	21.31	13.31
TEy22-2	2.8	1.37	0.62	51.3	19.21	15.31
TEy22-3	2.2	0.97	1.15	37.1	17.20	31.83
TEy22-4	2.3	1.85	0.63	36.8	35.21	15.64
TEy22-5	2.1	1.15	1.18	33.2	18.24	21.42
TEy22-6	2.2	1.87	0.88	27.4	35.57	22.17
TEy22-7	2.3	1.08	1.35	33.9	17.24	35.53
TEy22-8	2.0	0.50	0.88	33.4	9.24	17.08
TEy22-9	1.9	-	0.20	25.6	-	43.35
TEy22-10	1.2	-	1.48	17.4	-	34.01
TEy22-11	1.1	-	1.88	16.6	-	42.58
Gajendra	2.6	4.92	3.67	44.6	45.34	13.54
Local	0.5	4.52	1.85	9.4	40.25	35.31
SEm (±)	0.21	0.36	1.31	1.86	0.48	3.01
CD (0.05)	0.66	0.77	3.85	5.63	1.85	8.84
CV (%)	14.63	34.35	19.89	13.68	10.25	19.88

II.5.2. IET on Elephant foot yam (Season 2)

Second year IET on elephant foot yam with 11 entries (TEy22-1, TEy22-2, TEy22-3, TEy22-4, TEy22-5, TEy22-6, TEy22-7, TEy22-8, TEy22-9, TEy22-10 and TEy22-11) and Gajendra

and local as control were conducted at seven centres. The trial is in progress at Dholi, Coimbatore, Thiruvananthapuram, Kovvur and Palampur centres, out of seven centres.

Table 59. Pooled tuber yield of IET on elephant foot yam (Season 2)

Entries	Corm yield (t ha ⁻¹)						Corm yield per plant (kg)	
	Navsari			Kalyani			Navsari	Kalyani
	2022	2023	Mean	2022	2023	Mean		
TEy22-1	29.16	28.50	28.83	36.55	38.36	37.46	1.20	2.54
TEy22-2	6.74	6.08	6.41	23.70	25.41	24.56	0.27	1.67
TEy22-3	21.06	19.96	20.51	41.55	42.57	42.06	0.40	2.83
TEy22-4	14.95	13.37	14.16	24.45	26.13	25.29	0.50	1.72
TEy22-5	8.42	8.01	8.21	31.26	32.46	31.86	0.32	2.19
TEy22-6	11.86	10.36	11.11	43.15	43.83	43.49	0.41	2.94
TEy22-7	24.46	23.34	23.90	34.10	36.48	35.29	0.83	2.41
TEy22-8	8.99	7.17	8.08	38.65	40.17	39.41	0.50	2.60
TEy22-9	11.16	10.69	10.93	26.85	31.82	29.34	1.00	2.11
TEy22-10	8.92	7.82	8.37	25.20	26.68	25.94	0.82	1.77
TEy22-11	16.75	16.27	16.51	26.10	28.18	27.14	1.41	1.85
Gajendra	27.25	26.23	26.74	41.10	36.76	38.93	1.03	2.47
Local	20.29	19.24	19.77	22.47	24.44	23.46	0.46	1.61
SEm (±)	1.47	1.40	1.43	2.23	1.71	1.46	0.06	0.12
CD (0.05)	4.26	4.08	2.88	7.38	5.16	4.43	0.18	0.33
CV (%)	15.15	15.39	15.27	17.47	13.73	12.24	15.81	6.28

At Navsari, TEy22-1 gave higher tuber yield (28.50 t ha⁻¹) and found superior among the other entries. At Kalyani, marked variations in both corm weight and corm yield were observed among the entries ranging from 24.44 t ha⁻¹ to 43.83 t ha⁻¹ in Local and TEy22-6

respectively. The entries TEy22-3 (42.57 t ha⁻¹), TEy22-8 (40.17 t ha⁻¹), TEy22-1 (38.36 t ha⁻¹), TEy22-7 (36.48 t ha⁻¹) along with Gajendra (36.76 t ha⁻¹) also recorded high yield as compared to other entries. The highest corm yield was recorded in TEy22-6 followed by

TEy22-3, which was statistically on par, and was significantly superior to other entries including Gajendra. (Table 59).

II.5.3. MLT on elephant foot yam (Season 2)

MLT on elephant foot yam was initiated with the selected entries, TEy17-1, TEy17-4, TEy17-5, Gajendra and local at seven centres. Trial report was already given

in 2022 by Kovvur, Jagdalpur, Navsari and Thiruvananthapuram.

A. Dr. RPCAU, Dholi

Five elephant foot yam entries including one check entry Gajendra and one local cultivar were evaluated in multi-locational trial (2nd year) at four locations viz., Dholi, Birouli, Begusarai and Vaishali during 2022-23.

Table 60. Performance of elephant foot yam entries in MLT (Season 2) at Dholi centre

Entries	Weight of cormels per plant (g)					Cormel yield (t ha ⁻¹)				
	L ₁	L ₂	L ₃	L ₄	Mean	L ₁	L ₂	L ₃	L ₄	Mean
TEy17-1	4.10	3.88	3.74	4.24	4.0	48.9	46.3	43.8	45.3	46.1
TEy17-4	2.27	3.21	2.84	2.50	2.7	35.6	40.3	33.2	32.6	35.4
TEy17-5	2.26	1.94	2.43	2.10	2.2	32.5	29.6	30.4	33.8	31.6
Gajendra	2.87	2.95	2.76	2.98	2.9	41.4	37.6	39.3	42.6	40.2
Local	1.45	1.25	1.10	1.32	1.3	18.3	16.6	12.6	15.3	15.7
SEm (±)					0.13					1.14
CD (0.05)					0.42					3.55
CV(%)					10.27					6.75

L₁: Dholi, L₂: Birouli, L₃: Begusarai, L₄: Vaishali

During 2022-23, TEy17-1 recorded highest corm yield (46.1 t ha⁻¹) and found superior to other test entries including Gajendra (40.2 t ha⁻¹) used as national check. (Table 60).

Table 61. Pooled analysis of MLT on elephant foot yam

Entries	Corm yield (t ha ⁻¹)		
	2021-22	2022-23	Pooled
TEy17-1	45.0	46.1	45.6
TEy17-4	38.3	35.4	36.9
TEy17-5	26.2	31.6	28.9
Gajendra	36.2	40.2	38.2
Local	13.9	15.7	14.8
SEm (±)	1.06	1.14	0.98
CD (0.05)	3.30	3.55	2.97
CV (%)	6.66	6.75	5.74

In the pooled analysis for corm yield, TEy17-1 recorded highest corm yield (45.6 t ha⁻¹) and found superior to

other test entries including Gajendra (38.2 t ha⁻¹) used as national check.

B. BCKV, Kalyani

TEy17-1 performed well both in terms of corm yield per plant and corm yield per hectare at all the locations under trial. The highest average corm yield of 45.64 t ha⁻¹ was also recorded in TEy17-1 followed by 41.26 t ha⁻¹ in Gajendra (National Check) and 41.02 t ha⁻¹ in TEy17-4. From the pooled mean data, it is evident that yield of TEy17-1 was significantly superior over all other entries. The yield of Gajendra which was statistically on par with the yield of TEy17-4. (Table 62).

Table 62. Pooled analysis of MLT (Season 2) on elephant foot yam entries at Kalyani centre

Entries	Corm yield (t ha ⁻¹) 2022	Corm yield (t ha ⁻¹) 2023					Pooled
		L ₁	L ₂	L ₃	L ₄	Mean	
TEy17-1	44.74	43.63	47.26	44.78	46.88	45.64	45.19
TEy17-4	39.06	40.54	41.76	40.23	41.53	41.02	40.04
TEy17-5	25.23	27.12	28.27	26.82	28.41	27.66	26.45
Gajendra	41.80	41.38	41.12	40.36	42.18	41.26	41.53
Local	26.92	27.48	28.73	26.74	28.91	27.96	27.44
SEm (±)	2.53					1.37	1.21
CD (0.05)	7.54					4.16	3.61
CV (%)	16.68					14.57	12.48

L₁: Khatra, Bankura district; L₂: Chougacha, Nadia district; L₃: Nimpith- 24 Parganas (South) district; L₄: Purbasthali, Burdwan district.

C. MPUAT, Udaipur

Table 63. Pooled analysis of MLT (Season 2) on elephant foot yam entries at Udaipur centre

Entries	Corm yield (t ha ⁻¹) 2022	Corm yield (t ha ⁻¹) 2023				Pooled
		L ₁	L ₂	L ₃	Mean	
TEy17-1	20.75	22.56	21.85	19.87	21.42	21.09
TEy17-4	17.89	19.63	17.79	17.03	18.15	18.02
TEy17-5	18.54	20.37	15.55	18.02	17.98	18.26
Gajendra	21.21	26.67	22.84	24.19	24.58	22.90
Local	19.28	20.49	20.86	18.27	19.87	19.58
SEm (±)	0.50	0.78	1.10	0.78	0.72	0.40
CD (0.05)	1.46	2.45	3.65	2.59	2.38	1.17
CV (%)	8.71	6.15	9.67	6.96	6.11	5.83

Maximum tuber yield was recorded in entry Gajendra (24.58 t ha⁻¹) and lowest in entry TEy17-5 (17.98 t ha⁻¹) and the pooled (2021-22 & 2022-23) mean maximum

yield was recorded in entry Gajendra (22.90 t ha⁻¹) and lowest in entry TEy17-4 (18.02 t ha⁻¹).

II.6. ARROWROOT

II.6.1. MLT on arrow root (1st year)

The first year MLT on arrowroot was conducted with four entries (TAr18-4, TAr18-10, TAr18-12 and TAr18-14) at seven centres. Kalyani and Jagdalpur centres already harvest the trial in 2022.

A. TNAU, Coimbatore

TAr18-14 recorded higher rhizome yield of 14.75 t ha⁻¹ in their mean value across three locations. While lower rhizome yield recorded in TAr18-4 (10.34 t ha⁻¹). (Table 64).



Fig. 7 Field view of MLT on arrowroot at Coimbatore centre

Table 64. Yield attributes of arrowroot entries at TNAU, Coimbatore

Entries	No. of tillers plant ⁻¹	No. of rhizome plant ⁻¹	Rhizome yield (t ha ⁻¹)				Largest rhizome weight (g)
			L ₁	L ₂	L ₃	Mean	
TAr18-4	6.77	11.35	11.42	10.96	11.19	10.34	167.76
TAr18-10	6.33	22.38	13.49	12.78	13.14	13.62	141.78
TAr18-12	5.98	19.21	15.54	15.75	15.65	14.43	111.60
TAr18-14	6.26	16.55	17.21	16.74	16.98	14.75	181.34
SEm (±)	0.18	1.44	0.54	0.26	0.18	0.52	8.31
CD (0.05)	0.56	4.44	1.65	0.80	0.71	1.63	25.61
CV (%)	5.88	16.67	7.73	3.82	1.87	7.19	11.47

L₁: Coimbatore, L₂: Yethapur, L₃: Sattakkalpudur

B. UHS, Dharwad

Table 65. Yield attributes of arrowroot entries at Dharwad centre

Entries	No. of tillers plant ⁻¹	No. of rhizome plant ⁻¹	Rhizome yield (t ha ⁻¹)				Largest rhizome weight (g)
			L ₁	L ₂	L ₃	Mean	
TAr18-4	8.13	12.01	26.60	16.37	16.90	19.96	96.72
TAr18-10	11.21	18.19	31.78	21.19	19.89	24.29	114.48
TAr18-12	9.42	15.84	28.30	17.95	18.31	21.52	105.25
TAr18-14	7.34	11.56	24.08	14.03	15.05	17.72	93.77
SEm (±)	0.58	0.60	2.01	1.22	0.96	0.79	2.67
CD (0.05)	1.80	1.85	6.19	3.77	2.97	2.45	8.24
CV (%)	15.17	9.74	15.81	15.56	12.77	8.48	5.84

L₁: Dharwad, L₂: Bagalkot, L₃: Belagavi

TAr18-10 recorded higher rhizome yield of 24.29 t ha⁻¹ in their mean value across three locations. While lower rhizome yield of 17.72 t ha⁻¹ recorded in TAr18-14. The highest number of tillers plant⁻¹, number of rhizome plant⁻¹ and largest rhizome weight (11.21, 18.19 and 114.48 g, respectively) was recorded in TAr18-10. (Table 65).

C. BAU, Ranchi

Table 66. Yield attributes (t ha⁻¹) of 1st year MLT on arrowroot, Ranchi centre

Entries	Ranchi	Dumka	Darisai	Chianki	Chatra	Mean
TAr18-4	27.62	21.55	29.34	25.32	23.57	25.48
TAr18-10	25.66	19.44	26.49	21.84	23.57	23.40
TAr18-12	29.56	24.14	31.62	25.77	27.32	27.68
TAr18-14	26.45	20.78	27.58	24.48	22.96	24.45
SEm (±)						0.32
CD (0.05)						1.01
CV (%)						2.91

Table 67. Yield and quality attributes of 1st year MLT on arrowroot, Ranchi centre

Entries	No. of tillers plant ⁻¹	Rhizome yield (t ha ⁻¹)	No. of rhizome plant ⁻¹	Biggest tuber weight (g)
TAr18-4	8.98	25.48	16.84	121.63
TAr18-10	8.23	23.40	14.93	113.87
TAr18-12	9.84	27.68	19.12	132.24
TAr18-14	8.71	24.45	15.47	115.65
SEm (±)	0.34	0.32	0.79	6.64
CD (0.05)	1.06	1.01	2.43	20.46
CV (%)	8.66	2.91	10.63	12.28

During 2022-23 as first year of MLT on arrowroot trial, entry TAr18-12 recorded significantly superior yield of 27.68 t ha⁻¹ as an average across the five locations. (Table 66).

D. CAU, Imphal

Table 68. Yield attributes of arrowroot entries at Imphal centre

Entries	No. of tillers plant ⁻¹	No. of rhizome plant ⁻¹	Rhizome yield (t ha ⁻¹)					Largest rhizome weight (g)
			L ₁	L ₂	L ₃	L ₄	Mean	
TAr18-4	4.97	5.95	15.98	15.95	16.42	16.76	16.27	90.27
TAr18-10	6.26	6.40	17.07	18.13	17.19	17.52	17.48	101.68
TAr18-12	5.33	6.35	17.65	17.45	16.75	17.17	17.26	97.41
TAr18-14	5.08	6.78	18.78	18.50	17.10	18.35	18.18	104.64
SEm (±)	0.22	0.11	0.45	0.41	0.4	0.36	0.25	1.30
CD (0.05)	0.70	0.37	1.38	1.28	1.24	1.1	0.79	4.16
CV (%)	8.05	3.62	5.76	5.29	5.35	4.56	2.86	2.64

L₁: Andro, L₂: Leimaram, L₃: Nongdam, L₄: Kakching Khunou

Maximum number of tillers per plant was observed in TAr18-10 (6.26). However maximum number of tuber (6.78), maximum tuber yield (18.18 t ha⁻¹) and biggest tuber weight (104.64 g) was observed in TAr18-14. (Table 68).

E. ICAR-CTCRI, Thiruvananthapuram

In the first year MLT on arrowroot, the four entries with high tuber yield/starch content (TAr18-4, TAr18-10, TAr18-12, TAr18-14) and local check (AKI/2015-1) planted during 2022-23 in 14 locations covering the 7 districts viz., Thiruvananthapuram, Kollam, Alappuzha,

Kottayam, Ernakulam, Thrissur and Kannur showed that TAr18-10 recorded the highest tuber yield (47.48 t ha⁻¹) and was significantly superior to the local check (25.34 t ha⁻¹). However, TAr18-10 was on par with TAr18-14 (41.01 t ha⁻¹) and TAr18-12 (37.36 t ha⁻¹).

Table 69. Tuber yield (t ha⁻¹) of arrow root entries under MLT (1st year) in seven districts of Kerala

Entries	L ₁	L ₂	L ₃	L ₄	L ₅	L ₆	L ₇	Mean
TAr18-4	32.19	28.17	50.43	42.44	23.89	28.14	27.78	33.29
TAr18-10	43.97	31.50	86.42	42.89	37.78	43.16	46.67	47.48
TAr18-12	38.05	21.28	74.69	33.33	22.22	34.16	37.78	37.36
TAr18-14	35.75	40.34	72.41	52.67	19.45	33.14	33.33	41.01
Local check	28.20	17.89	37.66	29.78	17.22	19.95	26.67	25.34
CD (0.05)								7.89
CV (%)								19.39

L₁: Thiruvananthapuram, L₂: Kollam, L₃: Alappuzha, L₄: Kottayam, L₅: Ernakulam, L₆: Thrissur, L₇: Kannur

II.6.2. MLT on arrowroot (Season 2)

The second year MLT on arrow root was conducted with four entries (TAr18-4, TAr18-10, TAr18-12 and TAr18-14) at seven centres. Trial is in progress at Thiruvananthapuram, Dharwad, Ranchi and Coimbatore centres.

A. BCKV, Kalyani

In the second-year trial, the significantly highest rhizome yield was recorded in TAr18-4 at all the locations with an

average yield of 33.08 t ha⁻¹ followed by 27.04 t ha⁻¹ in TAr18-12 and 25.73 t ha⁻¹ in TAr18-10. Though the maximum number of tillers per plant was recorded in TAr18-14 (7.64 plant⁻¹), the highest number of tubers per plant (18.28 plant⁻¹) and the largest rhizome weight (97.27 g) was observed in TAr18-4. The pooled data for two years reveals that the entry TAr18-4 performed very well in West Bengal under MLT recording the highest rhizome yield of 24.77 t ha⁻¹ closely followed by TAr18-12 (24.54 t ha⁻¹). (Table 70 & 71).

Table 70. Yield attributes of arrowroot entries under MLT at Kalyani

Entries	No. of tillers plant ⁻¹	No. of rhizome plant ⁻¹	Rhizome yield (t ha ⁻¹)					Largest rhizome weight (g)
			L ₁	L ₂	L ₃	L ₄	Mean	
TAr18-4	7.34	18.28	30.78	33.76	31.86	35.93	33.08	97.27
TAr18-10	6.67	16.54	26.19	24.83	24.74	27.16	25.73	79.48
TAr18-12	6.41	17.63	25.96	27.18	26.66	28.37	27.04	86.23
TAr18-14	7.64	14.38	23.84	25.44	22.58	26.36	24.56	75.66
SEm (±)	0.07	0.82					1.40	2.87
CD (0.05)	0.22	1.43					4.17	8.64
CV (%)	6.57	8.34					12.46	16.42

L₁: Khatra, Bankura district; L₂: Chougacha, Nadia district; L₃: Nimpith- 24 Parganas (South) district; L₄: Purbasthali, Burdwan district.

Table 71. Pooled analysis of MLT arrowroot at Kalyani

Entries	2021-22	2022-23	Pooled
TAr18-4	16.46	33.08	24.77
TAr18-10	18.75	25.73	22.24
TAr18-12	22.04	27.04	24.54
TAr18-14	17.32	24.56	20.94
SEm (±)	1.29	1.40	0.72
CD (0.05)	3.71	4.17	2.18
CV %	14.68	12.46	9.37

B. IGKV, Jagdalpur

Table 72. Yield attributes of arrowroot entries at Jagdalpur (2023)

Entries	No. of tillers plant ⁻¹	No. of rhizome plant ⁻¹	Rhizome yield (t ha ⁻¹)					Largest rhizome weight (g)
			L ₁	L ₂	L ₃	L ₄	Mean	
TAr18-4	13.68	14.64	30.00	32.00	30.70	36.35	32.26	115.28
TAr18-10	13.87	13.50	37.00	36.40	33.20	42.51	37.28	118.91
TAr18-12	12.39	12.53	35.40	40.20	37.00	43.84	39.11	100.47
TAr18-14	13.33	12.57	34.25	34.50	31.60	40.62	35.24	91.47
SEm (±)	0.26	0.41					0.64	6.64
CD (0.05)	0.81	1.25					2.03	20.40
CV (%)	4.41	6.84					3.54	13.94

L₁: Bemetara; L₂: Ambikapur; L₃: Kanker; L₄: Jagdalpur

Table 73. Pooled yield of arrowroot entries at Jagdalpur (2022-23 and 2023-24)

Entries	Yield (t ha ⁻¹) 2022-23	Yield (t ha ⁻¹) 2023-24	Pooled (t ha ⁻¹)
TAr18-4	31.94	32.26	32.10
TAr18-10	23.78	37.28	30.53
TAr18-12	36.36	39.11	37.73
TAr18-14	26.81	35.24	31.03
SEm (±)	1.31	0.64	0.88
CD (0.05)	4.19	2.03	2.81
CV (%)	8.84	3.54	5.37

TAr18-12 recorded maximum tuber yield (39.11 t ha⁻¹) and pooled yield (37.73 t ha⁻¹), whereas TAr18-10 recorded biggest tuber weight (118.91 g) and higher number of tillers per plant (13.87) at Jagdalpur centre. (Table 72-73)

C. CAU, Imphal

Maximum number of tillers per plant was observed in TAr18-10 (5.56). However maximum number of tuber (6.50), mean maximum tuber yield (16.29 t ha⁻¹) and biggest tuber weight (109.13 g) was observed in TAr18-14.

Table 74. Yield attributes of arrowroot entries at Imphal

Entries	No. of tillers plant ⁻¹	No. of rhizome plant ⁻¹	Rhizome yield (t ha ⁻¹)					Largest rhizome weight (g)
			L ₁	L ₂	L ₃	L ₄	Mean	
TAr18-4	4.62	5.37	15.39	15.51	14.92	14.18	15.00	94.57
TAr18-10	5.56	5.75	14.33	14.37	14.52	15.72	14.73	101.96
TAr18-12	5.23	6.39	15.82	14.69	15.66	15.52	15.42	89.57
TAr18-14	5.32	6.50	17.14	15.77	15.95	16.32	16.29	109.13
SEm (±)	0.14	0.16	0.41	0.30	0.31	0.46	0.31	3.45
CD (0.05)	0.47	0.50	1.27	0.92	0.97	1.43	1.02	11.21
CV (%)	5.57	5.19	5.79	4.36	4.55	6.65	4.07	6.99

L₁: Andro, L₂: Leimaram, L₃: Nongdam, L₄: Kakching Khunou

III. AGRO TECHNIQUES

III.1. Water saving techniques in cassava (Season 2)

The trial is proposed at Yethapur & Peddapuram centres with the following water saving treatments in cassava. At Yethapur, the experiment was concluded at 2022. The following treatments were tried at Peddapuram during this year.

T₁: Drip irrigation at 50% CPE + ground cover sheet (120 gsm)

T₂: Drip irrigation at 50% CPE + mulching with crop residues

T₃: Drip irrigation at 50% CPE + coir pith @ 1 kg per plant

T₄: Drip irrigation at 50% CPE + anti transpirant spray

T₅: Drip irrigation at 50% CPE + Pusa hydrogel @ 0.5 g per plant

T₆: Drip irrigation at 50% CPE + synthetic SAP

T₇: Drip irrigation at 50% CPE

T₈: Drip irrigation at 100% CPE

Table 75a. Time of germination in water saving technique of cassava (Season 2) at Peddapuram

Treatments	First germination	50 % germination	100 % germination
T ₁	7.33	9.00	12.00
T ₂	7.67	9.33	12.00
T ₃	8.00	10.00	12.00
T ₄	7.67	10.00	12.00
T ₅	8.00	10.00	12.00
T ₆	8.00	11.00	11.67
T ₇	7.33	8.00	11.67
T ₈	7.33	9.00	11.67
SEm (±)	0.27	0.87	0.17
SE (d)	0.38	1.23	0.24
CV (%)	6.04	15.74	2.52

Table 75b. Growth attributes of cassava under water saving techniques (Season 2) at Peddapuram

Treatments	2 MAT*	4 MAT	At harvest	2 MAT	4 MAT	At harvest	2 MAT	4 MAT	At harvest	2 MAT	4 MAT	At harvest	2 MAT	4 MAT	At harvest
T ₁	43.87	118.67	1.57	3.83	7.22	8.81	35.97	210.53	307.30	2.53	77.67	254.07	0.68	7.35	9.12
T ₂	39.40	123.00	1.80	3.53	7.53	9.02	30.43	128.87	243.97	1.95	54.97	219.63	0.39	4.81	10.60
T ₃	34.33	131.67	1.61	3.77	7.54	10.50	28.50	159.40	281.10	3.42	62.53	284.30	0.45	5.10	10.56
T ₄	40.30	126.00	1.86	3.77	6.59	11.51	34.87	138.07	353.27	1.63	78.87	340.73	0.57	6.72	14.36
T ₅	38.97	125.33	2.05	3.73	7.14	11.43	31.97	153.73	320.87	1.64	72.00	308.30	0.58	5.79	15.73
T ₆	36.63	131.33	1.78	3.63	6.88	9.81	34.07	188.83	289.30	1.99	72.53	302.43	0.65	6.11	8.01
T ₇	38.87	118.00	1.74	3.80	7.14	10.03	26.30	174.63	281.40	2.44	57.20	322.17	0.32	5.94	9.81
T ₈	39.40	116.67	1.45	3.63	7.30	9.59	29.73	200.87	246.53	2.89	69.07	246.67	0.43	6.40	6.94
CD (0.05)	NS	NS	0.20	NS	NS	1.14	4.59	13.02	42.36	0.55	9.13	35.17	0.10	1.20	2.22
SEm (±)	3.17	6.06	0.07	0.10	0.50	0.37	1.50	4.25	13.83	0.18	2.98	11.48	0.03	0.39	0.72
SE (d)	4.48	8.57	0.09	0.14	0.71	0.53	2.12	6.01	19.56	0.25	4.22	16.24	0.05	0.55	1.02
CV (%)	14.09	8.48	6.51	4.53	12.09	6.39	8.25	4.35	8.25	13.41	7.58	6.99	11.44	11.22	11.78

* MAT - months after treatment

At Peddapuram, the biometric observations were made at 2, 4 and 7 months after planting, the yield and yield parameters were recorded during harvesting of the tubers which was carried out at 7 months after planting (7 MAP). The plant height and stem girth did not differ significantly under different treatments at 2 and 4 MAP. T₄ [Drip Irrigation at 50% CPE + anti transpirant (Kaolin) spray] and T₅ (Drip irrigation at 50% CPE + Pusa hydrogel @ 0.5 g per plant) were found significantly superior based on the measurements on plant height, stem girth, number of retained leaves and leaf area index. (Table 75b).

Table 75c. Yield attributes of cassava under water saving techniques (Season 2) at Peddapuram

Treatments	Tuber bulking rate			harvest index		
	2 MAP	4 MAP	At harvest	2 MAP	4 MAP	At harvest
T ₁	0.16	9.67	12.55	0.05	0.36	1.96
T ₂	0.04	11.78	5.86	0.03	0.42	2.58
T ₃	0.10	9.23	9.59	0.04	0.38	2.03
T ₄	0.17	10.54	8.13	0.07	0.42	2.49
T ₅	0.11	8.49	16.64	0.06	0.35	2.33
T ₆	0.13	14.72	13.11	0.08	0.49	1.81
T ₇	0.08	11.24	7.90	0.04	0.42	2.22
T ₈	0.07	14.20	10.36	0.05	0.43	2.19
CD (0.05)	0.02	1.70	2.91	0.01	0.06	0.18
SEm (±)	0.01	0.56	0.95	0.00	0.02	0.06
SE (d)	0.01	0.78	1.35	0.01	0.03	0.08
CV (%)	9.00	8.55	15.66	13.27	7.86	4.63

The tuber bulking was observed significantly higher for T_6 (Drip Irrigation at 50% CPE + Synthetic SAP) and T_5 (Drip Irrigation at 50% CPE + Pusa hydrogel @ 0.5 g per plant) at 4 MAP and at harvest, respectively. (Table 75c)

Table 75d. Tuber yield of cassava under different treatments of water saving technique (Season 2) in cassava at Peddapuram

Treatments	Tuber yield per plant (kg)			Tuber yield (t ha ⁻¹)		
	2021-22	2022-23	Mean	2021-22	2022-23	Mean
T_1	1.94	1.72	1.83	23.89	21.22	22.56
T_2	2.00	1.24	1.62	24.68	15.26	19.97
T_3	1.57	1.43	1.50	19.40	17.56	18.48
T_4	1.69	1.38	1.54	20.86	16.97	18.92
T_5	1.83	2.01	1.92	22.64	24.86	23.75
T_6	1.34	2.07	1.71	16.50	25.56	21.03
T_7	1.63	1.39	1.51	20.06	17.16	18.61
T_8	1.60	1.79	1.70	19.79	22.08	20.94
CD (0.05)	N/A	0.21	-	N/A	2.57	-
SEm ($\pm$)	0.21	0.07	-	2.60	0.84	-
SE (d)	0.30	0.10	-	3.68	1.19	-
CV (%)	21.48	7.3	-	21.48	7.24	-

Highest mean tuber yield was recorded in T_5 (Drip Irrigation at 50% CPE + Pusa hydrogel @ 0.5 g per plant) 23.75 t ha⁻¹ followed by T_1 (Drip Irrigation at 50 % CPE+ Ground cover sheet (120 gsm)) and T_6 (Drip Irrigation at 50% CPE + Synthetic SAP) 22.56 t ha⁻¹. (Table 75 d)

III.2. High density planting in cassava (Season 1)

The trial on high density planting in cassava conducted at nine centres with seven treatments of closer spacing (T_1 - 120 x 60 cm, T_2 - 90 x 90 cm, T_3 - 90 x 75 cm, T_4 - 90 x 60 cm, T_5 - 75 x 75 cm, T_6 - 75 x 60 cm and T_7 - 60 x 60 cm) and observation on yield attributes and number of plantable stems were recorded.

Table 76a. Number of plantable stems of cassava under high density planting (Season 1) recorded at different centres

Treatments	Peddapuram	Jagdarpur	Imphal	Dapoli	Thiruvananthapuram	Barapani	Bhubaneswar
	Number of plantable stems per ha						
T_1	27777.78	212962.99	82402.13	254631.78	75276	190972	94051
T_2	24691.36	189300.43	69955.00	226343.33	71439	169753	81712
T_3	29629.63	227160.42	81970.80	271608.44	72194	203704	93444
T_4	37037.04	283950.49	102466.27	339515.00	102406	254630	112517
T_5	28444.45	273809.48	96427.80	324628.56	98487	244444	107970
T_6	32592.59	340740.71	109628.53	407403.44	120367	305556	132811
T_7	33333.33	425925.96	142588.60	509263.44	149521	381944	165694
SEm ($\pm$)	1880.80	3095.24	2470.59	6207.254	6277.4	10238.33	1795
CD (0.05)	5859.50	9508.96	7611.39	19128.097	19346.17	31547.46	5591
CV (%)	10.68	1.92	4.37	3.230	23.01	22.78	8.4

Table 76b. Tuber yield (t ha⁻¹) of cassava under high density planting (Season 1) recorded at different centres

Treatments	Peddapuram	Jagdarpur	Imphal	Dapoli	Thiruvananthapuram	Barapani	Bhubaneswar
T_1	35.11	16.56	22.50	43.97	23.9	37.08	43.7
T_2	42.14	21.54	22.85	32.40	52.2	31.3	45.9
T_3	36.49	22.44	26.09	36.45	34.7	29.67	40.2
T_4	35.65	20.43	31.88	50.40	42.7	37.78	46.1
T_5	35.08	20.92	28.12	56.28	44.4	27.89	48.2
T_6	26.60	25.19	33.38	47.64	37.2	35.89	42.0
T_7	23.06	27.28	32.73	55.09	41.3	35.28	42.3
SEm ($\pm$)	-	1.39	0.51	1.452	5.56	1.756	535
CD (0.05)	-	4.26	1.57	4.474	17.0	0.564	1.7
CV (%)	-	10.90	3.12	5.460	14.4	2.532	2.1

There were significant differences among treatments for the number of plantable stems obtained in all the centres. Among all the seven treatments, maximum number of plantable stems was recorded in treatment T₇ (60 cm x 60 cm) at Jagdalpur, Imphal, Dapoli, Thiruvananthapuram, Barapani and Bhubaneswar whereas, the number of plantable stems per ha was highest in T₄ (90 cm x 60 cm) at Peddapuram. (Table 76 a.) The results revealed that there are significant differences between the treatments for yield. At Peddapuram the number of tubers per plant

and the tuber yield were highest in T₂ (90 cm x 90 cm) followed by T₃ (90 cm x 75 cm). At Jagdalpur, higher yield 27.28 t ha⁻¹ observed with lesser spacing of (60 cm x 60 cm). At Imphal, maximum tuber yield per hectare was recorded in T₆ (75 cm x 60 cm) with 33.38 t ha⁻¹ which was on a par with T₇ (32.73 t ha⁻¹) and T₄ (31.88 t ha⁻¹). At Dapoli, the highest tuber yield was recorded by the treatment T₅ (56.28 t ha⁻¹) followed by treatment T₇. At Thiruvananthapuram, significant difference among the treatments observed for tuber yield which was the highest in T₇ (37.6 t ha⁻¹), and was on a par with T₃ and T₆.

Table 77. Economics of cassava under high density planting (Season 1) at different centres

Treatments	Peddapuram		Jagdalpur		Imphal		Dapoli		Thiruvananthapuram		Barapani		Bhubaneswar	
	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio
T ₁	42055.12	1.23	165791	2.01	328639	2.71	1034220	3.92	382110	5.0	386400	2.28	334500	4.26
T ₂	132090.51	1.79	241986	2.99	344871	3.07	801795	3.68	949650	11.1	301500	1.79	356200	4.46
T ₃	80281.68	1.43	253021	3.02	394768	3.11	930003	3.72	597185	7.2	273360	1.59	300700	3.98
T ₄	6731.16	1.03	219256	2.51	488284	3.27	1254090	3.90	753480	8.5	388560	2.18	359800	4.54
T ₅	5270.91	1.02	227221	2.62	417199	2.87	1330648	4.00	788220	8.9	243460	1.39	380100	4.71
T ₆	-79362.35	0.69	286846	3.16	496120	2.89	1298968	3.77	639780	7.1	356230	1.96	322900	4.33
T ₇	-141866.64	0.52	312776	3.24	449746	2.20	1561022	3.79	716225	7.5	342428	1.83	323800	4.25

The net income and B:C ratio was also recorded at different centres. At Peddapuram and Thiruvananthapuram T₂ (90 cm x 90 cm) recorded highest B:C ratio (1.79 and 11.1, respectively) and T₇ (3.24) at Jagdalpur and at Dapoli treatment T₅ has recorded highest B:C ratio (4.00) followed by T₁ (3.92). At Bhubaneswar the net income (₹ 380100) and B:C ratio (4.71) was found highest in the treatment T₅.

III.3. High density planting in cassava (Season 2)

Table 78. Number of plantable stems of cassava observed at different centres under high density planting

Treatments	Number of plantable stems (ha ⁻¹)		
	Yethapur	Barapani	Kalyani
T ₁	25389	115741	12887
T ₂	22614	102881	10114
T ₃	23367	128395	13687
T ₄	28195	172840	16952
T ₅	25987	118519	15578
T ₆	30102	133333	17962
T ₇	36211	166667	24183
SEm (±)	83.72	4528.12	1414
CD (0.05)	236.81	11245.32	4256
CV (%)	13.66	22.84	23.78

The trial on high density planting in cassava at nine centres with seven treatments of closer spacing (T₁- 120 x

60 cm, T₂ - 90 x 90 cm, T₃- 90 x 75 cm, T₄- 90 x 60 cm, T₅- 75 x 75 cm, T₆ - 75 x 60 cm and T₇ - 60 x 60 cm) and observation on yield attributes and number of plantable stems were recorded.

Table 79. Tuber yield of cassava observed at different centres under high density planting

Treatments	Tuber yield (t ha ⁻¹)		
	Yethapur	Barapani	Kalyani
T ₁	42.02	29.20	27.65
T ₂	45.89	30.62	29.32
T ₃	40.76	31.67	32.19
T ₄	38.54	35.33	42.33
T ₅	36.70	27.96	41.79
T ₆	31.27	30.48	40.54
T ₇	28.03	27.11	35.11
SEm (±)	1.49	0.48	1.55
CD (0.05)	3.97	1.26	4.68
CV (%)	12.82	2.52	12.84

The observed data on plantable stems, yield and economics are given in Table 78 -80. At Yethapur centre, T₂ (90 x 90 cm) spacing recorded maximum tuber yield of 45.89 t ha⁻¹. The lowest tuber yield (28.03 t ha⁻¹) and maximum number of plantable stems per hectare (36211) was recorded in T₇ with 60 x 60 cm spacing. The maximum (5.30) and minimum (3.04) B:C ratio was

Table 80. Economics of cassava under high density planting (Season 2) at different centres

Treatments	Yethapur		Barapani		Kalyani	
	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio
T ₁	349960	4.84	268200	1.58	150150	1.99
T ₂	390995	5.30	291300	1.73	169500	2.46
T ₃	336370	4.67	303360	1.77	170760	2.16
T ₄	312245	4.38	351810	1.97	223680	2.76
T ₅	292205	4.14	244510	1.40	220110	2.85
T ₆	234119	3.48	275080	1.51	221100	2.63
T ₇	197455	3.04	219878	1.18	195060	2.27

obtained in T₂ with 90 x 90 cm and T₇ with 60 x 60 cm spacing, respectively. At Kalyani, the highest number of stems were recorded in T₇ (24183 ha⁻¹) and the highest tuber yield of 42.33 t ha⁻¹ was recorded in T₄. The highest B:C ratio was recorded in T₅ at (2.85). The trial is in progress at Peddapuram, Jagdalpur, Imphal, Dapoli, Bhubaneswar and Thiruvananthapuram centres.

III.4. High density planting in elephant foot yam (Season 1)

The trial on high density planting in cassava is proposed at eight centres, seven treatments of closer spacing (T₁- 120 x 60 cm, T₂ - 90 x 90 cm, T₃ - 90 x 75 cm, T₄ - 90 x 60 cm, T₅- 75 x 75 cm, T₆ - 75 x 60 cm and T₇ - 60 x 60 cm) and observation on seed tuber yield and economics were recorded.

Table 81. Seed tuber yield (t ha⁻¹) of different treatments under high density planting in elephant foot yam (Season 1) at different centres

Treatments	Coimbatore	Kovvur	Rajendranagar	Dharwad	Bhubaneswar	Navsari	Jagdalpur	Thiruvananthapuram
T ₁	11.7	12.62	10.85	36.71	38.9	13.89	10.52	31.39
T ₂	19.5	21.47	10.27	34.98	37.2	13.44	10.52	31.48
T ₃	21.0	17.09	12.34	34.27	36.5	14.49	10.16	34.67
T ₄	22.1	18.52	14.38	37.73	39.9	16.26	10.45	39.63
T ₅	25.1	15.88	16.54	37.83	40.0	16.11	8.95	37.09
T ₆	27.6	18.05	12.52	42.71	44.8	20.59	14.86	42.52
T ₇	33.9	19.32	12.35	46.51	48.4	23.15	17.75	44.72
SEm (±)	0.07	3.19	0.85	1.65	0.56	0.82	0.61	0.79
CD (0.05)	0.18	1.03	2.62	5.09	1.7	2.54	1.87	2.47
CV (%)	4.54	10.10	11.55	7.40	2.4	8.47	8.87	3.68

Table 82. Economics of elephant foot yam under high density planting (season 1) at different centres

Treatments	Kovvur		Dharwad		Navsari		Bhubaneswar		Jagdalpur		Thiruvananthapuram		Rajendranagar	
	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio
T ₁	108109.24	0.88	415300	2.30	561463	2.34	447300	2.35	520181	2.11	391455.70	2.14	561600	2.86
T ₂	276898.42	2.14	407700	2.40	598541	2.86	439800	2.45	637681	2.78	401123.00	2.25	477750	2.60
T ₃	197553.63	1.56	356500	2.08	658727	2.67	388300	2.14	638881	2.47	450480.10	2.26	656750	3.15
T ₄	222761.03	1.75	364400	1.93	757015	2.50	396100	1.99	825381	2.69	504098.40	2.22	715000	3.19
T ₅	154599.16	1.24	385300	2.04	732650	2.51	417500	2.09	578581	1.95	454226.20	2.14	795500	3.39
T ₆	207053.40	1.63	407800	1.91	928302	2.59	437000	2.00	900781	2.56	530634.90	2.13	574500	2.60
T ₇	229580.74	1.80	395900	1.74	1030618	2.33	421400	1.77	1017581	2.41	531001.60	1.96	605250	2.55

Among all the treatments, the treatment T₇ (60 x 60 cm) was found producing significantly high seed tuber yield at Coimbatore, Dharwad, Bhubaneswar, Navsari,

Jagdalpur and Thiruvananthapuram followed by T₆ (75 x 60 cm). At Kovvur, highest seed tuber yield was recorded in T₂ (21.47) followed by T₇ (19.32) which was on par

with T_4 and T_6 . At Rajendranagar, among the treatments, maximum seed tuber yield (16.54) was recorded in T_5 (75 x 75 cm). At Kovvur, among all the treatments, highest seed tuber yield was recorded in T_2 (21.47). Similarly, the highest net income and B:C ratio was recorded in T_2 followed by T_7 . At UHS, Dharwad net profit and B:C ratio was found with the treatment T_2 . At NAU, Navsari, the treatment T_7 gave higher seed corm yield (23.15 t ha⁻¹) with higher net income among other treatments. At Bhubaneswar, maximum net profit (₹ 447300) and B:C ratio (2.45) was found higher with the treatment T_1 and T_2 respectively (Table 82).

At IGKV, Jagdalpur highest B:C ratio of 2.78 was recorded in T_2 . At ICAR-CTCRI, Thiruvananthapuram the treatment T_7 observed higher tuber yield per ha at (44.72), due to its higher plant population, and was statistically on par with T_6 .

III.5. High density planting in elephant foot yam (Season 2)

The trial on high density planting in elephant foot yam is

Table 84. Economics of elephant foot yam under high density planting (season 1) at different centres

Treatments	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio	Net income (₹ ha ⁻¹)	B:C ratio
T_1	419340	2.41	932500	2.35	152200	1.4
T_2	486680	2.79	1032652	2.83	163440	1.3
T_3	563620	2.82	1001107	2.40	248700	1.9
T_4	574610	2.54	1625202	3.23	348797	2.5
T_5	575500	2.60	1207137	2.50	328960	2.3
T_6	536930	2.22	1230040	2.11	240545	1.6
T_7	469670	1.91	1267984	1.80	184200	1.2

The data observed at Kalyani, Port Blair & Lembucherra is given in the Table 83 & Table 84. At Kalyani, the highest corm yield of 49.17 t ha⁻¹ was recorded in T_7 with a spacing of 90 cm × 60 cm closely followed by 48.77 t ha⁻¹ in T_6 with a spacing of 60 cm × 60 cm, whereas, the highest B:C ratio of 2.82 were recorded in T_3 with a spacing of 90 cm × 75 cm. At ICAR-CIARI, Port Blair, the highest corm yield (48.77 t ha⁻¹) was resulted with plant density of 90 x 60 cm (T_4) followed by T_7 and T_6 which was on par with each other. Higher net income (₹ 1625202) and highest B:C ratio of 3.23 was recorded in T_4 (90 x 60 cm). At Lembucherra, high density planting of elephant foot yam with spacing of 90x60 cm (T_4) gave

proposed at fifteen centres, seven treatments of closer spacing (T_1 - 120 x 60 cm, T_2 - 90 x 90 cm, T_3 - 90 x 75 cm, T_4 - 90 x 60 cm, T_5 - 75 x 75 cm, T_6 - 75 x 60 cm and T_7 - 60 x 60 cm) were tried and observation on seed tuber yield were recorded.

Table 83. Seed tuber yield & tuber yield of elephant foot yam under high density planting (season 2) at different centres

Treatments	Seed corm yield (t ha ⁻¹)		Corm yield (t ha ⁻¹)		
	Kalyani	Port Blair	Kalyani	Port Blair	Lembucherra
T_1	35.83	21.62	35.83	27.41	21.6
T_2	37.90	24.84	37.90	28.81	24.5
T_3	43.70	21.78	43.70	29.23	31.5
T_4	47.41	34.54	47.41	43.89	40.6
T_5	46.76	27.52	46.76	34.84	39.5
T_6	48.77	30.98	48.77	37.41	32.5
T_7	49.17	30.13	49.17	40.65	28.6
SEm (±)	1.06	2.107	1.06	2.103	3.0
CD (0.05)	3.16	6.492	3.16	6.48	19.5
CV (%)	9.46	13.35	9.46	10.53	21.6

highest yield 40.6 t ha⁻¹ and highest B:C ratio (2.5). (Table 84)

The trial is in progress at Coimbatore, Kovvur, Rajendranagar, Dholi, Ranchi, Palampur, Dharwad, Thiruvananthapuram, Bhubaneswar, Navsari, Dapoli and Jagdalpur.

III.6. High density planting in greater yam (Season 1)

The trial on high density planting in greater yam is proposed at seven centres, seven treatments of closer spacing (T_1 - 120 x 60 cm, T_2 - 90 x 90 cm, T_3 - 90 x 75 cm, T_4 - 90 x 60 cm, T_5 - 75 x 75 cm, T_6 - 75 x 60 cm and T_7 - 60 x 60 cm) and observation on yield attributes and seed tuber yield were recorded.

Table 85. Seed tuber yield ($t\ ha^{-1}$) of greater yam under high density planting (season 1) at different centres

Treatments	Bhubaneswar	Udaipur	Jagdalpur	Kovvur	Thiruvananthapuram	Navsari
T ₁	36.4	5.77	8.00	15.02	28.01	7.54
T ₂	33.8	6.67	8.77	28.75	26.54	9.11
T ₃	35.6	5.32	9.47	22.03	23.41	7.96
T ₄	34.8	6.04	8.42	23.83	32.47	10.17
T ₅	35.8	6.35	11.05	26.17	31.82	9.47
T ₆	38.6	8.11	10.25	26.16	35.04	14.82
T ₇	43.4	7.82	11.87	26.24	44.44	14.96
SEm ($\pm$)	0.45	0.09	0.43	2.04	3.25	0.93
CD (0.05)	1.4	0.25	1.32	6.34	10.03	2.85
CV (%)	2.1	2.19	7.7	14.68	14.8	15.17

Among all the seven treatments, higher seed tuber yield was recorded in treatment T₇ (60 x 60 cm) at Jagdalpur, Navsari, Bhubaneswar, Thiruvananthapuram centres whereas at Kovvur the seed tuber yield per ha was

highest in T₂ (28.75 $t\ ha^{-1}$). At Udaipur higher seed tuberyield was recorded in treatment T₆ (8.11 $t\ ha^{-1}$). (Table 85)

Table 86. Economics of greater yam under high density planting (season 1) at different centres

Treatments	Net income (₹ ha^{-1})	B:C ratio	Net income (₹ ha^{-1})	B:C ratio	Net income (₹ ha^{-1})	B:C ratio	Net income (₹ ha^{-1})	B:C ratio	Net income (₹ ha^{-1})	B:C ratio	Net income (₹ ha^{-1})	B:C ratio
T ₁	343200	2.70	476400	2.19	269805	1.76	30609	0.31	1084520	4.43	407999	1.81
T ₂	317300	2.67	601200	2.98	315555	2.18	146043	1.50	1026450	4.42	521333	2.59
T ₃	325800	2.57	442100	2.93	336555	2.11	91418	0.94	845260	3.60	418479	1.84
T ₄	295700	2.31	570700	2.94	297555	1.65	110876	1.14	1261220	4.48	523334	1.96
T ₅	313200	2.40	540800	2.10	368555	2.08	127357	1.31	1236130	4.48	545936	2.10
T ₆	327800	2.30	725550	2.40	324055	1.61	118046	1.21	1352680	4.39	904988	2.95
T ₇	358900	2.23	682000	1.91	351055	1.48	132152	1.35	1767130	4.88	792204	2.16

At Bhubaneswar, the treatment T₇ recorded maximum net income. The B:C ratio was found higher with the treatment T₁ (Table 87). At Jagdalpur, highest B:C ratio observed in T₂ (2.18). At Kovvur, the highest net profit and B:C ratio was recorded in T₂ followed by T₇. At Thiruvananthapuram, net income and B:C ratio was higher for T₇ at all the stages of harvest, with the highest value at 10 MAP. At Navsari, treatment T₆ (75 x 60 cm) spacing gave higher net income among other treatments. At Imphal the experiment discontinued in season 1.

III.7. High density planting in greater yam (Season 2)

The trial on high density planting in greater yam is proposed at seven centres, seven treatments of closer spacing (T₁- 120 x 60 cm, T₂ - 90 x 90 cm, T₃ - 90 x 75 cm, T₄ - 90 x 60 cm, T₅ - 75 x 75 cm, T₆ - 75 x 60 cm and T₇ - 60 x 60 cm). The observation on yield attributes and seed tuber yield were recorded and the trial is in progress at Thiruvananthapuram, Bhubaneswar, Jagdalpur,

Udaipur, Kovvur, Imphal and Navsari centres.

III.8. Natural farming in taro (Season 1)

The experiment is proposed at seven centres to study the effect of natural farming in taro. The experiment was conducted in randomized block design with five replications. The crop was planted at 60 x 30 cm spacing. Observations on growth, yield parameters, soil chemical properties and economics were recorded.

T₁: Natural farming practices. Beejamrit (seed treatment for 2-3 hrs before planting) + Ghanjeevamrit (250 kg ha^{-1} as basal application in soil at planting) + Jeevamrit (500 l ha^{-1} at fortnightly intervals after sprouting), 2. Mulching with paddy straw, no weeding is recommended).

T₂:Organic farming (nutrient, pest & disease management by organic methods) (FYM @ 15 t ha^{-1} + green manuring to generate 15-20 t ha^{-1} of green matter in 45-60 days + neem cake @ 1.0 t ha^{-1} + ash @ 2.0 t ha^{-1} +

biofertilizers (*Azospirillum* @ 3 kg ha⁻¹, mycorrhiza @ 5 kg ha⁻¹ and phosphobacteria @ 3 kg ha⁻¹) & pest & disease management in organic mode)

management (FYM @ 12 t ha⁻¹ + NPK @ 80:25:100 kg ha⁻¹)

T₄: Absolute control (No FYM / fertilizers)

T₃: State POP practices for nutrient pest & disease

Table 87. Growth parameters under natural farming in taro (season 1) at different centres

Treatments	Bhubaneswar			Coimbatore			Barapani			Rajendranagar		
	Plant height (cm)	No of tillers	Leaf area	Plant height (cm)	No of tillers	Leaf area	Plant height (cm)	No of tillers	Leaf area	Plant height (cm)	No of tillers	Leaf area
T ₁	63	2.5	799	63.92	6.06	2.91	89.00	2.00	767.33	68.25	10	0.62
T ₂	53	2.1	637	54.53	3.65	2.71	115.67	1.33	749.33	70.16	12	0.67
T ₃	58	2.4	715	60.56	3.89	1.87	99.67	1.33	819.00	77.57	18	0.78
T ₄	43	1.3	455	50.29	3.01	1.97	75.33	1.33	754.33	57.48	12	0.52
SEm (±)	0.8	0.11	40.5	0.65	0.01	0.05	3.58	0.41	24.95	4.40	2.20	0.06
CD (0.05)	2	0.3	126	1.99	0.44	0.16	11.25	1.35	81.37	14.34	7.17	0.20
CV (%)	3.2	11.8	13.9	2.24	6.93	4.58	3.02	46.88	5.56	11.01	28.71	15.19

Table 88. Yield attributes and economics under natural farming in taro (season 1) at different centres

Treatments	Bhubaneswar				Coimbatore			
	Cormel yield (t ha ⁻¹)	Total yield (t ha ⁻¹)	Net return (₹ ha ⁻¹)	B:C ratio	Cormel yield (t ha ⁻¹)	Total yield (t ha ⁻¹)	Net return (₹ ha ⁻¹)	B:C ratio
T ₁	12.10	15.68	138600	2.76	10.46	13.33	153330	2.35
T ₂	9.32	12.18	62300	1.59	9.08	11.41	92080	1.68
T ₃	9.63	12.42	71900	1.72	9.32	12.57	122280	1.95
T ₄	5.54	7.94	31200	1.41	6.33	7.07	35280	1.33
SEm (±)	0.352	0.402	5481	0.05	0.12	0.17		
CD (0.05)	1.10	1.25	17100	0.17	0.38	0.55		
CV (%)	8.6	7.5	16.0	6.5	2.71	3.07		

Table 89. Yield attributes and economics under natural farming in taro (season 1) at different centres

Treatments	Barapani				Rajendranagar			
	Cormel yield (t ha ⁻¹)	Total yield (t ha ⁻¹)	Net return (₹ ha ⁻¹)	B:C ratio	Cormel yield (t ha ⁻¹)	Total yield (t ha ⁻¹)	Net return (₹ ha ⁻¹)	B:C ratio
T ₁	11.79	18.19	258297	2.45	8.0	10.4	183315	2.42
T ₂	8.53	14.82	175587	1.45	8.4	10.9	170465	2.09
T ₃	12.95	21.70	307962	2.44	9.4	12.7	193642	2.03
T ₄	7.06	14.73	194636	1.95	6.1	8.2	97655	1.66
SEm (±)	1.07	2.19			0.72	1.06		
CD (0.05)	3.50	3.15			2.36	3.46		
CV (%)	16.33	19.84			15.33	16.88		

Table 90. Increase/decrease in nutrient status under natural farming in taro (season 1) at different centres

Treatments	Bhubaneswar					Coimbatore				
	N (kg ha ⁻¹)	P (kg ha ⁻¹)	K (kg ha ⁻¹)	OC (%)	pH	N (kg ha ⁻¹)	P (kg ha ⁻¹)	K (kg ha ⁻¹)	OC (%)	pH
T ₁	12	3.5	10	0.03	0.2	10	33.4	-36	0.03	0.14
T ₂	20	8	26	0.02	0.1	13	37.9	176	0.04	-0.06
T ₃	8	4.1	12	0.01	0.1	0	34	4	0.01	0.12
T ₄	-5	-2	-6	0	0	-10	27.9	-18	0	0.49

The observed data on growth parameters, yield attributes, economics and nutrient status of soil are given

in Table (88, 89a, 89b, 90). At TNAU, Coimbatore in the natural farming practices (T₁) the plant height is higher

than the other treatments with 63.92 cm, number of green leaves (18.35), number of tillers (6.06), leaf area (2.91) were also highest in T_1 . The natural farming practices recorded the highest net income (₹ 153330 ha^{-1}) and B:C ratio (2.35) followed by integrated crop management practices with a B:C ratio of 1.96 and it was on a par with state POP, which recorded B:C ratio of 1.95. At Bhubaneswar also the treatment natural farming practices T_1 was found superior with highest corm and cormel yield per ha, net returns and B:C ratio (Table 89a). At Rajendranagar, among the tested treatments in natural farming in taro, highest yield (12.7 t ha^{-1}) and net income of ₹ 193642, was found in state recommended POP, (T_3) compared to other treatments. At Barapani, the treatment T_3 (state recommend POP practices) was found producing higher yield, 21.70 t ha^{-1} but the net income and B:C ratio was on a par with natural farming practices. The trial is in progress at Kovvur centre. At Dapoli & Palampur the experiment was concluded during 2022.

III.9. Natural farming in taro (Season 2)

The trial on natural farming in taro is proposed at seven centres to study the effect of natural farming in taro. The experiment was conducted in randomized block design with five replications. The crop was planted at 60 x 30 cm spacing and observations on growth and yield parameters were recorded.

T_1 : Natural farming practices. Beejamrit (seed treatment for 2-3 hrs before planting) + Ghanjeevamrit (250 kg ha^{-1} as basal application in soil at planting) + Jeevamrit (500 l ha^{-1} at fortnightly intervals after sprouting) 2. Mulching with paddy straw, no weeding is recommended).

T_2 : Organic farming (nutrient, pest & disease management by organic methods) (FYM @ 15 t ha^{-1} + green manuring to generate 15-20 t ha^{-1} of green matter in 45-60 days + neem cake @ 1.0 t ha^{-1} + ash @ 2.0 t ha^{-1} + biofertilizers (*Azospirillum* @ 3 kg ha^{-1} , mycorrhiza @ 5 kg ha^{-1} and phosphobacteria @ 3 kg ha^{-1}) & pest & disease management in organic mode)

T_3 : State POP practices for nutrient pest & disease management (FYM @ 12 t ha^{-1} + NPK @ 80:25:100 kg ha^{-1})

T_4 : Absolute control (No FYM/ fertilizers)

Table 91. Growth parameters under natural farming in taro (season 2) at Palampur

Treatments	No. of tillers		Leaf area		Plant height (cm)	
	2 MAP	4 MAP	2 MAP	4 MAP	2MAP	4 MAP
T_1	75.64	57.64	3.28	2.8	725.76	618.36
T_2	70	58.76	2.96	2.84	583.4	703.64
T_3	62.28	48.32	2.52	2.84	575.88	492.24
T_4	64.2	50.88	3.12	2.4	495.44	412.67
SEm ($\pm$)	3.96	2.96	0.26	0.25	65.84	55.28
CD (0.05)	5.6	8.77	0.77	0.75	194.9	163.63
CV (%)	13.01	12.29	19.64	20.72	24.74	22.21

Table 92 . Yield and yield attributes & economics under natural farming in taro (season 2) at Palampur

Treatments	Total cormel yield (t ha^{-1})	Total yield (t ha^{-1})	Net income	B:C ratio
T_1	3.16	7.70	173065	2.40
T_2	1.28	4.53	113333	1.73
T_3	3.40	6.57	245679	2.20
T_4	1.79	4.25	42840	1.41
SEm ($\pm$)	0.21	0.33		
CD (0.05)	0.29	0.98		
CV (%)	24.90	64.21		

At CSKHPKV, Palampur the data was recorded at 2 and 4 MAP. The highest plant height was recorded in treatment T_1 at 2 MAP (75.64 cm) and T_2 at 4 MAP (58.76 cm). The highest total cormal yield (t ha^{-1}) and total yield (t ha^{-1}) of 3.40 and 7.70 was recorded, respectively in T_3 and T_1 . The highest B:C ratio was recorded in T_1 (2.40), Table 92. The trial is in progress at Bhubaneswar, Dapoli, Kovvur, Coimbatore, Barapani and Rajendranagar centres.

III.10. Millet intercropping in elephant foot yam (Season 1)

A new trial on millet intercropping in elephant foot yam was proposed to be taken up at eleven centres to study the effect of millet intercropping in elephant foot yam and observations on growth attributes and yield parameters were recorded.

The treatments consists of

T_1 : Elephant foot yam (*Amorphophallus paeoniifolius*)

T_2 : Jowar (*Sorghum bicolor*)

T_3 : Ragi (*Eleusine coracana*)

T_4 : Little millet (*Panicum sumatrense*)

T_5 : Elephant foot yam+ sorghum

T_6 : Elephant foot yam+ ragi

T_7 : Elephant foot yam+ little millet

Table 93. Growth parameters & yield attributes under intercropping of elephant foot yam with millets (season 1) at Tripura

Treatments	Plant height of EFY (cm)	Plant height of millets (cm)	EFY yield/ Plant (g)	Millet yield/ plant (g)	EFY yield/ plot (kg)	Millet yield/ plot (kg)	Millet yield ha ⁻¹ (q)	Tuber equivalent yield
T ₁	92.5	0	3000.0	0	108.0	0	350.5	0
T ₂	0	109.6	0	75.0	0	35.0	116.0	0
T ₃	0	60.5	0	62.0	0	32.5	110.0	0
T ₄	0	45.5	0	36.0	0	21.6	72.0	
T ₅	82.5	106.5	1.8	73.5	35.0	14.0	35.0	437.5
T ₆	85.4	55.5	2.0	59.5	25.5	8.5	30.5	381.3
T ₇	87.5	50.5	2.1	30.5	20.5	6.5	15.4	192.5

At Lembucherra, intercropping of elephant foot yam with millets showed that elephant foot yam with sorghum (T₅) performed better with tuber equivalent yield of 437.5 kg, followed by finger millet (381.3 kg). The trial is in progress at Rajendranagar, Jagdalpur, Dapoli, Dharwad, Dholi, Kovvur, Kalyani, Bhubaneswar, Udaipur and Ranchi Centres.

III.11. Standardization of nano urea application in cassava

A new trial on standardization of nano urea application in cassava was proposed to be taken up at three centres with the following treatments.

T₁: As per the PoP recommendation of the State

T₂: IFFCO Nano urea as foliar spray

T₃: 2% ordinary urea in two foliar sprays in place of 2 foliar sprays of nano urea

T₄: PoP (Treat. 1) + IFFCO nano urea foliar spray

T₅: PoP (Treat. 1) + Ordinary urea 2% as foliar

The trial is in progress at Peddapuram, Yethapur and Jorhat Centres.

III.12. Standardization of nano urea application in elephant foot yam

The trial on standardization of nano urea application in elephant foot yam was proposed to be taken up at ten centres with the following treatments and observations on growth characters, yield parameters and economics were recorded.

T₁: As per the PoP recommendation of the State

T₂: IFFCO Nano urea as foliar spray

T₃: 2% ordinary urea in two foliar sprays in place of 2 foliar sprays of nano urea

T₄: PoP (Treat 1) + IFFCO nano urea foliar spray

T₅: PoP (Treat 1) + urea 2% foliar spray T₁

Table 94. Morphological characteristics under standardization of nano urea application in EFY at Kalyani

Treatments	Plant height (cm)		Plant girth (cm)		Canopy spread (cm)		No. of leaflets	
	3 MAP	6 MAP	3 MAP	6 MAP	3 MAP	6 MAP	3 MAP	6 MAP
T ₁	129.12	141.83	14.03	15.08	119.00	131.83	207.33	320.33
T ₂	128.17	140.66	16.83	17.97	115.17	121.12	225.67	342.42
T ₃	107.19	119.16	16.01	16.77	110.67	118.07	256.67	291.17
T ₄	140.83	149.83	15.37	19.25	117.67	122.83	271.00	377.17
T ₅	135.27	145.33	18.02	18.75	112.17	116.14	255.12	311.17
SEm (±)	2.09	1.47	0.46	0.48	1.29	1.31	7.91	6.26
CD (0.05)	6.24	4.38	1.36	1.47	3.68	3.82	23.41	18.73
CV (%)	14.27	11.21	8.62	9.36	12.34	10.54	16.36	14.37

At Kalyani centre, significant variations in plant growth and yield were recorded among the treatments. The plant morphological parameters recorded upto 6 months showed variations among the treatments. The significantly highest yield of 41.24 t ha⁻¹ was recorded in T₄ followed by 39.82 t ha⁻¹ in T₂. Though the highest net

income of Rs. 488400/- was recorded in T₄, the highest B:C ratio of 2.51 was recorded in T₂. As this new trial could not be initiated in normal time of planting, it may be continued for 2nd year. The trial is in progress at Kalyani, Kovvur, Udaipur, Dholi, Palampur, Dapoli, Navsari, Ranchi, Coimbatore and Thiruvananthapuram Centres.

Table 95. Corm yield and economics under standardization of nano urea application in EFY at Kalyani

Treatments	Corm yield (t ha ⁻¹)	Cost of cultivation (₹)	Gross income (₹)	Net income (₹)	B:C ratio
T ₁	38.69	316300	773800	457500	2.44
T ₂	39.82	316700	796400	479700	2.51
T ₃	35.87	315800	717400	401600	2.27
T ₄	41.24	336400	824800	4,88,400	2.45
T ₅	34.31	326300	686200	359900	2.10
SEm (±)	0.78	712	22241	13813	-
CD (0.05)	2.31	2148	66700	41600	-
CV (%)	9.46	19.68	24.63	23.42	-

III.13. Integrated weed management in taro (Season 2)

The trial on integrated weed management in taro (Season 2) was conducted with the following set of treatments at ten centres. At nine centres, the experiment concluded in 2022 and in one centre the experiment conducted during 2023 with the following treatments and observations on yield attributes, and economics were recorded.

T₁: Early post emergence herbicide (20 DAP) + post emergence herbicide at 60 & 90 DAP

T₂: Early post emergence herbicide (20 DAP) + hand weeding at 60 and 90 DAP

T₃: Hand weeding at 30 DAP+ post emergence herbicide at 60 and 90 DAP

T₄: Sowing cow pea in interspaces and incorporation at 45 DAP+ post emergence herbicide at 90 DAP

T₅: Mulching with weed control ground cover mat (120 gsm)

T₆: Straw mulching in interspaces

T₇: Check-complete weed free (hand weeding at 30, 60 and 90 DAP)

T₈: Control (unweeded plot)

Table 96. Effect of different weed management practices on growth of taro & economics at Kovvur

Treatments	LAI (cm ²)	No of tillers	Cormel yield (t ha ⁻¹)	Total yield (Corm+cormel) t ha ⁻¹	Net returns ha ⁻¹ (₹)	B:C ratio
T ₁	6092.94	4.00	30.34	43.19	248922.64	5.41
T ₂	7933.21	4.40	34 .09	48.50	273110.08	5.02
T ₃	8339.91	4.00	31.59	44.43	254335.12	5.10
T ₄	6572.27	3.53	39.80	56.06	356279.52	7.34
T ₅	8049 .09	4.27	44.18	62.45	366423.20	5.60
T ₆	7322.74	5.47	37.85	53.22	333547.52	6.92
T ₇	7195.81	5.60	43.01	61.61	352974.00	5.41
T ₈	3742.88	3.43	25.64	34.72	199675.84	4.62
CD(0.05)	1710.13	1.48	10.54	12.49		
SEm (±)	558.40	0.48	3.44	4.08		
CV (%)	14.01	19.34	16.64	13.98		

The important weeds observed in the experimental area were – *Echinochloa colona*, *Coccinea grandis*, *Panicum varigatum*, *Alternanthera sessilis*, *Panicum ramosum*, *Sida acuta*, *Spirobohus coromandilianmus*, *Cleome viscosa*, *Phyllanthus neruri*, *Commalina bengalensis*, *Parthenium hysterophorus*, *Vernonia cinera*, *Euphorbia hirta*, *Tridax procumbens*, *Amaranthus viridis*, *Scoparia dulcis* and *Physalis minima*.

Table 97. Pooled mean for number of fingers/ plant under integrated weed management in taro at Kovvur

Treatments	Cormel yield (t ha ⁻¹)	Total yield (t ha ⁻¹) (Corm + cormel)
T ₁	30.337	43.187
T ₂	34 .09	48.5
T ₃	31.587	44.427
T ₄	39.797	56.06
T ₅	44.177	62.447
T ₆	37.847	53.223
T ₇	43.007	61.613
T ₈	25.643	34.717

At YSRHU, Kovvur, number of tillers was maximum in T_7 (5.60). The maximum cormel yield (44.18 t ha^{-1}) was recorded in T_5 followed by T_7 . However T_5 & T_4 has recorded highest net returns (₹ 366423.20) and B:C ratio (7.34). (Table 96)

III.14. Validation of customized fertilizers in taro (Season 2)

The trial on validation of customized fertilizers in taro proposed with 3 sets of treatments at six centres. At Dholi, Kalyani, and Bhubaneshwar and Jorhat centres

Table 98. Yield and economics under validation of customized fertilizers in taro (season 2) at different centres

Treatments	Rajendranagar				Kovvur			
	Yield of cormels (t ha^{-1})	Yield of corm (t ha^{-1})	Net income (₹)	B:C ratio	Cormel yield (t ha^{-1})	Corm yield (t ha^{-1})	Net income (₹)	B:C ratio
T_1	9.8	2.01	158615	2.17	39.16	32.02	308520.74	4.78
T_2	10.92	2.21	189065	2.36	33.74	28.82	209326.11	2.68
T_3	8.36	1.77	122455	1.95	16.04	15.52	49372.91	0.86
SEm ($\pm$)	1.26	3.91						
CD (0.05)	0.41	12.18						
CV (%)	11.20	7.24						

At Rajendranagar among three treatments tried, significantly higher cormel yield (10.92 t ha^{-1}), net income (₹ 189065) and B:C ratio (2.36) was recorded in T_2 . At Kovvur cormel yield was significantly higher (39.16 t ha^{-1}) with a net income and B:C ratio of ₹ 308520 and 4.78 under treatment T_1 . (Table 98)

Table 99. Increase/decrease in nutrient status of soil under validation of customized fertilizers in taro (season 2) at Rajendranagar

Treatments	N (kg ha^{-1})	P (kg ha^{-1})	K (kg ha^{-1})	OC (%)	pH
T_1	95	-2	77	0	-0.15
T_2	178	18	485	0.2	7.41
T_3	152	16	421	0.2	7.62

III.15. Validation of customized fertilizers in cassava (Season 2)

The trial on validation of customized fertilizers in cassava proposed with 3 sets of treatments at Peddapuram and Yethapur centres. At Yethapur centre, the experiment concluded in 2022 and in Peddapuram the experiment conducted during 2023 with the following treatments.

T_1 : Present recommendation as per POP

T_2 : FBMP (Soil application of customized fertilizer and foliar application of Micronol Cassava

the experiment was concluded in 2022 and in Rajendranagar and Kovvur the experiment conducted during 2023 with the following treatments.

T_1 : Present recommendation as per POP

T_2 : FBMP (Soil application of customized fertilizer and foliar application of micronol in taro).

T_3 : Absolute Control (No FYM/ fertilizer) and observations on yield attributes, soil chemical properties and economics were recorded.

T_3 : Absolute control (No FYM fertilizer) and observation on yield attributes, tuber quality, soil chemical properties and economics were recorded.

Table 100. Yield & economics of cassava under validation of customized fertilizers (season 2) at Peddapuram

Treatments	No. of tubers plant ⁻¹	Tuber yield (t ha^{-1})	Net income (₹)	B:C ratio
T_1	11.41	31.60	70042.81	1.67
T_2	9.16	34.47	96945.39	1.85
T_3	8.58	28.12	92552.99	2.16
CD (0.05)	1.65	6.27		
SEm ($\pm$)	0.47	1.78		
SE (d)	0.66	2.51		
CV (%)	9.64	11.26		

Table 101. Quality attributes of cassava under validation of customized fertilizers (season 2) at Peddapuram

Treatments	Dry matter (%)	Starch (%)	Sugars (%)	HCN (Score)
T_1	37.25	20.78	2.37	5.00
T_2	37.50	19.86	2.44	5.25
T_3	35.50	20.17	2.27	5.75
CD (0.05)	NS	NS	NS	NS
SEm ($\pm$)	2.20	1.55	0.16	0.25
SE (d)	3.12	2.20	0.23	0.35
CV (%)	11.99	15.33	13.49	9.38

The results revealed that there are non-significant differences between the treatments for quality parameters.

At Peddapuram, the results revealed that there is significant difference between the treatments for yield parameters. The total tuber yield per plant (2.79 kg) and per hectare (34.47 t ha⁻¹) was highest in T₂ (Customized fertilizer) followed by T₁ (Present recommendation as per POP). The B:C ratio was highest for T₃ (Control) followed by T₂ (customized fertilizers). (Table 100).

Table 102. Pooled data analysis of tuber yield under validation of customized fertilizers in cassava at Peddapuram

Treatments	Tuber yield (t ha ⁻¹)		Mean	Starch (% fw)	Average B:C ratio
	2021-22	2022-23			
T ₁	32.84	31.60	32.22	23.26	1.66
T ₂	30.56	34.47	32.51	22.44	1.63
T ₃	24.69	28.12	26.40	22.60	1.90
CD (0.05)	5.28	6.27	3.90	NS	-
SEm (±)	1.50	1.78	1.11	0.78	-
CV (%)	10.20	11.26	7.29	6.83	-

The results revealed that there are significant differences between the treatments for yield. The total tuber yield per hectare (32.51 t ha⁻¹) was highest in T₂ (customized fertilizer) followed by T₁ (Present recommendation as per POP).

Table 103. Increase/decrease in nutrient status of soil under validation of customized fertilizers in cassava at Peddapuram

Treatments	N (kg ha ⁻¹)	P (kg ha ⁻¹)	K (kg ha ⁻¹)	OC (%)	pH
T ₁	17	11	6.1	0.02	0.08
T ₂	11.6	4	6.5	0	-0.12
T ₃	-15.8	-4	-18.7	-0.02	-0.22

At Peddapuram, the treatment T₁ (11.6 & 4, respectively) recorded significantly higher increase in N and P content as compared to T₂ (17 & 11, respectively)

III.16. Validation of organic production technology in cassava (Season 2)

The trial on validation of organic farming in cassava is proposed to be conducted at Yethapur, Peddapuram & Jagdalpur centres with three treatments and observation on growth and yield attributes, tuber quality, soil chemical properties and economics were recorded. The treatment consists of

T₁: Conventional [Present package of practices (POP) recommendations]

T₂: Traditional (farmers' practice)

T₃: Organic- FYM @ 12.5 t ha⁻¹, *in situ* green manuring (normally produces green matter @ 15-20 t ha⁻¹), crop residue incorporation (generates dry biomass @ 3 t ha⁻¹), *Azospirillum* @ 3 kg ha⁻¹, phosphobacteria @ 3 kg ha⁻¹ and K solubilizer @ 3 kg ha⁻¹

Table 104. Growth, yield parameters and economics of cassava under validation of organic production technology (season 2) at different centres

Treatments	Peddapuram				Jagdalpur			
	Plant height (m)	Tuber yield (t ha ⁻¹)	Net returns (₹ ha ⁻¹)	B:C ratio	Plant height (m)	Tuber yield (t ha ⁻¹)	Net returns (₹ ha ⁻¹)	B:C ratio
T ₁	2.30	42.14	137972.26	2.28	196.58	23.16	145690.75	1.69
T ₂	2.08	39 .09	133333.82	2.25	235.20	26.91	184599.75	2.18
T ₃	1.70	33.87	114449.68	2.22	212.93	21.61	241610	2.90
SEm (±)	0.08	1.93	-	-	9.41	1.14	-	-
CD (0.05)	0.25	6.16	-	-	29.58	3.57	-	-
CV (%)	9.52	12.32	-	-	10.73	11.66	-	-

Table 105. Quality parameters of cassava under validation of organic production technology (season 2) at different centres

Treatments	Peddapuram				Jagdalpur			
	Dry matter (%)	Starch (% fw)	Sugars (% fw)	HCN (Score)	Dry matter (%)	Starch (% fw)	Sugars (% fw)	HCN (Score)
T ₁	41.00	24.59	2.50	6.67	33.17	26.73	-	-
T ₂	38.67	23.13	2.26	7.33	35.83	26.17	-	-
T ₃	37.67	24.04	2.47	6.83	35.65	24.57	-	-
SEm (±)	2.05	0.75	0 .09	0.18	-	-	-	-
SE (d)	2.89	1.06	0.12	NS	-	-	-	-
CV (%)	12.81	7.67	8.92	6.26	-	-	-	-

Table 106. Pooled data parameters of cassava under validation of organic production technology (season 2) at Peddapuram

Treatments	Tuber yield ha ⁻¹ (t)		Mean	Starch (% fw)	Average B:C ratio
	2021-22	2022-23			
T ₁	30.02	42.14	36.08	25.33	1.89
T ₂	29.80	39 .09	34.45	24.45	1.88
T ₃	25.26	33.87	29.57	24.76	1.86
CD (0.05)	3.42	6.16	4.28	N/A	-
SEm (±)	1.51	1.93	1.34	0.43	-
CV (%)	9.25	12.32	9.84	4.27	-

Table 107. Increase/ decrease in nutrient status of cassava under validation of organic production technology (season 2) at different centres

Treatments	Peddapuram					Jagdalpur				
	N (kg ha ⁻¹)	P (kg ha ⁻¹)	K (kg ha ⁻¹)	OC (%)	pH	N (kg ha ⁻¹)	P (kg ha ⁻¹)	K (kg ha ⁻¹)	OC (%)	pH
T ₁	11.6	-1	6.6	0.22	-0.17	15.7	2.3	10.8	0.11	-0.08
T ₂	7.2	6	-3	0.05	-0.34	21.9	4.2	11.9	0.12	-0.05
T ₃	25.6	24	25.4	0.08	0.05	16.9	3.6	13	0.18	-0 .07

At Dr. YSRHU, Peddapuram, the results revealed that there are significant differences between the treatments for growth and yield parameters. The tuber yield and B:C ratio was highest in T₁ (POP as per CTCRI) followed by

T₂ (POP as per centre). At Jagdalpur, the performance of growth and yield parameters was superior under T₂. The B:C ratio was highest for T₃(2.90).

IV. PEST AND DISEASE MANAGEMENT

IV.1. Management of mealy bugs in cassava (Season 1&2)

The trial was proposed at Peddapuram with the following treatments.

T₁: Imidacloprid 17.8 SL (0.6 ml l⁻¹)

T₂: Thiamethoxam 25 WG (0.6 g l⁻¹)

T₃: Dimethoate 30 EC (2 ml l⁻¹)

T₄: Neem oil: soap mixture @ (10:4) ml l⁻¹ followed by Neem oil @ 15 ml l⁻¹ after one week

T₅: 1:1:1 combination of neem oil:soap mixture @ (10:4) ml l⁻¹ and Imidacloprid 17.8 SL (0.6 ml l⁻¹)

T₆: Application of *Lecanicillium lecanii* ($\geq 10^8$ cfu g⁻¹) @ 5g l⁻¹

T₇: Farmer's practice (control)

A. Dr. YSRHU, Peddapuram

(Season 1)

Experiment was laid out at Peddapuram with seven treatments and three replications with variety Sree Reksha. Since mealy bug incidence could not be observed in the laid out experiment, treatment imposition were not taken. The experiment will continue in the next season.

(Season 2)

Experiment was laid out at Peddapuram with seven treatments and three replications with PDP CMR-1 variety. Since mealy bug incidence could not be observed in the laid out experiment, treatment imposition were not taken. It will be observed for three more months and the treatment imposition will be take up as and when observed the mealy bug incidence.

IV.2. Management of mealy bugs in elephant foot yam corms during storage (Season 2)

This trial was proposed to be taken up at Rajendranagar, Kovvur and Bhubaneswar with the following treatments. At Bhubaneswar, the experiment got concluded in 2022.

T₁: Imidacloprid 17.8 SL (0.6 ml l⁻¹)

T₂: Thiamethoxam 25 WG (0.6 g l⁻¹)

T₃: Salt (NaCl) solution @ 1000 ppm

T₄: Neem oil: soap mixture @ (10:4) ml l⁻¹ followed by Neem oil @ 15 ml l⁻¹ after one week

T₅: 1:1:1 combination of neem oil: soap mixture @ (10:4) ml l⁻¹ and Imidacloprid 17.8 SL (0.6 ml l⁻¹)

T₆: Cowdung slurry (2 kg l⁻¹)

T₇: Farmer's practice (control)

A. SKLTSHU, Rajendranagar

Mealy bug incidence was not observed during the period

B. Dr. YSRHU, Kovvur

Table 108. Effect of different treatments on management of mealy bugs in elephant foot yam

Treatments	110 DAT*	120 DAT*
T ₁	0.00 (1.000)	0.00 (1.000)
T ₂	0.037 (1.018)	0.037 (1.018)
T ₃	0.037 (1.018)	0.037 (1.018)
T ₄	0.183 (1.082)	0.667 (1.276)
T ₅	1.553 (1.460)	2.443 (1.749)
T ₆	0.037 (1.018)	0.627 (1.271)
T ₇	3.737 (2.150)	13.703 (3.801)
SEm (±)	0.188	0.222
CD (0.05)	0.585	0.691
CV (%)	26.045	24.142

(Figures in the parenthesis are transformed values)

*DAT-Days after treatment

During the storage period, the mean number of mealy bugs was 3.74 per cm² and 13.70 per cm² in the control after 110 days and 120 days, respectively. In contrast, no mealy bugs were found in imidacloprid treatment till 120 days after treatment. The next effective treatments were thiomethoxam 25WG @ 0.6gm l⁻¹, common salt (NaCl) and cow dung slurry (2kg l⁻¹). After 110 days, the number of mealy bugs steadily increased as the storage period progressed. However, based on the appearance of mealy bugs in all the treatments the mean number of mealy bugs per cm² was significantly low when compared to control at 110 days and 120 days after treatment.

IV.3. Yield loss assessment in cassava due to cassava mosaic disease (Season 1)

This trial was proposed to be taken at nine centres with the following treatments. Except Barapani the experiment was concluded during 2022.

T₁: Plants showed symptom in two months

T₂: Plants showed symptom after 3 to 6 months

T₃: Asymptomatic plants (If not available, Scale 1 may be taken)

At Barapani, there was no infestation of cassava mosaic disease

IV.4. Yield loss assessment in cassava due to cassava mosaic disease (Season 2)

This trial was conducted at nine centres with the following treatments.

T₁: Plants showed symptom in two months

T₂: Plants showed symptom after 3 to 6 months

T₃: Asymptomatic plants (If not available, scale 1 may be taken)

At Jorhat, Ranchi, Imphal and Barapani, no incidence of cassava mosaic disease was observed through the growing season of cassava, and hence observations were not taken. The trial is in progress at Dapoli and Peddapuram. At Jagdalpur, yield loss of only 3.81 % was noticed in T₁ compared to T₃. (Table 109).

Table 109. Yield loss assessment in cassava due to cassava mosaic disease at Jagdalpur centre

Treatments	*Yield per plant (kg)			Average yield	Yield per ha (t ha ⁻¹)	Yield loss (%)
	R1	R2	R3			
T ₁ (2 months)	1.47	1.50	1.57	1.51	18.68	3.81 %
T ₂ (3-6 months)	-	-	-	-	-	-
T ₃ (Asymptomatic)	1.53	1.58	1.61	1.57	19.42	-

* Average of 20 plants

*Note: In T₁ treatment observation were taken in 20 cassava plants but symptoms observed only in 4 plants. No CMD symptom observed in T₂ treatment. At TNAU-TCRS, Yethapur, among the different treatments T₂ (plants shows symptoms in 3-6 months) recorded highest per plant yield and yield per hectare (3.69 kg and 39.65 t ha⁻¹) for variety Thailand white and (4.01 kg and 41.79 t ha⁻¹) for variety H 226 . (Table 110a and 110b). No CMD symptom observed in T₃ treatment.

Table 110a. Yield loss assessment in cassava due to cassava mosaic disease at Yethapur centre

Variety: Thailand white					
Treatments	R1	R2	R3	Average yield (kg plant ⁻¹)	Yield (t ha ⁻¹)
T ₁	3.14	2.90	3.40	3.15	30.22
T ₂	3.71	3.20	4.15	3.69	39.65

Table 110b. Yield loss assessment in cassava due to cassava mosaic disease at Yethapur centre

Variety: H 226					
Treatment	R1	R2	R3	Average yield (kg plant ⁻¹)	Yield (t ha ⁻¹)
T ₁	3.45	3.11	3.90	3.49	32.42
T ₂	4.22	3.98	3.83	4.01	41.79

UHS, Dharwad, among the different treatments T₁ (plants shows symptoms in two months) recorded lowest average per plant yield and yield per hectare among the different treatments T₁ (plants shows symptoms in two months) recorded lowest average per plant yield and yield per hectare (1.67 kg and 20.59 t ha⁻¹), followed by T₂ (plants shows symptoms in 3-6 months) (1.88 kg and 23.16 t ha⁻¹), while highest per plant yield and yield per hectare (2.29 kg and 28.23 t ha⁻¹) was recorded in T₃ (Asymptomatic plants). Highest per cent loss in yield ha⁻¹ of 27 July was recorded in plants showing symptoms in two months (Table 111).

Table 111. Yield loss assessment in cassava due to cassava mosaic disease at Dharwad centre

Treatments	*Yield per plant (kg)			Average yield	Yield (t ha ⁻¹)	Per cent yield loss (ha ⁻¹)
	R1	R2	R3			
T ₁	1.78	1.63	1.59	1.67	20.59	27.07
T ₂	1.99	1.85	1.79	1.88	23.16	17.95
T ₃	2.29	2.08	2.49	2.29	28.23	-

*Average of 20 plants

IV.5. Yield loss assessment in elephant foot yam due to collar rot disease

This trial was conducted at ten centres and the following observations were taken

Every month record the no. of diseased plants from each field, calculate disease incidence.

Take the yield of ten damaged plants individually (plants showing symptoms from 5th month onwards) Observe yield individually for ten healthy plants during

harvest and calculate yield loss in each category (monthly diseased plants) per hectare compared to control and express in rupees.

A. BCKV, Kalyani

Moderate incidence of collar rot in elephant foot yam plants with an average of 14.19% was observed in July followed by 19.02% in August, 26.80% in September and 31.99% in October. Significant reduction in corm

yield per plant was observed due to collar rot infection. The percent yield loss varied from 34.23% in July after 5 months of planting to 18.82% in October after 8 months of planting.

The result showed that the infection of collar rot in elephant foot yam at the early stage of the crop caused the highest reduction in corm size, and the incidence of collar rot was high during September-October due to heavy rain in West Bengal situation.

Table 112. Yield loss assessment in elephant foot yam due to collar rot disease at Kalyani centre

No. of diseased plants in each month																																	
	Field 1 (Total plants=124)										Field 2 (Total plants=108)										Field 3 (Total plants=115)												
Months	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10			
July							11										22										19						
Aug								18										24										24					
Sept									31										29										33				
Oct										33										36										42			

Table 113. Yield loss assessment in elephant foot yam collar rot infected plants from 5th month onwards

Infected plants	5 m	6 m	7 m	8 m
10 plants	1.21	1.85	2.47	2.99

B. ICAR-CIARI, Port Blair

Table 114. Yield loss assessment in elephant foot yam due to collar rot disease at Port Blair centre

Locations	Field	Disease incidence (%)			Average yield of infected plants (kg)			Average yield of healthy plants (kg)		Yield loss (%) per plant basis		
		5 m	6 m	7 m	5 m	6 m	7 m	At harvest		5 m	6 m	7 m
Maccaphar		4	3	2	0.64	0.92	1.3	2.85		70.15	66	53.7
Beodnabad	1	1	1	2.2	0.57	1.1	125	2.8		71.5	61.5	52.1
Burmanallah	2	1	1	2	-	0.95	1.72	2.97		70.5	51.2	48.5
Average	3	2.00	1.67	2.07	0.61	0.99	42.67	2.87		70.72	59.57	51.43

Table 115. Yield loss assessment in elephant foot yam due to collar rot disease from 5th months onwards

Months at which the disease observed	Disease incidence (%)	No. of plants affected/ha	Average yield of healthy plants (kg)	Estimated yield (t ha ⁻¹)	Estimated yield to be obtained due to disease (t ha ⁻¹)	Estimated yield loss per ha basis (t ha ⁻¹)	Expected loss in revenue (₹)
May	2.0	263	2.87	36.8	35.5	0.65	32500
June	1.8	238			36.75	0.39	19500
July	2.5	345			36.45	0.49	24500

Yield loss assessment studies were conducted at three locations in South Andaman district. The incidence of collar rot ranged from 1.8 to 2.5% at 5 to 7th month of planting and the number of infected plants ranged from 238 to 345/ ha. The estimated yield loss due to the incidence of collar rot ranged from 0.39 to 0.65 (t ha⁻¹) which in turn resulted in the loss of income from ₹ 19500 to ₹ 32500 per ha basis.

C. ICAR-RC, NEH, Lembucherra

Elephant foot yam is cultivated in Tripura during April to December. Collar rot is a major problem under the tropical climate of Tripura and loss in terms of yield and income has been recorded. Disease incidence under Tripura ranges from 0.70% in May to 10.3% in December. Average yield was recorded 3.6 kg/plant in

healthy plants and 2.4 kg/ plant in infected plant at final harvest stage in December which accounted to around 34.7 % yield loss.

Table 116. Yield loss assessment in elephant foot yam due to collar rot disease from 8th month onwards

Months	Yield of infected plants (kg plant ⁻¹)	Yield of healthy plants (kg plant ⁻¹)	Yield loss (%)
Aug.	0.20	0.47	52.30
Sept.	0.56	1.45	60.2
Oct.	1.25	2.20	35.3
Nov.	1.55	2.67	36.5
Dec.	2.4	3.6	34.7
SEm (±)	0.04	0.02	0.03
CD (0.05)	0.4	0.16	2.6
CV (%)	14.3	16.5	19.4

Table 117. Collar rot infection and disease incidence on elephant foot yam at Lembucherra centre

Months	No. of infected plants/ plot of 200 plants	Disease incidence
May	0.62	0.70
June	1.45	1.88
July	3.75	3.24
Aug.	6.45	4.65
Sept.	9.35	6.80
Oct.	12.9	7.8
Nov.	15.5	7.4
Dec.	19.5	10.3
SEm (±)	0.04	0.02
CD (0.05)	1.1	0.8
CV (%)	16.5	14.4

Table 118. Yield and monetary loss due to collar rot of elephant foot yam at Tripura

Months	Yield (kg plant ⁻¹)	Yield (t ha ⁻¹)	Yield loss (t ha ⁻¹)	Value of total yield (₹)	Loss (₹ ha ⁻¹)
Aug.	0.12	1.25	30.5	20500	410000
Sept.	0.65	7.2	24.4	98300	332200
Oct.	1.5	10.4	25.7	159000	271500
Nov.	1.9	15.6	20.6	225000	205500
Dec.	2.6	20.5	16.7	293500	137000
Control (yield at harvest of healthy plants)	3.45	31.3	-	430500	-
SEm (±)	0.03	0.05	0.05	1.3	1.2
CD (0.05)	0.34	1.4	1.5	25.4	34.5
CV (%)	12.4	14.2	15.1	18.3	20.5

D. SKLTSHU, Rajendranagar

Table 119. No. of diseased plants in each month under yield loss assessment in elephant foot yam due to collar rot disease at Rajendranagar centre

Months	Field 1										Field 2										Field 3									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
PDI	1	7	18	46	72	82	85	86	88	90	-	3	12	38	55	60	72	74	76	80	-	5	18	38	55	60	72	74	77	82
	-	4	9	23	36	41	43	43	44	45	-	2	6	19	28	30	36	37	38	40	-	3	9	19	28	30	36	37	39	41

*Per Disease Incidence = No. of diseased plants/no of total plants (200 plants) *100

Table 120. Yield loss assessment in elephant foot yam due to collar rot disease from 5 month onwards

Average yield of infected plants in each month (A)						Average yield of healthy plants (B)						Per cent yield loss					
5	6	7	8	9	10	282.5						5	6	7	8	9	10
75.8	64.6	60.5	42.6	38.5	30.5							74.23	76.0	78.5	84.9	86.3	89.2

Studies on yield loss assessment in elephant yam against collar rot, upto 89.20 % yield loss recorded by collar rot in elephant yam.

E. TNAU, Coimbatore

Table 121. No. of diseased plants in each month under yield loss assessment in elephant foot yam due to collar rot disease at Coimbatore centre

No. of diseased plants in each month																													
Field 1										Field 2										Field 3									
1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
-	-	-	5.2	7.81	10.21	12.24	12.85	13.11	13.11	-	-	-	6.21	7.10	7.98	8.35	10.25	10.25	10.25	-	-	-	5.81	5.84	6.54	11.21	12.54	13.1	13.1
PDI										PDI										PDI									
5.78										6.90										6.46									

Three fields were selected for PDI calculation. In all the fields, collar rot observed after 4th month onwards. In the field no. 1 the PDI ranges at 4th month to 10th month is from 5.78 to 14.57, respectively.

In the field no. 2 the PDI ranges at 4th month to 10th month is from 6.90 to 11.39, respectively.

In the field no. 3 the PDI ranges at 4th month to 10th month is from 6.46 to 14.56, respectively.

All the fields, after 8th month there is no significant increase in the disease incidence.

The Experiment is under progress at Palampur, Udaipur, Ranchi, Dapoli, and Navsari. At Kovvur, Dholi and Jorhat no incidence of collar rot was observed.

Table 122. Yield loss assessment in elephant foot yam collar rot infected plants from 5th month onwards

Infected plants Plant 1	Rep 1 Yield (kg plant ⁻¹)	Rep 2 Yield (kg plant ⁻¹)	Rep 3 Yield (kg plant ⁻¹)
2	-	-	-
3	-	-	-
4	-	-	-
5	1.05	0.8	0.55
6	1.45	1.2	0.95
7	1.77	1.52	1.27
8	2.07	1.82	1.57
9	2.36	2.11	1.86
10	2.37	2.12	1.87
	1.05	0.8	0.55

Table 123. Yield loss assessment in elephant foot yam collar rot infected plants from 5th month onwards

Months	Average yield of infected plants in each month (A)	Average yield of healthy plants (B)	Per cent yield loss *	Total no. of infected plants	Disease incidence %
5	0.80	1.25	36.00	5.74	6.38
6	1.20	1.52	21.05	6.92	7.69
7	1.52	2.10	27.62	8.24	9.16
8	1.82	2.74	33.58	10.60	11.78
9	2.11	3.30	36.06	11.88	13.20
10	2.12	3.40	37.65	12.15	13.51

*Per cent yield loss $B-A(1)/B*100$

IV.6. Survey and surveillance of pests and diseases of root and tuber crops

Table 124. Per cent incidence of pest and diseases at different centres

Centre	Crop	Pests and disease	% incidence infestation	Period
Dr. BSKKV, Dapoli	Cassava	Cassava mosaic disease	10-20	July
	Sweet potato	Sweet potato weevil	30-40	November
	Yam spp.	Anthraxnose	2-30	October
	Taro	Leaf blight	3-40	September
ICAR-CIARI, Port Blair	Sweet potato	Weevil	23.0-26.0	October-December
	Greater yam	Anthraxnose	11.0-16.0	August-October
	Taro	Leaf blight	5.2-10.5	August-October
Dr. YSRHU, Kovvur	Elephant foot yam	Leaf blight	9	-
		Viral diseases	<5	-
	Taro	Leaf blight	5	-
		Dasheen mosaic disease	<5	-
IGKV, Jagdalpur	Elephant foot yam	Collar rot	27.50	-
	Taro	Leaf blight	36.67	-
ICAR RC NEH, Barapani	Sweet potato	Weevil	2-5	July-August
	Taro	Corm borer	20-40	July-August
		Taro leaf blight	60-80	July-September

-

MPUAT, Udaipur	Sweet potato	Weevil	< 12.0	
	Greater yam	Anthraxnose	10.00	-
	Elephant foot yam	Collar rot	13.0	-
	Taro	Leaf blight	16.0	-
SKLTSHU, Rajendranagar	Sweet potato	Cercospora leaf spot	3.5	-
		Weevil	21.8-52.38	-
		Mosaic virus	6.5-10.5	-
	Elephant foot yam	Mosaic	<10	-
		Tuber rot	58.65	-
		<i>Phytophthora</i> blight	22.5-57.66	-
	Taro	Tobacco caterpillar	5.6-10.45	-
		Aphid	8.5-12.38	-
UHS, Dharwad	Sweet potato	Pumpkin beetle	45	-
AAU, Jorhat	Cassava	Spider mite	3.6	August-November
		Scale insects	2.1	August-November
	Sweet potato	Sweet potato weevil	3.2	May-December
	Elephant foot yam	Collar rot	3.0	July-October
		Leaf blight	20.3	June-September
	Taro	Aphid	11.7	May-October
Dr. YSRHU Peddapuram,	Cassava	Cassava mosaic disease	100	Throughout season
		Leaf spot	15-20	August onwards
		White fly	40-50	July onwards
		Spiraling white fly	10-15	September onwards
		Red spider mite	80-90	October-December
		Mealybug	25-30	October-December
		Nematode	80-90	February-April
	Sweet potato	Sweet potato weevil	0-45	February -March
		Tortoise beetle	10-15	November-December
		Spiraling white fly	5-10	November-December
		Nematode	30-35	January-February
		Boron deficiency	20-25	February-March

The incidence of different pests and disease during the year and the percentage of infestation at different centres are summarized in Table 124. At ICAR-CIARI, Port Blair, low to moderate incidence of leaf blight in taro, anthracnose in greater yam and high incidence of Sweet potato weevil was observed. At Jagdalpur, taro blight (36.67 %) and collar rot in EFY (27.5%) were observed. In Tripura, incidence of aphid on *Colocasia* including swamp taro was major problem, apart from Sweet potato weevil. Among various diseases on tuber crops, leaf blight on taro and swamp taro, rhizome rot of swamp taro, collar rot of elephant foot yam and anthracnose on *Dioscorea* was mostly prevalent. At SKLTSHU, Rajendranagar sweet potato was found to be infested with Sweet potato weevil (*Cylas formicarius*). The infestation of tubers ranged from 21.8 to 52.38 % per cent and also *Cercospora* leaf spot (3.5%) and mosaic

incidence 6.5-10.5 % were also recorded. In *Colocasia*, the major diseases was *Phytophthora* blight and the incidence ranged from 22.5-57.66 %. In elephant foot yam, collar rot (58.65%) and also yam mosaic (10%) were observed.

At Dholi, Bihar, Sweet potato was found to be infested with Sweet potato weevil at collar region and tubers; however yam bean was found to be infested with yam bean pod borer at flowering and pod formation stages. There was no incidence of diseases in these crops. At the same time, taro was found to be infested with tobacco caterpillar and *phytophthora* leaf blight. Sweet potato was found to be affected with sweet potato latent virus (SPLV) whereas yam bean was found to be infected with bean common mosaic virus (BCMV) showing symptoms of stem splitting and leaf puckering. At the same time EFY was infected with *Alternaria* causing severe leaf

spots which later turned into blight and toppling down of the plant. Similarly Arvi (*Colocasia*) was also found to be severely infected with *Phytophthora colocasiae* causing blight in the plants. Other than fungal blight, the arvi plants were infected with bacterial blight which gave burnt appearance to the plants along with yellow hallows.

At TNAU, Coimbatore, 74 sweet potato entries are being maintained at Department of Vegetable Science, Coimbatore, and the germplasm was evaluated for the incidence of sweet potato weevil. Surveys were undertaken in the following tuber growing areas of Tamil Nadu viz., Coimbatore, Erode, Pollachi, Dindigul and Gobichettipalayam.

Table 125. Per cent incidence of sweet potato weevil in different places of Tamil Nadu

Name of the pest	Coimbatore	Pollachi	Dindigul
Sweet potato cultivar	CO 5	Local	Local
Cultivar Per cent incidence	12.80 %	11.22 %	15.22 %

Table 126. Disease incidence of taro leaf blight and EFY collar rot in different districts of Tamil Nadu

District/ Particular	Taro leaf blight (%)	EFY Collar rot (%)
Coimbatore	CO 1	CO 1
Per cent incidence	11.58 %	18.69 %
Thiruvannamalai	Local	-
Per cent incidence	15.24 %	-
Erode	-	CO 1
Per cent incidence	-	15.95 %
Gobichettipalayam	-	CO 1
Per cent incidence	-	11.71 %

At Yethapur, the 376 germplasm entries are evaluated for the incidence of cassava mosaic disease. All the entries had varied per cent of cassava mosaic disease incidence except Me 145, Me 211, Me 681, Me 713 and Me 859.

The occurrence of cassava mealybug and papaya mealybug was noticed in tapioca fields in Salem, Namakkal, Erode, Dharmapuri, Kallakuruchi, Perambalur and Trichy of Tamil Nadu. Among the cassava varieties, high level (38 to 69 %) of mealybug

infestation was recorded in White Thailand, Black Thailand, Mulluvadi and M4, moderate infestation (19 to 29 %) in Yethapur 1, Burma, Kunguma rose, Sree Jaya and Sree Athulya. Cassava mealybug infestation was maximum between August to November.

ICAR-National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru has imported a solitary CMB specific parasitoid, *Anagyrus lopezi* (Encyrtidae: Hymenoptera) and mass multiplied at TCRS, Yethapur free of cost. Mass production facility for CMB is being maintained at TCRS, Yethapur. CMB colonies were established on tapioca plants grown in screen net house / shade net house and the parasitoid was released and maintained. After 15 days, the cassava leaves harbouring the parasitised mealybugs were collected in plastic bins and covered with gadda cloth and transferred to laboratory. The emergence of parasitoids were monitored everyday and collected using aspirator. The collected parasitoids were supplied to cassava farmers on need basis (free of cost) everyday. Release of 100 parasitoids per acre during the presence of 3rd instar nymph or adult CMB. So far more than 650 farmers from 10 districts viz., Salem, Namakkal, Kallakurichi, Cuddalore, Tiruvannamalai, Dharmapuri, Erode, Karur, Tiruchy and Perambalur were supplied with around 65,000 parasitoids. The follow up was done in the *Anagyrus lopezi* released farmers field and the data revealed that there was more than 75% reduction in CMB population.

Red spider mite incidence was noticed during April to July months especially during the prolonged drought conditions. During the survey it has been observed that the severity of infestation (80 to 90%) was observed in White Thailand and Black Thailand varieties of cassava. Further M4, Mulluvadi 1 and H226 are moderately susceptible to the incidence of red spider mites. However, Sree Reksha, YTP 2, Sree Athulya, Sree Kaveri exhibit field tolerance to the red spider mite infestation.

V. RESEARCH-EXTENSION-FARMERS-LINKAGE

V.1. Integrated farming systems involving tuber crops in tribal areas

Farming system studies were carried out in tribal areas by different centres and the results are presented below.

A. BAU, Ranchi

Under the farming system studies different crop components, animal components and horticultural crops components have been tested in the fields of tribal farmers at Beyasi village of Chanhoo block of Ranchi district in Bihar.

B. ICAR-CIARI, Port Blair

The Nicobari tribal communities mainly rely on coconut, tuber crops, pigs and marine fisheries for their livelihood. The tribal farmers clear the forest area and cultivate crops in joint family system called, Tuhet. They mainly grow only Nicobar Aloo (greater yam) along with cassava and banana mainly for food in the traditional tuhet garden in addition to their existing coconut plantation. Community

based tuber crops-based farming system was demonstrated in the farmer's field at Harminder Bay, Little Andaman during 2023 in 0.3 ha model involving tuber crops, vegetables, fruits and spices integrated with piggery. Planting materials of tuber crops (elephant foot yam, taro, sweet potato), ginger and piglets were distributed to farmers. Regular trainings and field visits were organized to upgrade the farming skills of tribal farmers. Prior to interventions, the net income of the Tuhet was ₹ 70000 with a B:C ratio of 1.22. After intervention of tuber crops-based farming system the net income increased to ₹ 203770 with a B:C ratio of 2.29. The employment generation in the tuber crops-based farming system was 457 man days ha⁻¹ as compared to 240 man days ha⁻¹ in their traditional system. The detailed description of one hectare model in terms of area, yield, economics and generation of man days prior and after intervention are given in Tables 127, 128 and 129.

Table 127. Farming system involving tuber crops (0.3 ha model) prior to intervention (per ha basis) at Port Blair centre

Crop/other components	Area (ha)	Yield (kg)	Gross income (₹)	Expenditure involved (₹)	Net income (₹)	B:C ratio	Employment generation (man days)
Nicobari aloo	0.2	1650	82500	38000	44500	1.17	47
Cassava	0.1	1125	45000	19500	25500	1.31	25
Total	0.3	2725	127500	57500	70000	1.22	72

Employment generation: 240 man days ha⁻¹

Table 128. Farming system involving tuber crops (0.3 ha model) after intervention (per ha basis) at Port Blair centre

Crop/other components	Area (ha)	Yield (kg)	Gross income (₹)	Expenditure involved (₹)	Net income (₹)	B:C ratio	Employment generation (man days)
I. Crop component							
Nicobari aloo	0.10	1340	67000	24600	42400	1.72	20
Sweet potato	0.02	262	15720	6000	9720	1.62	10
Colocasia	0.04	620	31000	8500	22500	2.64	11
EFY	0.02	315	15750	5250	10500	2.00	10
Cassava	0.05	945	37800	10500	27300	2.60	16
Ginger	0.01	135	27000	8000	19000	2.37	13
Vegetables	0.03	290	17400	5250	12150	2.31	16
Banana	0.02	215	6450	2000	4450	2.22	05
Turmeric	0.01	110	11000	3500	7500	2.14	09
Total	0.30	4232	229120	73600	155520	2.11	110
II. Animal component							
Pig	3 no	255	63750	15500	48250	3.11	27
Grand Total	0.30	4487	292870	89100	203770	2.29	137

Employment generation: 457 man days ha⁻¹

Ginger- ₹ 200/kg, EFY- ₹ 50/kg, Colocasia and Nicobari aloo- ₹ 50/kg, Sweet potato- ₹ 60/kg, Cassava- ₹ 40/kg, Vegetables-60/kg, banana- ₹ 30/kg, Turmeric- ₹ 100/kg and Pork- ₹ 250/kg

Table 129. Economics of one hectare farming system involving tuber crops at Port Blair centre

Particulars	Prior to intervention (ha) basis	After intervention (ha) basis
Gross income (₹ ha ⁻¹)	425000	976233
Net income (₹ ha ⁻¹)	233330	679233
B:C ratio	1.22	2.29
Employment generation (man days ha ⁻¹)	240	457

CSKHPKV, Palampur

Farmer in the IFS system has undertaken planting of elephant foot yam and *Colocasia* in addition to livestock and poultry components (Table 130). Field observation and other records related to expenditure and returns have been maintained by the farmers. By the end of Rabi season, all the required observations will be recorded.

Table 130. Demonstrations under integrated farming systems at Palampur centre

Sl.No.	Title of demonstration	Date	Place
1	Elephant foot yam seed production technology	June 2023	Vill. Bari Majerwan, Tehsil Ghumarwin Distt. Bilaspur H.P.
2	Elephant foot yam seed production technology	June 2023	Vill. Bari Majerwan, Tehsil Ghumarwin Distt. Bilaspur H.P.
3	Scientific cultivation of <i>Colocasia</i>	June 2023	Vill Kothi Dobka Tehsil Jhandutta Distt. Bilaspur H.P.

V.2. Integrated farming systems involving tuber crops in NEH region

A. AAU, Jorhat

Various crops have been harvested including fish and tuber crops.

B. CAU, Imphal

Tuber crops based integrated farming system studies were conducted in 6 different villages (Huikap, Imphal West District; Nongdam, Imphal East District; Khukthar Village, Chandel District; Khurkhul, Imphal West District; Bishnupur ward no. 11, Bishnupur District and

Kakching Khunou, Kakching District), all the centres except Nongdam, Imphal East and Kakching khunou, Kakching district were discontinued. Planting materials of tuber crops like sweet potato, cassava, *Colocasia* and other vegetables seedlings along with three piglets and fifty chicks were provided to the farmers in each centre. A piggery sty and a poultry shed were also constructed in each centre. After the intervention, farmers could get their income providing employment throughout the year. (Table 131). At Nongdam, due to intervention the employment generation could increase from 177 to 533. The B:C ratio also drastically increased from 1.04 to 2.41 (Table 132).

Table 131. Farming system involving tuber crops at Nongdam before and after intervention at Imphal centre

Before intervention							
Crops/other components	Area (ha)	Yield (kg)	Gross income (₹)	Expenditure (₹)	Net income (₹)	B:C ratio	Employment generation
Potato	0.18	3000	45000	22000	23000	1.04	32
After intervention							
Crops/other components	Area (ha)	Yield (Kg)	Gross income (₹)	Expenditure (₹)	Net income (₹)	B:C ratio	Employment generation
Sweet potato	0.03	420	14700	4000	10700	2.68	12
Cassava	0 July	1260	25200	6700	18500	2.76	15
Pea	0.04	240	14400	3900	10500	2.69	17
Onion	0.04	400	12000	3450	8550	2.48	17
Piggery	0.0006	2 nos. pig	78000	20000	58000	2.90	20
Poultry	0.0015	+ 3 piglets	26250	13500	12750	0.94	15
Total	0.1821	30 birds	170550	51550	119000	2.41	96

Table 132. Economics on per hectare basis for IFS at Nongdam before and after intervention at Imphal centre

Intervention	Components	Gross income (₹)	Expenditure (₹)	Net income (₹)	B:C ratio	Employment generation
Before	Horti.	250000	122222	127777	1.04	177
After	Agri+Horti+Livestock	936573.3	283086.2	653487.1	2.41	533

Location: Kakching Khunou, Kakching District

Table 133. Farming system involving tuber crops at Kakching Khunou before and after intervention at Imphal

Before intervention							
Crops/other components	Area (ha)	Yield (kg)	Gross income (₹)	Expenditure (₹)	Net income (₹)	B:C ratio	Employment generation
Cabbage	0.12	1900	28500	11000	17500	1.59	25
After intervention							
Crops/other components	Area (ha)	Yield (kg)	Gross income (₹)	Expenditure (₹)	Net income (₹)	B:C ratio	Employment generation
Sweet potato	0.02	280	9800	2500	7300	2.92	9
Cassava	0.04	640	11520	2900	8620	2.97	14
Turmeric	0.02	260	5200	1400	3800	2.71	8
Cabbage	0.03	300	9000	2500	6500	2.60	8
Piggery	0.0006	2 pig+6 piglets	96000	18000	78000	4.33	17
Poultry	0.0015	20 birds	21875	10900	10975	1.01	10
Total	0.1121		153395	38200	115195	2.76	66
Economics on per hectare basis for IFS							
Intervention	Components		Gross income (₹)	Expenditure (₹)	Net income (₹)	B:C ratio	Employment generation
Before	Horti.		250000	91667	158333	1.73	208
After	Agri+Horti+Livestock		1368376	340767	1027609	2.76	589

C. ICAR RC NEH, Barapani

Tuber crops based farming system studies were initiated at Lumdiengngan village of Ribhoi district with an objective of integrating different components viz., animals, fish, vegetable, fruit and tuber crops for improving productivity in the farmers field. Prior to farming system studies, the total area of 0.50 ha was used for farming by Banlumlang V.O. Lumdiengngan with a

net income of ₹ 82,078. AICRP on Tuber Crops has made interventions in this village by providing demonstration and training on tuber crops production along with distribution of tuber crops, vegetable seeds, vermibed, jalkund sheet, shade net etc. to the farmers. After intervention the total area of 1.50 ha was used by Banlumlang V.O. Lumdiengngan, earning a net income of ₹ 478905 (Table 134).

Table 134. Farming system involving tuber crops at Lumdiengngan village before and after intervention at Barapani

Before intervention								
Crops/other components	Area (ha)	Yield (kg)	Selling rate (₹ kg ⁻¹)	Gross income (₹)	Expenditure (₹)	Net income (₹)	B:C ratio	Employment generation
Cassava	0.1	1500	25	37500	16845	20655	1.23	32
Ginger	0.2	2500	20	50000	15542	34458	2.22	50
French bean	0.1	1500	20	30000	11645	18355	1.58	28
Cabbage	0.1	1350	15	20250	11640	8610	0.74	28
Total	0.5	-	-	137750	55672	82078		138
After intervention								
Crops/other components	Area (ha)	Yield (kg)	Selling rate (₹ kg ⁻¹)	Gross income (₹)	Expenditure (₹)	Net income (₹)	B:C ratio	Employment generation
<i>Colocasia</i>	0.2	5210	20	104200	35000	69200	1.98	75
Sweet potato	0.3	7510	10	75100	22750	52350	2.30	50
Elephant foot yam	0.2	4800	20	96000	35000	61000	1.74	72
Tapioca	0.2	8815	10	88150	28600	59550	2.08	60
Ginger	0.2	5100	20	102000	23258	78742	3.39	50
French bean	0.2	2120	30	63600	11645	51955	4.46	55
Cabbage	0.1	3150	30	94500	11640	82860	7.12	28
Pineapple	0.1	1250	10	12500	6052	6448	1.07	20
Piggery	0.008	100	200	20000	8200	11800	1.44	22
Vermicompost	0.01	500	20	10000	5000	5000	1.00	20
Total	1.52	-	-	666050	187145	478905	2.46	452

D. ICAR-RC, NEH, Lembucherra

IFS model was demonstrated at the field of Shri Prasanta

Das of village, Damdamia, West Tripura. His total area is 0.70 ha, but before the intervention total area under

cultivation was only 0.60 ha. IFS model: Horti. with tuber crops + piggery + poultry + fishery + goat was introduced in his farm.

Cultivation of local low productive paddy (1.5 t ha^{-1}) and vegetables ($10\text{-}15 \text{ t ha}^{-1}$) were found to be non-profitable for the farmers. Meat production capacity of local breed Mali pig was only 55-65 kg/pig. Local poultry birds were less productive in terms of egg production (40-50 eggs/year). Fish production was only 80 kg in his pond. Resultantly, his net profit was ₹ 93500.00 with a B:C ratio of 1.4.

After intervention of improved technologies in the integrated farming system based on high yielding vegetables and livestock, productivity of vegetable crops was increased to 25 t ha^{-1} from 15 t ha^{-1} . Productivity and net income of other components also increased. Adoption of IFS technology increased his annual gross income to ₹ 304650.00 from ₹ 93500.00 with B:C ratio of 2.5. Cattles gave valuable organic manures and milk which augmented his income and overall productivity. Total man days generated was 150 days from 100 days.

Table 135. IFS at the field of Shri Prasanta Das, vill. Damdamia, West Tripura

Technological Intervention		Area (ha)		Production cost (₹)		Production (kg)		Gross profit (₹)		Net Profit (₹)		B:C	
Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Local variety	Gomati Rice (4.5 t/ha)	0.1	0.16	5000	9000	400	1200	8400	26400	3400	17400	0.7	1.9
Horticulture	HYV vegetables, Swamp Taro, lemon	0.3	0.32	30000	40000	5000	8000	75000	160000	45000	120000	1.5	3.0
Cattle (02 Nos.)	Cattle (2 Nos.)	0.01	0.01	9000	12000	450	650	22500	32500	13500	20500	1.5	1.7
Back yard poultry (05 Nos)	Poultry (40 Nos.)	0.01	0.01	1500	4500	15	50	3000	15000	1500	10500	1.0	2.3
Goat (01 Nos.)	Goat (3 Nos.)	0.01	0.01	2000	5000	8	25	5600	18750	3600	13750	1.8	2.8
Fish (Un scientific)	Fishery with composite culture)	0.16	0.16	8000	25000	80	450	20000	112500	12000	87500	1.5	3.5
Pig (01 Nos.)	Pigs (3Nos.)	0.01	0.01	8000	15000	150	250	22500	50000	14500	35000	1.8	2.3
Total		0.6	0.68	63500	201000	6103	10625	157000	415150	93500	304650	1.4	2.5

V.3. Popularization and demonstration of tuber crops technologies among scheduled caste farmers

A. BAU, Ranchi

Demonstration of different varieties and technologies were carried out for the scheduled caste farmers as shown in Table 136.

Table 136. OFTs/field level demonstrations and outreach programmes at Ranchi centre

Sl.No.	Crop & variety/ technology demonstrated	Number of demonstrations and duration	Area coverage (cents)	Place and Date	No. of beneficiaries (male/female/rural youth)
1	Performance of orange and purple fleshed sweet potato	1	400 m ² (10 cents)	June, 2023 Choreya, Chanhoo, Ranchi & Kunda and Lawalaung village of Chatra district	15
2	Impact of mulching in EFY	1	200 m ² (5 cents)	July 2023 Horeya, Chanhoo, Ranchi & Kunda and Lawalaung village of Chatra district	15

B. CAU, Imphal

Training programmes on scientific cultivation and value addition of tuber crops were organized as per the details given in table 137.

Table 137. Farmers training programmes/ field days/ exhibitions organized at Imphal centre

Sl.No.	Topic	Date	Place	No. of beneficiaries
1	Scientific cultivation and value addition of tuber crops	16 November 2023	Leimaram	37
2	Hands on training programme on processing and value addition of tuber crops	22 November 2023	Kakching Khunou Angom Leikai	40

C. CSKHPKV, Palampur

Distribution of inputs like pesticides, fungicides, fertilizers, traps and small farm implements, micronutrients etc. were carried out. (Table 138).

Table 138. Distribution of inputs to farmers by CSKHPKV, Palampur

Inputs	Place and Date	No. of beneficiaries (male/female/rural youth)
Seed materials of tuber crops (1000 kg), Turmeric (200 kg), Vegetable seeds (5.5 kg) and Vegetables (4400 no.) seedlings	15 March 2023 at KVK Berthin	200 (100/ 100)
Nano urea-25 litre	Vill. Berthin Tehsil Jhandutta Distt Bilaspur H.P.	50 (25/ 25)
Agricultural small equipment, Watering can (Sprinkler)	15 March 2023 at KVK Berthin	100 (50/ 50)
Mini poultry shed	Vill. Kothi Dobka Tehsil Ghumarwin Distt. Bilaspur H.P.	17 (14/ 3)

Table 139. OFTs/field level demonstrations and outreach programmes organized by CSKHPKV, Palampur

Crop & Variety / Technology etc. demonstrated	Number of demonstrations and duration	Area coverage (cents)	Place and Date	No. of beneficiaries (male/female/rural youth)
Scientific seed production of elephant foot yam	4	75.01	Vill. Bari Majerwan, Dangar, Teh Ghumarwin Distt. Bilaspur, V.P.O. Fagog Tehsil Jhandutta Distt. Bilaspur H.P.	4 (2/1/1)
<i>Colocasia</i> Scientific cultivation	2	37.51	Vill. Kothi Dobka Tehsil Ghumarwin Distt Bilaspur H.P.	2 (2/0/0)

Table 140. Farmers training programmes/ field days/ exhibitions organized by CSKHPKV, Palampur

Title of programme	Place and Date	Venue	No. of beneficiaries (male/female/rural youth)
Integrated crop management in tuber crops	Berthin 15 March 2023	Berthin	45 (25/15/5)
Integrated management on tuber crops	Kothi tobka 12 April 2023	Kothi tobka	13 (11/3/0)

D. Dr. BSKKV, Dapoli

Under this programme, planting materials were distributed to SC farmers (Table 141).

Table 141. Farmers training programmes/ field days/exhibitions organized by Dr. BSKKV, Dapoli

Title of programme	Date	Place	No of beneficiary
Distribution of tuber crops planting material, implements, pesticides, fungicides fertilizers etc.	31 March 2023	Wakawali	16

E. Dr. RPCAU, Dholi

Dholi centre is regularly involved in transfer of technologies developed in tuber crops to the farmers of Bihar and other adjoining states and to officers of

Agricultural Department, Govt. of Bihar and Scientists working under different KVKs by conducting on and off campus training programme, participation in Kisan Mela and providing lectures in training programme organized by Dr. RPCAU, Pusa, Bihar (Samastipur).

Table 142. Farmers training programmes/ field days/ exhibitions organized at Dholi

Sl.No	Particulars	Date & Place
1	Three days training programme was organized for Schedule caste women farmers regarding tuber crops value added products	11-13 January 2023
2	Two days training programme was organized for Schedule caste farmers regarding tuber crops production and protection technologies. (Under SCSP)	25-26 March 2023
3	Two days training programme was organized for Schedule caste farmers regarding tuber crops production and protection technologies. (Under SCSP)	23-24 July 2023
4	Dr. Ashish Narayan delivered a lecture on package of practices of tuber crops to the farmers in training programme organised by Directorate of extension, RPCAU, Pusa	25 July 2023

5	Dr. Ashish Narayan delivered a lecture on Seed production and processing of tuber crops to a group of 21 farmers from ATMA, Madhubani, Bihar organised by Directorate of extension, RPCAU, Pusa	01 December 2023
6	Dr. Tanweer Alam, Dr. R.S. Singh and Dr. Ashish Narayan visited fields of farmer's growing Sweet potato, EFY and yambean located at Muzaffarpur, Vaishali and Samastipur districts regarding management of pest and diseases and for survey	25, 30 November 2023 and 15 December 2023 Muzaffarpur, Vaishali and Samastipur
7	Exposure visit of under graduate students was organized on enhancing the production and productivity of tuber crops at TCA, Dholi campus	20 Dec. 2023, Dholi

F. Dr. YSRHU, Kovvur

Dr. K. Mamatha, Principal Scientist (Hort.), Dr. YSRHU-HRS-Kovvur visited Sanapallilanka village of Ainavilli mandal on 16 February 2023 and a training programme on Management of nutritional deficiencies in elephant foot yam was organized to the farmers under SCSP and conducted a method demonstration on seed sett preparation and seed treatment in elephant foot yam.

G. IGKV, Jagdalpur

Jagdalpur centre has organized the following farmers training programmes/field days/exhibitions (Table 143).

Table 143. Farmers training programmes/ field days/ exhibitions organized at Jagdalpur centre

Sl.No.	Title of Training & Place	Inputs distributed	Date	No. of Beneficiaries		
				Male	Female	Total
1	Improved cultivation technology of tuber crops at Vill.- Chavel, Dist; Kanker (Off Campus training conducted by CARS, Kanker)	Spade and vegetable seeds	11 March 2023	35	30	65
2	Production technology of tuber crops at SGCARS, Jagdalpur	Sprayer and casava setts	17 March 2023	27	00	27
3	Improved cultivation technology of tuber crops at Vill.- Kusma, Dist; Kondagaon (Off Campus training conducted by KVK, Kondagaon)	Spade, vegetable seeds and cassava setts, colocasia seeds	18 March 2023	41	09	50
4	Production technology of tuber crops at Vill.- Chidapadar, panchayat- Tikra Lohga, Bastar	Spade, vegetable seeds and cassava setts, colocasia and EFY seeds	22 March 2023	27	00	27
5	Production technology of tuber crops at SGCARS, Jagdalpur	Water cane, cassava Setts-100, Vegetable seeds	22 December 2023	25	00	25

H. ICAR-RC, NEH, Lembucherra

Table 144. Details of input distribution to SC farmers by ICAR-RC RS, NEH, Lembucherra

Sl.No.	Title	Inputs distributed	Date	Place	No. of beneficiaries
1	Cultivation technology of <i>Colocasia</i>	Water can and vegetable seeds, sweet potato cuttings	06 May 2023	Naogaon	25
2	Cultivations technology of swamp taro	Water cans, sprayers, vegetable seeds and sweet potato cutting	05 July 2023	Kakrabon	75
3	Integrated farming system for livelihood improvement	Water can, sprayers and vegetable seeds and fruit plants	09 August 2023	Belbari	50
4	Cultivation of <i>Colocasia</i> in horticulture based cropping	Water can, sprayers and vegetable seeds and fruit plants	10 November 2023	Lembucherra	30
5	One day training on capacity building programme and distribution of planting materials for IFS	Water can, sprayers and vegetable seeds	06 December 2023	Kailashahar	50
6	Training on scientific cultivation of <i>Colocasia</i> & swamp taro and input distribution	Water can, sprayers and vegetable seeds and fruit plants	07 December 2023	Fatikroy	50

I. NAU, Navsari

Training cum value addition programme on tuber crops for SC women was conducted on 23 March 2023 at KVK, Navsari.

J. SKLTSHU, Rajendranagar

The following training programmes/ field days/ exhibitions organized by SKLTSHU, Rajendranagar (Table 145).

Table 145. Farmers training programmes/ field days/ exhibitions organized by SKLTSHU, Rajendranagar

Sl.No.	Title of training	Date	Place
1	Training programme on production technology of <i>Colocasia</i> in Telangana state	07 January 2023	Vegetable Research Station, Rajendranagar
2	Training programme on production technology of tuber crops in Telangana state	21 March 2023	Narayanpur (Vill.), Vikarabad (dist)
3	Women empowerment through processing and value addition in tuber crops	28 March 2023	Erravally(Vill.), Vikarabad (dist)
4	Training programme on production technology of sweet potato	20 November 2023	Gavicherla (Vill.), Vikarabad (dist)

K. TNAU, TCRS, Yethapur

Training on agro-techniques, sett treatment and value addition in cassava were conducted by the TCRS, Yethapur (Table 146).

Table 146. Farmers training programmes organized by TCRS Yethapur

Sl.No.	Name of the programme	Date	Place	No. of beneficiaries
1	Training on agro-techniques of cassava, demonstration of sett treatment and value addition in cassava	07 November 2023	TCRS, Yethapur	100

L. UHS, Dharwad

Table 147. Farmers training programmes organized by UHS Dharwad

Sl.No.	Training	Inputs	Date	Place	No. of beneficiaries		
					Male	Female	Total
1	Pest management in sweet potato through integrated approach	Double battery-operated sprayers	10 August 2023	Bilure Village	12	3	15
2	Training programme on production of sweet potato through advance scientific approach	Double battery-operated sprayers	17 November 2023	Khanapur	14	1	15

Table 148. Demonstrations organized by UHS Dharwad

Sl.No.	Crop & variety / technology etc. demonstrated	Place and Date	No. of beneficiaries (male/female/rural youth)
1	Sweet potato Var. Sree Bhadra	Khanapur 27 September 2023	25
2	Demonstration of soil application of entomopathogenic fungi such as <i>Metarhizium anisopliae</i> + <i>Beauveria bassiana</i> for management of sweet potato weevil and pumpkin beetle	Khanapur 16 October 2023	30

V.4. Popularisation and demonstration of tuber crops technologies under ONEH scheme

A. BAU, Ranchi

(i). Technology Park: Improved production technologies of all the tuber crops viz., elephant foot yam, sweet potato, taro (arvi, dasheen), *Dioscorea*, cassava and yam bean etc were exhibited in demonstration plots at Technology Park, BAU.

(ii). Popularization of tuber crops by pot culture/ kitchen

garden/ terrace farming in the urban/ semi-urban areas is going on. Planting material raised in pots/ poly bags distributed.

(iii). Cultivation of elephant foot yam with the wastes/ residues of mushroom unit in collaboration with Department of Plant Pathology.

Women empowerment through processing and value addition in tuber crops

(i). Training on value addition of tuber crops were

imparted in the training programmes conducted in the Department of Horticulture.

(ii). Work on value addition of tuber crops have been

going on with the collaboration of Department of Home Sciences, B.A.U and Department of Plant Pathology (Mushroom).

Table 149. Details of training programme organized by BAU, Ranchi

Sl.No.	Topic	Date	Location of training	No. of beneficiaries (male/female/rural youth)
1	Hands on training on tuber crops based convenience and intermediate moisture foods	11 March 2023	Chatra	40 (10 /12 /18)
2	Post- harvest management and value addition in tuber crops	13 March 2023	Chatra	40 (10 /12 /18)

Agrotech Kisan Mela, 2023 was organized in the premises of BAU, Ranchi during 03-05 February 2023 along with other horticultural produces different types of tuber crops were exhibited. Many farmers and other people having interest in tuber crops visited the stall and acquainted with new technologies in tropical tuber crops.

B.CAU, Imphal

Table 150. Details of training programme organized by CAU, Imphal

Sl.No.	Topic	Date	Location of training	No. of beneficiaries
1	Scientific cultivation and value addition of tuber crops	23 November 2023	Lamboi Khongnang khong	30
2	Scientific cultivation and value addition of tuber crops	07 December 2023	Oinam Bishnupur	35

C.CSKHPKV, Palampur

Table 151. Details of Farmers training programmes/ field days/ exhibitions organized by CSKHPKV, Palampur

Sl.No.	Title of programme	Date	Venue	No. of beneficiaries (male/female/rural youth)
1	Scientific management of tuber crop	25 August 2023	Behna, Brahmana	25(20/5/0)
2	Integrated crop management of tuber crops	19 September 2023	Berthin (H.P.)	25(15/10/0)
3	Exhibitions on tuber crops at Nalwari Fair	05 April 2023-09 April 2023	Ghumarwin (H.P.)	50 (17/13/20)
4	Exhibitions on tuber crops at seer utsav	02 October 2023	Ghumarwin (H.P.)	30 (19/11/0)
5	Awareness programme on tuber crops	-	Distt Bilaspur HP	42 (15/15/12)

Table 152. Women empowerment and value addition programmes organized by CSKHPKV, Palampur

Sl.No.	Title of programme	Date	Venue	No. of beneficiaries (male/female/rural youth)
1	Value addition of tuber crops with special emphasis on women empowerment	10 March 2024	Research Sub Station Berthin	14 (0/5/9)

Table 153. Farmers training programmes/exposure visits organized by CSKHPKV, Palampur

Sl.No.	Details of the programme	Date	Venue	No. of beneficiaries
1	Exposure visits of 13 no. of farmer under Prakritik Kheti Khushal Kisan Scheme organized by Subject matter specialist Kunihar Distt. Soalam (H.P.)	20 January 2023	Research Sub Station, Berthin	13
2	One day exposure visit of farmers under JICA	08 February 2023	Research Sub Station, Berthin	10
3	Conducted exposure visit to trainee farmers under JAICA, Dept. of forest to progressive farmer, Vill. Fagog Tehsil Jhandutta Distt. Bilaspur H.P.	30 March 2023	Research Sub Station, Berthin	10
4	Farmer's Camp organized by integrated development project, Govt. of H.P.	13 March 2023 & 14 March 2023	Research Sub Station, Berthin	200
5	Exposure visit of farmers under NICRA Project of KVK, Kullu H.P.	11 June 2023	Research Sub Station, Berthin	30

6	Two-day training programme of project staff on watershed management organized by Manav vikas sansthan, Kalol	06 June 23	Research Sub Station, Berthin	10
7	Five days in service vocational trainers (agriculture sector) under national skills qualification framework	20 July 2023, 03 August 2023, 10 August 2023	Research Sub Station, Berthin	146
8	Awareness programme on tuber crops organized by Nirmala Agro Fresh Distt. Bilaspur H.P	28 August 2023	V.P.O. Samlohal Teh Ghumarwin Distt. Bilaspur H.P.	15
9	Two-day training programme on marketing of agricultural products through farmer producer organizations (FPOs)	21 December 2023	Vill. & P.O. Padyalag Tehsil Ghumarwin Distt. Bilaspur H.P.	40
10	Five-day vocational training programme skill training programme under CBT for the year 2023-2024	05 December 2023	Vill. & P.O. Balseena Teh Jhandutta Distt. Bilaspur H.P.	25

A radio talk on tuber crop cultivation techniques has been broadcasted at Aakashwani, Hamirpur Himachal Pradesh on 14 June 2023.

D. Dr. BSKKV, Dapoli

Table 154. Exhibitions organized by Dr. BSKKV, Dapoli

Sl.No.	Organizer	Place	Date	No. of beneficiaries
1	State level Agriculture Exhibition	Sillod, Aurangabad	01- 05 January 2023	756
2	State level Agriculture Exhibition	Alibaugh, Raigad	06-09 January 2023	512
3	Central Experiment Station, Wakawali	Wakawali	23 February 2023	197

Table 155. Farmers training programmes organized by Dr. BSKKV, Dapoli

Sl.No.	Organizer	Place	Date	No. of beneficiaries
1	Navbharat Chhatrawas, Kunbi Seva Sangh	Dapoli	04 February 2023	22
2	Central Experiment Station, Wakawali	Wakawali	23 February 2023	197

A programme on women empowerment through processing and value addition in tuber crops was organized by CSKHPKV, Palampur at Matwan on 03 March 2023 which was benefitted by 30 women farmers.

E. Dr. YSRHU, Kovvur

Kovvur center has conducted a training programme on value addition in elephant foot yam to 40 women farmers and demonstrated preparation of different value-added products in elephant foot yam on 23 August 2023. Dr. K. Mamatha, Principal Scientist (Hort.) imparted training on good agricultural practices in elephant foot yam to FPOs of Tuni and Ravulapalem and conducted a field visit to tuber crops experimental plots on 13 September 2023, which was sponsored by NABARD, E.G. Dist. A training on scientific cultivation of tuber crops was imparted to the farmers and demonstrated spraying of micronutrients by drone technology with the assistance of DRYSRHU-KVK VR Gudem on 26 September 2023.

F. Dr. YSRHU, Peddapuram

Created awareness and knowledge about cassava, sweet potato, other tuber and vegetable crops by field visits,

scientist and farmer's interaction, training programmes, exhibitions, method demonstrations, TV Shows, radio talks, hands-on training on value added products with special emphasis on women and youth empowerment and press coverage.

Role in village adoption:

Adopted two villages viz., J. Thimmapuram (up to May 2023) and Kondapalli (From June 2023 to till date) under VC to Village programme.

- Created awareness on importance of horticultural crops, soil testing, kitchen gardening, improved package of practices and improved varieties and technologies developed on cassava, sweet potato, oil palm and other crops.
- Created awareness on value addition in cassava for SHG's
- Distributed vegetables seeds to Anganwadi centres
- Distributed planting material of improved varieties of cassava and sweet potato
- Given MLT experiments in cassava and sweet potato and also given cassava minikits

- Provided research information material on cassava to VHA's of respective RBK's
- Visited farmer fields regularly and given remedial measures on identified pests and diseases

Dr. M. Janaki, Scientist (Hort.) and Head, HRS, Peddapuram conducted training on improved package practices of cassava for SC farmers under SCSP held at Kondapalli village on 04 August 2023 and explained about significance of SCSP and characteristics of CMD resistant cassava varieties and pest and disease management in cassava. Dr. M. Janaki, Scientist (Hort.) and Head, HRS, Peddapuram has attended as a resource person for the following training programmes.

- Skill training programme on preparation of value-

added products from cassava and sweet potato conducted by KVK, Pandirimamidi on 10 March 2023.

- Raitu Sadassu conducted by RHWEF students allotted to HRS, Peddapuram on 15 March 2023 at R.B. Patnam village.

Dr. M. Janaki, Scientist (Hort.) and Head, HRS, Peddapuram has participated in the TV programme on improved package of practices in sweet potato (Telugu) through RBK channel, integrated call centre, Gannavarm recorded on 25 August 2023 also conducted 12 phone-in programmes. Conducted six method demonstrations and 4 field diagnostic visits as in Table 156.

Table 156. Details of diagnostic field visits conducted at Dr. YSRHU, Peddapuram

Date	Scientists	Place	Purpose	Control measure suggested
10 November 2023	Dr. M. Janaki, Scientist (Hort.) & Head, HRS, Peddapuram and Smt. N. Sujatha, Horticultural Officer, Peddapuram	Kattamuru and Kondapalli	To visit the drought affected and red mite infected cassava fields	Spraying of Urea @ 10g/l or 13-0-45 or Potassium Nitrate @ 5g/l in drought affected areas. Spraying of Profenophos @ 2 ml/l or Propergite @ 1ml/l or Oberon @ 1.5 ml/l to control red mite
23 November 2023	Dr. M. Janaki, Scientist (Hort.) & Head, HRS, Peddapuram; Dr. N. B. V. Chalapathi Rao, Principal Scientist and Head, HRS, Ambajipeta and Smt. N. Sujatha, Horticultural Officer, Peddapuram	Cassava fields of farmers in Peddapuram, Valu thimmapuram and Kattamuru villages of Peddapuram mandal	To confirm that the observed mealy bug in cassava fields is <i>Phenococcus manihoti</i> or not as which caused severe yield loss in Tamil Nadu and also observed the incidence of white fly severe red mite and mosaic	The collected mealy bug samples were sent to NBAIR, Bangalore for identification
08 December 2023	Dr. M. Janaki, Scientist (Hort.) & Head, HRS, Peddapuram and Smt. N. Sujatha, Horticultural Officer, Peddapuram and VHA's	J. Thimmapuram, Kattamuru, Peddapuram, R.B. Patnam, Valu thimmapuram and Kondapalli	Visited the Michaung cyclone affected cassava fields and observed cassava lodging and partial tuber uprooting	Recommended remedial measures like earthing up and also spraying up of 13-0-45 @ 5g/l
09 December 2023	Dr. M. Janaki, Scientist (Hort.) & Head, HRS, Peddapuram along with DHO, Kakinada; Horticultural Officer, Peddapuram and VHA's	J. Thimmapuram, Kattamuru, Peddapuram and Gudivada villages	Visited the Michaung cyclone affected cassava and banana fields and observed lodging and partial tuber uprooting in cassava and falling of trees with bunches in banana	Recommended remedial measures like earthing up and also spraying up of 13-0-45 @ 5g/l

G. IGKV, Jagdalpur

The centre has organized different exhibitions in national and state level Kissan Mela for the popularization of major and minor tuber crops in Chhattisgarh during the year 2023 (Table 157).

Table 157. Exhibitions conducted on improved varieties of tuber crops and value added products

Sl.No.	Name of Kissan Mela/Programme	Organizer	Date	Venue	No. of beneficiaries
1	Flower show	Society of Prakriti ki aur, Raipur	7-9 January 2023	Gandhi Udyan, Raipur	700
2	Kisan mela	Ram Krishna Mission Ashram, Narayanpur	10 & 11 February 2023	Narayanpur	500
3	AKTI Tyhor exhibition of tuber crops	SGCARS, Jagdalpur	22 April 2023	SGCARS, Jagdalpur	100
4	Exhibition of tuber crops	Collectorate, Bastar (C.G.)	09 August 2023	PG college Ground, Jagdalpur	300

Table 158. Details of women empowerment programmes on processing and value addition in tuber crops organized by Dr. YSRHU, Peddapuram

Sl.No.	Topic	Place	Date	No. of beneficiaries
1	Processing and value addition of tikhur	SGCARS, Jagdalpur	09 January 2023	08
2	Processing and value addition of tikhur	SGCARS, Jagdalpur	10 January 2023	08
3	Processing and value addition of tuber crops	SGCARS, Jagdalpur	15 March 2023	23

Table 159. Details of hands-on trainings on tuber crops based convenience and intermediate moisture foods organized by Dr. YSRHU, Peddapuram

Sl.No.	Topic	Place	Date	No. of beneficiaries
1	Processing and value addition of tuber crops	SGCARS, Jagdalpur	15 March 2023	23 women farmers + 60 students

H. ICAR-CTCRI RC, Bhubaneswar

Twenty demonstrations of high yielding varieties, each of greater yam (Sree Nidhi) (250 m² per farmer), elephant foot yam (Gajendra) (100 m² per farmer), taro (Sree Hira and Sree Telia) (400 m² per farmer) and cassava (Sree Jaya) (250 m² per farmer) were laid-out in farmers field at Karanjiari village, Rasulpur block, Jajpur district. Five demonstrations on biofortified Sweet potato variety Bhu Sona @ 1600 m² per farmer were laid-out at Beruda village, Jajpur block, Jajpur district. Planting materials of different tuber crops were distributed to farmers as follows: greater yam - 1000 kg, elephant foot yam - 500 kg, taro - 750 kg, cassava stems – 1000nos. and sweet potato - 50000 vine cuttings.

I. ICAR-CIARI, Port Blair

The centre has conducted two FLDs on organic cultivation of elephant foot yam var. Gajendra in farmers' field at South Andaman in an area of 0.05 ha and recorded the yield of 1125-1312 kg per farmer. Each

farmer has earned net income of ₹ 30000-36500 from elephant foot yam cultivation with B:C ratio ranging from 2.36 to 2.86. Organized three days training on Climate resilient Agricultural Practices for island based Cropping System at Perka, Chukchucha and Tapoiming village of Car Nicobar islands from 01-03 November 2023 which was benefitted by 191 tribal farmers (147 males and 47 females). Organized a Field Day on Scientific tuber crops cultivation for improving the food security of Islanders, an awareness programme on tuber wealth of Andaman and Nicobar islands for livelihood security in collaboration with ICAR- KVK, Sippighat on 22 December 2023 in which about 32 farmers participated and benefitted.

J. MPUAT, Udaipur

Popularization and demonstration of tuber crops technologies under ONEH scheme training, interaction with farmer and lecture delivered on crops like greater yam, elephant foot yam, sweet potato and *Colocasia*.

Table 160. Details of programmes for popularization and demonstrations of tuber crops organized by MPUAT, Udaipur

Sl.No.	Particulars	Date	Place
1	Lecture delivered on production technology of ginger and tuber crops	07 January 2023	Science College, MLSU, Udaipur
2	Lecture delivered on improved cultivation practices of tuber crops in District level Horticulture seminar organized by DD, Horticulture, Banswara	23 February 2023	Collectorate, Banswara
3	Lecture delivered on improved cultivation practices of tuber crops in District level Horticulture seminar organized by DD, Horticulture, Dungarpur	27 February 2023	PD, ATMA, Office, Dungarpur

4	Lecture delivered on improved cultivation practices of tuber crops in District level Horticulture seminar organized by DD, Horticulture, Bhilwara	25 March 2023	DFRS, Arjia, Bhilwara
5	Lecture delivered on improved cultivation practices of tuber crops	16 May 2023, 06 December 2023, 15 December 2023	KVK, Badgaon

A women group awareness camp/ training was organized for value addition technologies of tuber crops on sweet potato and greater yam on 01 March 2023 which benefitted 25 women farmers.

K. NAU, Navsari

Trainings, demonstrations, distribution of inputs, implements, and hands-on training on value added products were organized with special emphasis on women and youth empowerment.

Women farmer's training programme on value addition of sweet potato was organized on 20 October 2023 in collaboration with KVK, Navsari. There were a total of 73 farmers and other staffs from 15 villages of Navsari District. Dr. N. B. Patel, Professor, Department of Vegetable Science, ASPEE College of Horticulture, NAU, Navsari has given information on different tuber crop cultivation. Dr. Himani B. Patel, Assistant Horticulturist, AICRP on Tuber crops Scheme provided extensive information on value added products in tuber crops and its market value. During the technical session,

Dr. Nital Patel, Scientist (Home Science), KVK, Navsari gave detailed information on value addition of sweet potatoes like wafer, *chakri* and french-fries.

L. SKLTSU, Rajendranagar

Meeting on tuber crops: Production technologies in *Colocasia* under SCSP was conducted at VRS, Rajendranagar on 07 January 2023 and distributed battery-operated sprayers.

Meeting on tuber crops: Production technologies in tuber crops under SCSP was conducted at Narayanapur (Vill.), Vikarabad (Distt.) on 21 March 2023 and distributed *Colocasia* seed and sweet potato cuttings.

A meeting on value addition on tuber crops and women empowerment under SCSP programme was organized on 28 March 2023 at Erravalli (Vill.), Vikarabad (Distt.) and distributed *Colocasia* seed and sweet potato cuttings. A programme was conducted on 'Dumpa pamtalalo Yajamanya Paddathulu' at Gavicherla (Vill.), Sangem (Mdl), Warangal (Distt.) on 21 Nov. 2023.

M. TNAU, Coimbatore

Table 161. FLD in CO 1 elephant foot yam by TNAU, Coimbatore

Sl.No.	Crop & Variety / Technology etc. Demonstrated	Number of demonstrations and duration(s)	Area coverage (cent)	Place and Date	Number of farmers benefitted (M/F/R)
1	FLD in CO 1 elephant foot yam	1	30	Sattakkal pudur, Kinathukadavu on 07 Sept. 2023	1

Table 162. Women empowerment and value addition programmes organized by TNAU, Coimbatore

Sl.No.	Title of programme	Date	Venue	No. of beneficiaries (male/female/rural youth)
1	Nursery technology in vegetables and value addition in tuber crops	02 November 2023	Pullagoundenpudur Thondamuthur	20

Table 163. Exhibition arranged by TNAU, Coimbatore

Sl.No.	Title of programme	Date	Venue	No. of beneficiaries (male/female/rural youth)
1	Exhibition arranged on the eve of farmers day programme organized by TNAU	09 September 2023	Codissia complex Coimbatore, Tamil Nadu	-
2	Nursery technology in vegetables and nano fertilizer application in tuber crops	02 November 2023	Pulla gounden pudur on Thondamuthur Coimbatore	20 +10

N. TNAU, TCRS, Yethapur

Table 164. Details of programmes for popularization and demonstrations of tuber crops organized by Yethapur centre

Name of the programme	Date	Place
i. Training		
Agro-techniques of cassava	20 April 2023	TCRS, Yethapur
Tapioca cultivation	21 June 2022 & 22 June 2023	TCRS, Yethapur
Tapioca cultivation & field visit	22 June 2023	Kammapuram
Tapioca cultivation & field visit	23 June 2023	Kodumudi
Tapioca and turmeric cultivation in farmers grievance day meeting	30 June 2023	Salem
Tapioca cultivation	05 July 2023 & 06 July 2023	TCRS, Yethapur
Tapioca cultivation	14 July 2023	Villupuram
Tapioca cultivation in farmers grievance day meeting	25 July 2023	Salem
Tapioca cultivation	12 September 2023	Attur
Tapioca cultivation	20 September 2023	Thiruchengode
Tapioca cultivation	25 September 2023	Thalaivasal
Smart Farming' and demonstration of drone applications in agriculture	26, 27 September 2023	Erode & Bhavani
Tapioca cultivation	12 October 2023	Keeripatti
Tapioca cultivation	08 November 2023	Edappadi
Tapioca cultivation	15 December 2023	Periyeri, Thalaivasal
Value addition in cassava	18 December 2023	Attur
Popularization of value added products in cassava	22 December 2023	Attur
ii. Demonstration		
Value addition in cassava	18 December 2023	Attur
Popularization of value added products in cassava	22 December 2023	Attur
iii. Women empowerment through processing and value addition in tuber crops		
Preparation of pappads	25 September 2023	Thalaivasal
Popularization of value added products in cassava	22 December 2023	Attur

O. UHS, Dharwad

Table 165. Details of training programmes organized by UHS, Dharwad

Sl.No.	Details of the programme	Place	Date	No. of beneficiaries
1	Training programme on scientific ways of organic farming in horticulture crops	RHREC, Dharwad	24 July 2023	50
2	Tri-monthly workshop -I	RHREC, Dharwad	20 Sept. 2023	30
3	Training program on role of tuber crops in nutritional kitchen garden, terrace garden, and hydroponics to the high school students of classic public school dharwad	RHREC, Dharwad	10 Nov. 2023	100
4	Training program on role of tuber crops nutritional kitchen garden to the kannada high school students of JHS Gulaganji and JHS, Kamalapur, Dharwad	RHREC, Dharwad	22 & 23 Nov. 2023	100
5	Training program on role of tuber crops nutritional kitchen garden to the urdu high school students Kamalapur, Dharwad	RHREC, Dharwad	24 Nov. 2023	45
6	Training programme on improved cultivation of sweet potato	RHREC, Dharwad	28 Nov. 2023	28

Table 166. Hands-on trainings organized on value added products with special emphasis on women and youth empowerment by UHS, Dharwad

Sl.No.	Title of programme	Date	Venue	No. of beneficiaries (male/female/rural youth)
1	Processing and value addition in sweet potato and taro	25 September 2023	Dharwad Karnataka	74 (02/35/37)
2	Processing and value addition in arrow root	27 September 2023	Dharwad, Karnataka	47 (01/21/25)
3	Training programme on scientific information of tuber crops crops for women	22 October 2023	NGO, Dharwad	94 (02/45/47)

Table 167. Details of Exhibitions organized by UHS, Dharwad

Sl.No.	Title of programme	Date	Venue	No. of beneficiaries (male/female/rural youth)
1	Exhibition of various germplasms of tuber crops during Krishimela at UAS, Dharwad	9-12 September 2023	Dharwad Karnataka	1700 (500/350/850)

P. RSICAR-CTCRI, Bhubaneswar

A training programme on value addition of tuber crops was conducted on 15 October 2023 at Mohana, Gajapati district, Odisha.

V.5. Production and supply of nucleus planting material of improved varieties of tuber crops and establishment of seed chain

A. AAU, Jorhat

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stem cuttings)	Sree Jaya Sree Vijaya	800	-	1500/1000 cuttings
2	Sweet potato (vine cuttings)	OFSP	2500	0.5	500/1000 cuttings
3	Yams Greater yam Lesser yam	Kuwari Alo (local)	0.1 0.06	- -	4300 t ⁻¹ 4300 t ⁻¹
4	<i>Colocasia</i> Taro Bunda Swamp taro (seedlings)	Ahina Local selection Local selection	0.1 0.1 500	2 1 1	20000 t ⁻¹ 18000 t ⁻¹ 4500/1000 small plants

B. BAU, Ranchi

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stem cuttings)	Sree Vijaya, Sree Jaya	5000	0.40	0.50/1000 cuttings
2	Sweet potato (vine cuttings)	Sree Bhadra, Bhu Sona, Bhu Krishna	12350	0.15	0.25/1000 cuttings
3	Elephant foot yam	Gajendra	0.30	0.03	20000 t ⁻¹
4	Greater yam	Sree Keerthi, Sree Roopa	0.025	0.01	20000 t ⁻¹
5	Lesser yam	Sree Latha	0.02	0.01	15000 t ⁻¹
6	Taro (Eddoe type)	Muktakeshi	0.22	0.21	15000 t ⁻¹
	Taro (Dasheen type)	NDB-1	0.03	0.03	15000 t ⁻¹

C. CAU, Imphal

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stem cuttings)	CAU Umangra-1	5500	0.03	4080/1000 cuttings
2	Sweet Potato (vine cuttings)	Sree Bhadra Bhu Sona	1000 1000	0.01	2051/1000 Cuttings

D. BCKV, Kalyani

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stem cuttings)	Sree Jaya	14000	1	500/1000 setts
2	Sweet Potato (vine cuttings)	Bidhan Jagannath Kamala Sundari	45000 30000	0.75 0.50	300/1000 cuttings
3	Elephant foot yam	Bidhan Kusum	3	0.50	8000 t ⁻¹
4	Taro (Eddoe type)	Bidhan Chaitanya	0.4	0.50	10000 t ⁻¹
5	Taro (Dasheen type)	BCB-1	0.2	0.13	12500 t ⁻¹
6	Swamp taro (seedlings)	Bidhan Latika	5000	0.2	2000/ 1000 seedlings

E. Dr. BSKKV, Dapoli

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stem cuttings)	Sree Jaya	2000	0.49	9730/1000 stems
		H-226	2000		
		Sree Reksha	2000		
		Other	1000		
2	Sweet potato (vine cuttings)	Konkan Ashwini	1500	0.50	3870/1000 vine cutting
		S-56/2	1000		
		Bhu Sona	1000		
		Bhu Krishna	1000		
		Bhu Kanti	1000		
3	Elephant foot yam	Gajendra	4.50	1	38,377 t ⁻¹
		Other	0.25		
4	Lesser yam	Konkan Kanchan	1.500	0.90	32,460 t ⁻¹
		Other	0.30		
5	Greater yam	Konkan Ghorkand	0.050	0.10	29,050 t ⁻¹
		Sree Karthika	0.050		
		Other	0.050		
6	Aerial yam	Konkan Kalika	0.050	0.35	43,460 t ⁻¹
		Other	0.10		
7	<i>Colocasia</i>	Sree Pallavi	0.15	0.29	30,634 t ⁻¹
		Other	0.20		
		NDB - 9	0.02		
		NDB- 22	0.02		
8	<i>Xanthosoma</i>	Konkan Haritparni	0.200	0.30	0.038 t ⁻¹
9	Arrowroot (suckers)	Trivandrum	1000	0.10	0.02 t ⁻¹
10	Yam bean	RM-1	0.015	0.75	0.024 t ⁻¹

F. CSKHPKV, Palampur

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Elephant foot yam	Palam Zimikand-1 Gajendra	2.00 0.50	3	10000 t ⁻¹
2	Greater yam	Local	0.20	0.01	10000 t ⁻¹
3	Taro (Eddoe type)	Local	0.50	0.025	5000 t ⁻¹

G. Dr. RPCAU, Dholi

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Sweet potato (vine cuttings)	Cross -4	5000	0.3	300/1000 Cuttings
		RS-47	5000		
		RS-92	5000		
		TSP 12-6 (RS-7)	5000		
2	Elephant foot yam	Gajendra	5.0	1.0	20000 t ⁻¹
3	Taro	Rajendra Arvi-1	0.20	0.15	15000 t ⁻¹
		Rajendra Arvi-2	0.20		
4	Lesser yam	Lotani, Sree Latha, Chaparia	0.5	0.2	12000 t ⁻¹
5	Yam bean	RM-1, RM-2, RM-3	0.02	0.5	0.2 t ⁻¹

H. Dr. YSRHU, Kovvur

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Elephant foot yam	Gajendra	6.75	1.69	-
2	Greater yam	Kovvur	0.01	-	-
		Bombay pendalam	0.05	-	-
3	Taro (Eddoe type)	Godavari chema	1.18	-	
		Bhavapuri	0.01	-	

I. Dr. YSRHU, Peddapuram

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stems cuttings)	PDP CMR-1	14830	13	85354
		Sree Reksha	8095		
		Sree Shakthi	1300		
2	Sweet potato (vine cuttings)	24 varieties	29480	0.35	9800

J. ICAR RC NEH, Barapani

Sl.No.	Crop	Variety	Quantity of planting material produced (nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stems cuttings)	Sree Vijaya	5000	-	5450
2	Sweet potato (vine cuttings)	Local	10000	-	5000
3	Elephant foot yam	Gajendra	0.250	-	4500
4	Taro	Megha Taro 2	1.500	-	22500
		Megha Taro 1	0.500	-	6420
		Muktakeshi	0.500	-	6420

K. MPUAT, Udaipur

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Sweet potato (vine cuttings)	Co 3, Co 4 & Gouri	50,000	-	-
2	Elephant foot yam	Gajendra	0.2	-	-
3	Greater yam	Local	0.5	-	-
4	Taro	Muktakeshi	0.5	-	-

L. ICAR-CIARI, Port Blair

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stems cuttings)	Sree Jaya	300	0.10	-
		SreeVijaya	300	0.10	-
2	Sweet potato (vine cuttings)	CARI –Swarna	500	0.01	-
		CARI –Aparna	500	0.01	-
		BhuSona & Bhu Krishna	250	-	-
3	Elephant foot yam	Gajendra	1.25	0.45	-
4	Greater yam	CARI- Yamini	0.15	0.10	-
5	Taro	Sree Kiran	0.1	0.10	-
		Local	0.1	0.10	-
		Sree Rashmi	0.5	0.10	-
		Megha Taro	0.05	-	-

M. IGKV, Jagdalpur

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stems cuttings)	C.G.Cassva-1	5000	0.04	1270/1000 Stems
2	Sweet potato (vine cuttings)	Indira Madhur	5000	-	-
		Indira Nandini	5000	-	-
		Indira Naveen	5000	-	-
		C.G. Shakarkand Priya	5000	-	-
		C.G. Shakarkand Narangi			
3	Elephant foot yam	Gajendra	1.2	0.2	830/1000 Cuttings
4	Yams Greater yam Aerial yam	C.G.Ratalu-1	0.1	0.24	4598.7 t ⁻¹
		C.G.Dankanda-1	0.01		
5	Taro Taro eddoe Dasheen	Indira Arvi-1	0.4	0.03	4598.7 t ⁻¹
		CG.Sakhen Bunda1	0.05	0.03	5804.18 t ⁻¹
6	East Indian Arrow root	C.G. Tikhur-1	-	0.02	5000 t ⁻¹

N. ICAR-RC RS, NEH, Lembucherra

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stems cuttings)	Sree Reksha	3000	0.10	2000/1000 cuttings
2	Elephant foot yam	Tripura Batema	0.5	1.0	10000 t ⁻¹
		Gajendra	2.0	-	6500 t ⁻¹
3	Yams	Tripura Yam Tha	0.4	0.3	-
4	Taro	Muktakeshi	0.25	3.5	15000 t ⁻¹
	Eddoe	Tripura <i>Colocasia</i>	0.25	-	-
	Swamp taro (seedlings)	Local selection	2000	1.0	-
5	Sweet potato (vine cuttings)	Bhu Sona, Bhu Krishna and Local selection	3000	0.06	2000/1000 cuttings

O. NAU, Navsari

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Sweet potato (vine cuttings)	C-71	3640	0.04	598/1000 Cuttings
		Bhu Kanti	50	0.0006	598/1000 Cuttings
2	Greater yam	Hemlata	0.005	0.002	16,759 t ⁻¹
3	Tannia	Local	0.054	0.01	19.330 t ⁻¹

P. SKLTSHU, Rajendranagar

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Sweet potato (vine cuttings)	Kiran, Local	100000	10	50000
2	Taro (Dasheen type)	Shatamukhi, RNCA-1	1.0	5	50000

Q. TNAU, Coimbatore

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Sweet potato (vine cuttings)	CO 5	2000	1.0	5500
		IB 73	5000		
2	Elephant foot yam	CO 1	0.500	1	25000

R. TNAU-TCRS, Yethapur

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stems cuttings)	Sree Athulya	12000	11.23	4
		Sree Reksha	450	0.50	
		YTP 1	6500	5.90	
		YTP 2	34000	30.90	
		Mulluvadi-1	200	0.40	

S. UHS, Dharwad

Sl.No.	Crop	Variety	Quantity of planting material produced (t/nos.)	Area covered (ha)	Cost of production (₹)
1	Cassava (stems cuttings)	Sree Jaya	14000	1	-
2	Sweet potato (vine cuttings)	Sree Bhadra, Bhu Sona	200000 25000	5	-
3	Elephant foot yam	Gajendra	1.25	1	-
4	Arrow root		0.25	0.50	-

Revenue Generation

Sl.No.	AICRPTC centres	Revenue generation (₹)
1	AAU, Jorhat	15000
2	BAU, Ranchi	17550
3	BCKV, Kalyani	-
4	CAU, Imphal	10,000
5	CSK HPKV, Palampur	42500
6	Dr. BSKKV, Dapoli	11576
7	Dr. RPCAU, Dholi	50000
8	Dr. YSRHU, Kovvur	166140
9	Dr. YSRHU, Peddapuram	81683

10	ICAR CIARI, Port Blair	35000
11	ICAR RC NEH, Barapani	2000
12	RS, ICAR RC NEH, Lembucherra	15000
13	IGKV, Jagdalpur	33880
14	MPUAT, Udaipur	100000
15	NAU, Navsari	39515
16	SKLTSHU, Rajendranagar	261000
17	TNAU, Coimbatore	8025
18	TNAU, TCRS, Yethapur	39650
19	UHS, Dharwad	70500
	Total	666472

V.6. Special programmes carried out under NEH

A. CAU, Imphal

Input distribution

Distributed agricultural inputs like vegetable seeds and tubers to the farmers of Oinam - Bishnupur District, Andro - Imphal East District and Haroarou - Imphal East District.

Table 168. Input distribution to farmers by CAU, Imphal

Sl.No.	Particulars	Quantity (kg)	No. of beneficiaries
1	Sweet potato tubers	50	10
2	Potato tubers	550	10
3	Coriander seeds	13	50
4	Tomato seeds	3.4	50

C. ICAR-RC RS, NEH, Lembucherra

Table 170. Details of training programmes organized by RS, ICAR-RC, NEH, Lembucherra

Sl.No.	Title	Date	Place	Input distributed
1	Training on integrated farming system	02 April 2023	Belbari	Water cans, sprayers, vegetable seeds and sweet potato cutting
2	Scientific cultivation of tuber crops in vegetable-based cropping system	06 June 2023	Satdubia, Mohanpur	Water cans, sprayers and vegetable seeds and fruit plants
3	Cultivation of <i>Colocasia</i> and input distribution	18 August. 2023	Lembucherra	Water cans, sprayers and vegetable seeds and fruit plants
4	Cultivation of high yielding tuber crops and vegetables	10 Novovmber 2023	Kakraban	Water cans, sprayers and vegetable seeds
5	One day training on capacity building programme and distribution of planting materials for IFS	06 December 2023	Kailashahar	Water cans, sprayers and vegetable seeds and fruit plants
6	Training on scientific cultivation of <i>Colocasia</i> & swamp taro and input	07 December 2023	Fatikroy	Water cans, sprayers and vegetable seeds and fruit plants

V.7. Special programmes carried out under SCSP

A. BAU, Ranchi

Eight farmers' training programme conducted and 320 number of farmers belonging to scheduled caste got benefitted. Inputs viz., seeds, fertilizer, pesticides were distributed among farmers. SCSP programme has been started with crop components later on other components and will be incorporated and developed into a Integrated Farming System model.

Under the chairmanship of Dr. G. Byju, Director, CTCRI and PC, AICRP on Tuber Crops, an one day awareness and training programme of tuber crops was conducted on 02 February 2023 in Choreya village under Chanhob block of Ranchi district and about 60 farmers from Scheduled Caste category got benefitted with this

B. ICAR RC NEH, Barapani

One day training programme on improved production techniques of fruits, vegetable, spice and tuber crops was conducted on 15 September 2023 at Nongshilliang, Umroi and on 25 August 2023 at Shilliangmyntang village where 60 and 45 farmers, respectively were benefitted.

Demonstration on technological interventions on tuber crops for improving productivity and livelihood security of tribal farmers of Meghalaya was conducted at Lumdiengngan village, Ri Bhoi, Meghalaya.

Table 169. Performance of tuber crops at Lumdiengngan

Sl.No.	Crop	Variety	Total yield (t ha ⁻¹)
1	Colocasia	Megha Taro 2	28.24
		Megha Taro 1	18.45
		Muktakeshi	21.23
2	Elephant foot yam	Gajendra	35.25
3	Cassava	Sree Vijaya	30.18

programme and got acquainted with recent technologies for better cultivation of tuber crops and various farm instruments like maize sheller, grubber, hoe etc. were also distributed to them for promotion of tuber crops.

B. BCKV, Kalyani

Six farmers' training on improved methods for cultivation and value addition of tropical tuber crops including sweet potato, elephant foot yam, taro, swamp taro, yams and cassava were organized at Mondouri, ICAR-AICRP on Tuber Crops, Kalyani Centre and Mohanpur, BCKV under SCSP for imparting skill on both production and value addition in tuber crops. Various inputs like knapsack sprayers, vermicompost, plant food supplements, spades etc. were distributed among the farmers.

Table 171. Trainings organized by BCKV, Kalyani

Sl.No.	Title	Date	Place	Male	Female
1	Training on improved cultivation of aroids	17 July 2023	Mondouri Farm, BCKV	21	4
2	Training on <i>Phytophthora</i> blight of taro	14 August 2023	Mondouri Farm, BCKV	20	-
3	Training on cultivation of elephant foot yam.	16 September 2023	Mondouri Farm, BCKV	15	5
4	Training on nutritional values and cultivation of orange and purple-fleshed sweet potato	12 October 2023	Mondouri Farm, BCKV	18	5
5	Training on cassava cultivation	27 November 2023	Mondouri Farm, BCKV	16	4
6	Training on value addition in tuber crops	20 December 2023	Mohanpur, BCKV	15	5

Training on various aspects of different tuber crops seemed to be very effective in increasing the interest of the farmers for growing tuber crops in their fields. Gaining knowledge from the trainings on nutritional values and scientific cultivation of sweet potato, especially orange-fleshed sweet potatoes, the vegetable growers have included sweet potato in the list of vegetables for cultivation along with other vegetables enormously grown in West Bengal. Some of the vegetable growers have shown interest in to growing elephant foot yam and taro in large areas during March-April, 2024.

Demonstrations

Demonstration on preparation of sweet potato vine cuttings have shown that growth of sweet potato plants from vine cuttings of secondary nursery was better than the direct cuttings from old plants. The crop is in the field and the tuber yield will be recorded in March 2024. It was demonstrated that the yield of cassava cv. Sree Jaya was highest with good quality tubers in the plants raised from matured setts than that of the upper portion. Elephant foot yam plants treated with nano urea recorded higher yield as compared to the PoP.

Table 172. Details of Demonstrations organized by BCKV, Kalyani

Sl.No.	Demonstration	Date	Place
1	Preparation of sweet potato vine cuttings for planting in the field	13 Oct. 2023	Mondouri Farm, BCKV
2	Cassava sett preparation from matured lower and middle portion of stems leaving 1/3 rd top portion.	28 Nov. 2023	Mondouri Farm, BCKV
3	Effect of nano urea on yield of elephant foot yam	22 Dec. 2023	Mondouri Farm, BCKV

C. Dr. RPCAU, Dholi

Training programs (using special funds of SCSP) have been provided by Dholi centre during the reporting period.

Three days training to schedule caste farmers during 11-13 January 2023 were provided on tuber crops technologies and their popularization and tuber value added products. Hands on training were given for crop production and products development of sweet potato and value added products of elephant foot yam like pickles, chunks, kheer and snacks.

Two days training programme was organized during 25-26 March 2023 for SC farmers on tuber crops production and protection technologies.

Two days training programme during 23-24 July 2023 was organized to 28 SC farmers for production techniques of tuber crops and their popularization. Inputs like sprayers, planting materials of sweet potato, yam bean and insecticides were provided to the trainees.

D. Dr. YSRHU, Peddapuram

Distributed the cassava planting material (PDP CMR-1 and Sree Reksha) to SC farmers of Kondapalli, Marripudi, R.B. Patnam and Valuthimmapuram villages of Peddapuram Mandal for 25 acres under the SCSP programme of AICRP on Tuber Crops.

Distributed inputs such as urea, SSP and MoP, Per one acre – 533 metres planting material, 1 bag urea, 3 bags SSP, 1 bag MoP, Profenophos – 0.5 lit, M-45 – 0.5 kg and

1 sickle profenophos and M-45 and sickles to 19 SC farmers under SCSP, AICRP on Tuber Crops.

E. CAU, Imphal

Launched products prepared by women's self-help groups of Kakching khunou, Kakching district under AICRP-Tuber Crops, CAU, Imphal centre at College of Agriculture, Iroisemba, CAU, Imphal. Inputs were distributed to farmers as shown in Table 173.

Table 173. Details of distribution of small farm implement to the farmers of Andro, Imphal East District

Sl.No.	Particular	Quantity	No. of beneficiaries
1	Sprayer (power operated)	2	20
2	Spade	10	
3	Shovel	5	
4	Watering can	5	

F. ICAR-CTCRI, Bhubaneswar

- Twenty demonstrations of high yielding varieties 20 each of greater yam (Sree Nidhi) (250 m² per farmer), elephant foot yam (Gajendra) (100 m² per farmer), taro (Sree Hira and Sree Telia) (400 m² per farmer) and cassava (Sree Jaya) (250 m² per farmer) were

laid-out in farmers field at Karanjiari village, Rasulpur block, Jajpur district.

- Five demonstrations on biofortified sweet potato variety Bhu Sona @ 1600 m² per farmer were laid-out at Beruda village, Jajpur block, Jajpur district.
- Quality planting materials of greater yam 1000 kg, elephant foot yam 500 kg, taro 750 kg, cassava stems 1000 and sweet potato 50000 vine cuttings were distributed to SC farmers.
- Two capacity building trainings on tuber crops cultivation were organized on 28 June 2023 and 18 August 2023 at Karanjiari village, Rasulpur block, Jajpur district.
- One capacity building training on value addition of tuber crops (live demonstration on chips, snack foods (seva, murukku, pakoda and khandia and jam production from cassava and sweet potato) was organized on 22 November 23 at Karanjiari village, Rasulpur block, Jajpur district.
- Taro crop was harvested and recorded average yield of 18.3 t/ha. Other crops are yet to be harvested.

G. MPUAT, Udaipur

Table 174. Training Activities organized by MPUAT, Udaipur centre

Training	Date	Place	No. of beneficiaries		
			M	F	Total
Improved vegetable cultivation practices	15 January 2023	Jodhana, Mavli, Udaipur	15	06	21
Production technology of tuber crops	30 January 2023	DOR, MPUAT, Udaipur	20	32	52
Production technology of tuber crops	13 March 2023	Jarga Ambaji, Sayra, Udaipur	28	36	64
Production technology of tuber crops	18 March 2023	Berotha, Pratapgarh	114	0	114
Production technology of tuber crops	04 June 2023	Dob, J. Phalasia, Udaipur	14	31	45
Production technology of tuber crops	30 September 2023	KVK, Banswara	42	02	44
Production technology of tuber crops	29 December 2023	Jhadoli, Udaipur	16	29	45

H. NAU, Navsari

AICRP on Tuber Crops, Department of Vegetable Science, ASPEE College of Horticulture and Krishi Vigyan Kendra, Navsari Agricultural University, Navsari organized one day training cum value addition programme & kit distribution to 21 SC farmers held at KVK, NAU, Navsari during 23rd March, 2023. The training programme was inaugurated by the Chief Guest Dr. K.D. Desai, Principal, Horticulture Polytechnic, NAU, Navsari and Dr. C.G. Intwala was the Guest of Honour. A galaxy of vegetable scientists including Dr. J.M. Vashi, Dr. A.I. Patel and Dr. K.A. Shah, SMS, KVK,

Navsari, Dr. C.G. Intwala, Professor (Breeding), Department of Vegetable Science, NAU, Navsari welcomed the farmers and emphasized on the importance of tuber crops as major source of carbohydrates, fibres, vitamins that contribute to nutritional security in addition to tuber crop production enhances the income of small farmers. Dr. K.D. Desai, Principal, Horticulture Polytechnic, NAU acknowledged the enormous diversity of tuber crops and suggested ways to enhance and sustain tuber crop productivity.

Hon'ble Vice Chancellor, Dr. Z.P. Patel inaugurated one

day training programme of SC farmers on ‘Advance production technology of tuber crops’ organized by AICRP (TC), Department of Vegetable Science, ASPEE College of Horticulture, NAU, Navsari on 21 September 2023 wherein 25 SC farmers were imparted training.

I. SKLTSHU, Rajendranagar

Meeting on tuber crops: Production technologies in *Colocasia* under SCSP conducted at VRS, Rajendranagar on 07 January 2023 and distributed battery operated sprayers.

J. IGKV, Jagdalpur

A total of 5 trainings were conducted under SCSP scheme and details given below

Table 175. Training programmes organized by IGKV, Jagdalpur

Sl.No.	Training & Place	Date	Distribution	No. of beneficiaries		
				Male	Female	Total
1	Improved cultivation technology of tuber crops at Vill.- Chavel, Distt. Kanker (Off Campus training conducted by CARS, Kanker)	11 March 2023	Spade and vegetable seeds	35	30	65
2	Production technology of tuber crops at SGCARS, Jagdalpur	17 March 2023	Sprayer and cassava setts	27	00	27
3	Improved cultivation technology of tuber crops at Vill.- Kusma, Distt. Kondagaon (Off Campus training conducted by KVK, Kondagaon)	18 March 2023	Spade, vegetable seeds and cassava setts, <i>Colocasia</i> seeds	41	09	50
4	Production technology of tuber crops at Vill-Chirai padar, panchayat- Tikra Lohga,	22 March 2023	Spade, vegetable seeds, and cassava setts, <i>Colocasia</i> and EFY seeds	27	00	27
5	Production technology of tuber crops at SGCARS, Jagdalpur	22 December 2023	Water cane, cassava setts, vegetable seeds	25	00	25

K. TNAU, Coimbatore

The details of training programmes organized by TNAU, Coimbatore are listed below.

Table 176. Training programmes organized by TNAU, Coimbatore

Sl.No.	Training particulars	Date	Place	No. of beneficiaries	
				Male	Female
1	SCSP Farmers training on improved agronomic practices in tropical tuber crops and input distribution, Kallakurichi District	27 January 2023	Dept. of Vegetable Crops, TNAU and TANUVAS, KVK, Chinnasalem, Kallakurichi District	22	5
2	SCSP Farmers training on improved agronomic practices in tropical tuber crops input distribution at Panamarthupaati block, Salem District	24 February 2023	Dept. of Vegetable Crops, TNAU and KVK, Sandhiyur, Salem	12	-
3	SCSP Farmers training on improved agronomic practices in tropical tuber crops input distribution at Sandhiyur block, Salem District	24 February 2023	Dept. of Vegetable Crops, TNAU and KVK, Sandhiyur, Salem District	10	3
4	SCSP Farmers training on awareness on tropical tuber crops and introduction of sweet potato at Thalavady, Erode District	28 March 2023	Dept. of Vegetable Crops, TNAU and ADH office Thalavadi, Erode district	20	5

L. TCRS, Yethapur

The following training programmes were organized by TCRS, Yethapur

Table 177. Training programmes organized by TCRS, Yethapur

Sl.No.	Name of the programme	Place	Date	No. of beneficiaries
1	Training on agro-techniques of cassava, demonstration of sett treatment and value addition in cassava	TCRS, Yethapur	07 Nov. 2023	50

M. UHS, Dharwad

UHS, Dharwad organized the following training programmes.

Table 178. Training programmes organized by UHS, Dharwad

Sl.No.	Inputs	Farmers details	Place and Date	Number of farmers benefitted (male/female/rural youth)
1	Double battery operated sprayers	Bilur village	RHREC, Dharwad 10 Aug. 2023	15 (12/3)
2	Double battery operated sprayers	Khanapur	RHREC, Dharwad 17 Nov. 2023	15 (14/1)

V.8. Special programmes carried out under TSP

A. BAU, Ranchi

Fifty-five farmers belonging to scheduled tribe hailing from Chanhoo and Kuru blocks of Ranchi and Lohardaga districts got benefitted. Inputs viz., seeds, fertilizer, pesticides were distributed among farmers.

B. IGKV, Jagdalpur

The details of training programmes organized by IGKV, Jagdalpur are listed below.

Table 179. Training programmes organized by IGKV, Jagdalpur

Sl.No.	Title of Training & Place	Date	No. of beneficiaries (male/ female)
1	Production technology of tuber crops at Vill.-Chokar, Block-Bastar	01 March 2023	67 (45/22)
2	Production technology of tuber crops at Vill.-Lakhibeda, Block-Lohandiguda.	02 March 2023	45 (36/09)
3	Production technology of tuber crops at Vill.-Chaparbharpuri, Bastar	04 March 2023	53 (45/08)
4	Improved cultivation technology of tuber crops & field visit	18 August 2023	38 (27/11)
5	Improved cultivation technology of tuber crops	4 October 2023	46 (46/00)

23rd ANNUAL GROUP MEETING



All India Coordinated Research Project on Tuber Crops (AICRP TC) is the national research network of tropical root and tuber crops across 18 states and one union territory (Andaman & Nicobar islands). The network includes 21 centres located in 12 state agricultural universities (SAU), two central agricultural universities (CAU) and five ICAR institutes. The 23rd annual group meeting (AGM) was held at Bidhan Chandra Krishi Viswavidyalaya (BCKV), Kalyani, West Bengal during 10-12 May 2023. Dr. Anand Kumar Singh, Deputy Director General (Horticultural Science), ICAR; Dr. Sudhakar Pandey, Assistant Director General (FVS & MP), ICAR; scientists from 21 centres, external experts, heads of divisions and selected scientists of ICAR-CTCRI participated in the deliberations. There were seven sessions including the session on action taken report (ATR) of recommendations of 22nd AGM. A critical and constructive evaluation of different programmes carried out by different centres was done and recommendations for future action are included in this proceedings. Fifteen entries (cassava: 3, greater yam: 4, eddoe taro: 4, dasheen taro: 3 and elephant foot yam: 1) were recommended for release. Six crop production and protection technologies have also been recommended for inclusion in package of practices (PoP) of different agro climatic zones (ACZ) in India. The best centre award for 2022-2023 is shared by Dr. YSRHU, Peddapuram and Dr. YSRHU, Kovvur, the two AICRP TC centres of Dr. YSRHU, Andhra Pradesh.

Salient recommendations of 23rd AGM

- Characterization of germplasm at different centers needs to be unified by using same DUS/NBPGR/APGRI descriptors by all centres. First part of

catalogues of major crops will be brought out by December 2023.

- Development of core collections of major crops in each centre needs to be completed by March 2024.
- The originating centres of 15 entries recommended for release will take immediate steps for release of the varieties. All scientist(s) involved in IET, URT and MLT of each entry recommended for release will be duly credited as co-developers of the variety even if it is not recommended for the state where his/her centre exists.
- All centres will take immediate steps to include the eight crop production/ protection technologies in the package of practices of the respective ACZ (states). All scientist(s) involved will be duly credited as co-developers of the technology even if it is not recommended for the state where his/her centre exists.
- The principal developer of above 15 lines and 8 crop production/ protection technologies will consolidate and analyze data and prepare and submit manuscripts of research papers in high impact journals for publication by December 2023.
- Planting material production needs to be strengthened by miniset techniques in cassava, yams, elephant foot yam and taro by centres, and possibility of large-scale multiplication using tissue culture techniques need to be explored at CTCRI HQ.
- Decentralized seed multipliers (DSM) will have to be identified and got registered by all centres (minimum of five DSM by each centre every year) to meet the demand of quality planting materials by farmers. The details of the farms including geocoordinates need to be collected and reported during mid-term review during November-December 2023.
- Same variety will be used by all centres in all future trials on agro techniques.
- While presenting the data, the units of parameters should be uniform across all centres.
- While presenting pooled analysis, season 1 and 2 data and results of pooled analysis should be presented as

- per SOP and detailed technical programme.
- A brainstorming session on elephant foot yam will be organized by HRS, Kovvur centre during 2023.
- A midterm review meeting will be conducted during November-December 2023 to review the progress of work by all centres.

Publications released during 23rd AGM

Sl.No.	Centre	Citation
1	ICAR-CIARI, Port Blair, A&N Islands	Augustine Jerard B., Damodaran V. and Sunitha S. 2023. A catalogue of conserved <i>Colocasia</i> accessions at ICAR-CIARI, Port Blair. Technical bulletin, ICAR-AICRP TC and ICAR-CIARI, Port Blair, 60p.
2		Augustine Jerard B., Damodaran V., Sunitha S., Sheela M.N. and Suresh Kumar J. 2023. A catalogue of conserved greater yam accessions at ICAR-CIARI, Port Blair. Technical bulletin, ICAR-AICRP TC and ICAR-CIARI, Port Blair, 132p.
3	BCKV, Kalyani, West Bengal	Surajit Mitra and Jayanta Tarafdar. 2023. A field identification guide on sweet potato feathery mottle virus and other virus diseases (SPVD) and its management. Technical folder, ICAR-AICRP TC, BCKV, West Bengal.
4		Surajit Mitra and Jayanta Tarafdar. 2023. Value addition in sweet potato. Technical folder, ICAR-AICRP TC, BCKV, West Bengal.
5		Surajit Mitra and Jayanta Tarafdar. 2023. Cultivation and seed production of tuber crops under improved practice (Bengali). Technical bulletin, ICAR-AICRP TC, BCKV, West Bengal, 40p.
6	MPUAT, Udaipur, Rajasthan	Virendra Singh, Jidendra Kumar T. and Surabhi P. 2023. Production technology of tuber crops (Hindi). Technical bulletin, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan, 32p.
7		Virendra Singh, Mohan Singh and Vineeth Kumar Meena. 2022. Advanced technology of production of sweet potato (Hindi). Technical folder, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan.
8		Virendra Singh, Mohan Singh and Mahendra Kumar Gora 2022. Advanced technology of production of taro (Hindi). Technical folder, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan.
9	Dr. RPCAU, Dholi, Bihar	Narayan, A., Singh, R.S., Tanveer Alam., Giri, G.S., Sudha Nandini., Ravindra Prasad., Geethanjali Choudary. and Singh P.P. 2022. Advanced technology for production of Rajendra Sweet Potato-7 (Hindi). Technical folder, ICAR-AICRP TC, Dr. Rajendra Prasad Central Agricultural University, Dholi, Bihar.
10		Narayan, A., Singh, R.S., Tanveer Alam., Giri, G.S., Sudha Nandini., Ravindra Prasad., Geethanjali Choudary and Singh P.P. 2022. Advanced technology of production of Rajendra Misrikand-3 (Hindi). Technical folder, ICAR-AICRP TC, Dr. Rajendra Prasad Central Agricultural University, Dholi, Bihar.
11		Narayan, A., Singh, R.S., Tanveer Alam., Giri, G.S., Sudha Nandini., Ravindra Prasad., Geethanjali Choudary. and Singh P.P. 2022. Advanced technology of production of Rajendra Arvi-2 (Hindi). Technical folder, ICAR-AICRP TC, Dr. Rajendra Prasad Central Agricultural University, Dholi, Bihar.
12	CSK HPKV, Palampur, Himachal Pradesh	Manpreet Kaur, Gourav., Seema Shah and Suman Kumar. 2023. Calendar of operations on elephant foot yam cultivation in sub mountainous low rainfed hilly region of Himachal Pradesh. Technical folder, ICAR-AICRP TC, CSK HPKV, Palampur, Himachal Pradesh.
13	ICAR RC for NEH Region, Barapani, Meghalaya	Talang, H.D., Verma, V.K., Rymbai, H., Bilashini Devi, M., Assumi, S.R., Vanlalruati, Hazarika S. and Mishra V.K. 2023. Tuber crops: future smart crops. Technical bulletin, ICAR-RC, NEH, Barapani, Meghalaya, 44p.
14	SKLTSHU, Rajendranagar, Telangana	Anita Kumari, D., Suresh Kumar, J. and Suresh, V. 2023. Management of leaf blight in taro (Telugu). Technical folder, Sri Konda Laxman Telangana State Horticultural University, Telangana.
15	Dr. YSRHU, Peddapuram, Andhra Pradesh	Janaki, M., Pavani Priyanka, A. 2023. Scientific management practices in karrapendalam cultivation (Telugu). Technical folder, Dr. YSR Horticultural University, Andhra Pradesh.

Production / protection technologies recommended

Sl.No.	Name of the technology	Details	Agro climatic zones where it is recommended
1	Organic production technology in cassava	Farmyard manure @ 12.5 t ha ⁻¹ , <i>in situ</i> green manuring, crop residue incorporation, <i>Azospirillum</i> @ 3 kg ha ⁻¹ , phosphobacteria @ 3 kg ha ⁻¹ and K solubilizer @ 3 kg ha ⁻¹	Southern Plateau and Hills (Tamil Nadu and Andhra Pradesh), Eastern Plateau and Hills (Chhattisgarh)
2	Water saving technique in cassava	Drip irrigation at 50% CPE + ground cover sheet (120 gsm) or drip irrigation at 50% CPE + mulching with crop residues	Southern Plateau and Hills (Tamil Nadu)
3	Five integrated farming system (IFS) models involving tuber crops for NEH	Meghalaya: Agri + Horti + Piggery system Manipur: Agri + Horti + Livestock (piggery & poultry) system Tripura: Agri + Horti + Livestock (piggery & poultry) system Assam: Agri + Horti + Livestock + Fishery system Himachal Pradesh: Agri + Horti + Poultry system	Eastern Himalayan Region (Assam, Meghalaya, Manipur, Tripura) and Western Himalayan Region (Himachal Pradesh)
4	Four integrated farming system (IFS) models involving tuber crops for tribal areas	Jharkhand: Agri + Horti + Animal (poultry, piggery and duck) system A & N Islands: Agri + Horti + Piggery system Chhattisgarh: Agri + Horti system Odisha: Agri + Horti + Poultry system	The Islands Region (A&N Islands), Middle Gangetic Plains Region (Jharkhand), Eastern Plateau and Hills (Chhattisgarh) and East Coast Plains and Hills Region (Odisha)
5	Secondary and micronutrients inclusive customized fertilizers for cassava	Modified QUEFTS model based, zone specific customized fertilizers including major, secondary and micronutrients	Southern Plateau and Hills Region (Tamil Nadu and Andhra Pradesh)
6	Secondary and micronutrients inclusive customized fertilizers for taro	Modified QUEFTS model based, zone specific customized fertilizers including major, secondary and micronutrients	Eastern Himalayan Region (Assam), Eastern Plateau and Hills Region (Odisha, West Bengal), Middle Gangetic Plains Region (Bihar) and Southern Plateau and Hills Region (Telangana)
7	Management of mealy bugs in elephant foot yam	Dipping of corms in cow dung slurry (2 kg l ⁻¹) for 15 minutes followed by shade drying for 24-48 hours and storage in layers for a period of 3 months	Eastern Plateau and Hills Region (Odisha)
8	Management of post-harvest rot in elephant foot yam seed corm during storage	Single application of combination fungicide containing mancozeb + carbendazim 0.2% by dipping the corms in the solution for 1-2 minutes followed by shade drying for 12-24 hours and storage in layers for a period of 3 months	Eastern Himalayan Region (Assam, Tripura), Lower Gangetic Plains Region (West Bengal), Middle Gangetic Plains Region (Jharkhand, Bihar), (Chhattisgarh), Gujarat Plains and Hills Region (Gujarat), Southern Plateau and Hills (Telangana), and East Coast Plains and Hills Region (Andhra Pradesh).

Varieties recommended for release during 2023

A total of 15 varieties were recommended for release during the 23rd AGM of AICRP TC. Three varieties were recommended for release in cassava, four varieties each in greater yam and taro, one variety in elephant foot yam and three in dasheen taro for higher yield during 2023.

MNS 41 (TCa16-5): This cassava variety was recommended for release at the national level and is a selection from Kerala through ICAR-CTCRI, Thiruvananthapuram centre. The variety recorded an average yield of 40 t ha⁻¹, potential yield of 80 t ha⁻¹ and resistant to cassava mosaic disease over the locations. The variety recorded 24.5 % total starch, 38 % dry matter content and has good cooking quality. It is found suitable for the states of Chhattisgarh, Manipur, Tamil Nadu &



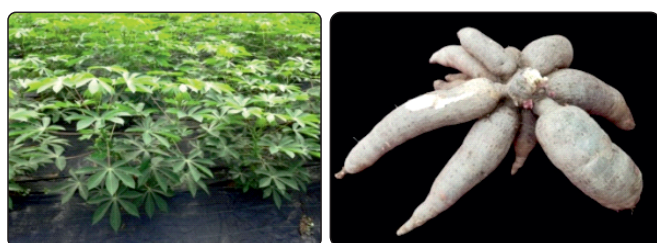
Field view and tubers of MNS 41

MNS 135 (TCa16-4): This cassava variety is a selection by ICAR-CTCRI, Thiruvananthapuram centre and was recommended for state release in Maharashtra. The variety recorded an average yield of 42 t ha⁻¹, potential yield of 80 t ha⁻¹, 40 % dry matter content and total starch of 27 %. It also has tolerance to anthracnose disease with good cooking quality.



Field view and tubers of MNS 135

MNS 255 (TCa 16-3): This cassava variety is from ICAR-CTCRI, Thiruvananthapuram centre and recorded 35 % dry matter content, 25.3 % total starch, average yield of 45 t ha⁻¹ and potential yield of 60 t ha⁻¹. The variety with good cooking quality is resistant to cassava mosaic disease and was recommended for the state of Kerala.



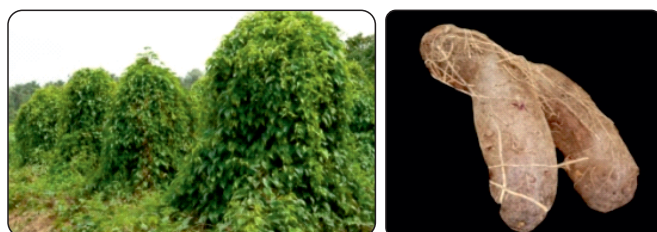
Field view and tubers of MNS 255

TGy17-6: This greater yam variety is a local selection from Assam state and recorded 2.9 % protein, 68.32 % total starch, average yield of 18-22 t ha⁻¹ and potential yield of 30-35 t ha⁻¹. The variety with excellent cooking quality was recommended for central release for the states of Assam and West Bengal.



Tubers of TGy 17-6

Da 67 (TGy17-8): This greater yam variety was recommended for release at the national level and is a selection from Kerala through ICAR-CTCRI, Thiruvananthapuram centre. The variety recorded 30 % dry matter content, 20 % total starch, 4.9 % protein, 3 months shelf life, average yield of 40 t ha⁻¹ and potential yield of 60 t ha⁻¹. It is found suitable for the states of Chhattisgarh & Kerala.



Field view and tubers of Da 67

IKDIO-04-59 (TGy17-4): This greater yam variety is a selection by IGKV, Jagdalpur centre and was recommended for the state release in Rajasthan. The variety recorded an average yield of 28.64 t ha⁻¹, potential yield of 37.45 t ha⁻¹, dry matter content of 35.56 % and tolerant to anthracnose disease.



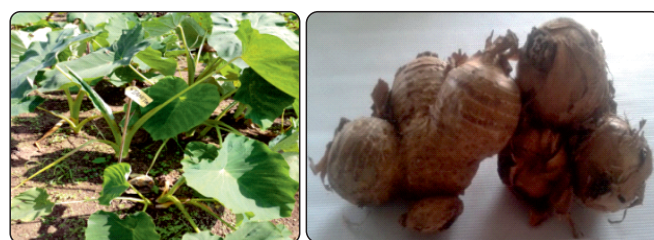
Field view and tubers of IKDIO-04-59

TGy17-3: This greater yam variety is a selection by Dr. YSRHU, Kovvur centre and was recommended for the state release in Kerala. The variety recorded an average yield of 28.64 t ha⁻¹, potential yield of 37.45 t ha⁻¹, dry matter content of 35.56 % and tolerant to anthracnose disease.



Field view and tubers of TGy 17-3

Tamitin (TTr17-12): This stolon taro variety recommended for release at the national level and is a selection from ICAR-RC, NEH, Barapani centre. The variety recorded an average yield of 25-28 t ha⁻¹, potential yield of 42 t ha⁻¹ and moderately tolerant to phytophthora leaf blight disease and *Colocasia* corm borer over the locations. It is found suitable for the states of Bihar, Maharashtra, Jharkhand, Kerala, Tamil Nadu & Tripura.



Field view and tubers of Tamitin

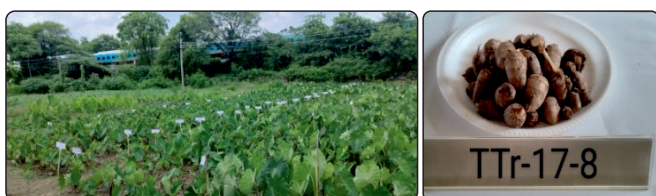
BCC-38: This stolon taro variety was recommended for release at the national level for the states of Assam and Meghalaya and is a selection from BCKV, Kalyani

centre. This variety recorded an average yield of 21.5 t ha⁻¹, potential yield of 40 t ha⁻¹, 19.39 % total sugar and 23.64 % dry matter content.



Field view and tubers of BCC-38

TTr17-8: This variety in stolon taro is a selection from MPUAT, Udaipur centre and recorded 24.1 % dry matter content, moderately resistant to leaf blight and tolerant to water stagnation, 14.1 % total starch with excellent cooking quality and have an average yield of 20 t ha⁻¹. The variety was recommended for state release in Assam.



Field view and tubers of TTr 17-8

C149 (TTr17-3): This stolon taro variety is a selection from Dr. RPCAU, Dholi centre and was recommended for state release in Rajasthan. This variety recorded 24.24 % dry matter content, 14.19 % total starch, excellent cooking quality, tolerant to water logging and moderately resistant to leaf blight.



Field view and tubers of C 149

C4 (TBd17-4): This dasheen taro variety was recommended for release at the national level for the states of Bihar and Jharkhand and is a selection from Dr. RPCAU, Dholi centre. This variety recorded an average yield of 33 t ha⁻¹, potential yield of 36 t ha⁻¹, 15.87 % total starch, 23.64 % dry matter content, 37.24 mg 100 g⁻¹ calcium oxalate, 1.19 % sugar, moderately resistant to leaf blight and tolerant to water logging with excellent cooking quality.



Field view and tubers of C 4

C8 (TBd17-2): This dasheen taro variety was recommended for release at the national level for the states of Chhattisgarh, Assam and Meghalaya and is a selection from Dr. RPCAU, Dholi centre. This variety recorded an average yield of 26 t ha⁻¹, potential yield of 28 t ha⁻¹, 15.22 % total starch, 23.84 % dry matter content, 37.07 mg 100 g⁻¹ calcium oxalate, 1.13 % sugar, moderately resistant to leaf blight, good cooking quality and grown well as a rainfed crop.



Field view and tubers of C 8

C7 (TBd17-3): This dasheen taro variety is a selection from Dr. RPCAU, Dholi centre and was recommended for state release in Bihar. This variety recorded 23.82 % dry matter content, 15.18 % total starch, 37.14 mg 100g⁻¹ calcium oxalate content, 1.11 % sugar, excellent cooking quality, tolerant to water logging and moderately resistant to leaf blight.



C3: This elephant foot yam variety is a selection from Dr. RPCAU, Dholi centre and was recommended for state release in Bihar. This variety recorded an average yield of 45.6 t ha⁻¹, potential yield of 50 t ha⁻¹, 24.5 % dry matter content, 18.62 mg 100g⁻¹ calcium oxalate content, good cooking quality, tolerant to collar rot and moderately tolerant to high moisture stress.



Tubers of C 3

MONITORING AND FUNCTIONING OF CENTRES

Project Coordinator has taken firm steps for smooth progress and functioning of various coordinating centres by visiting them regularly in addition to keep the constant touch will all through phone, email, whatsapp and e-networking. Time to time advice and direction was given to all centres for proper implementation of all the activities. Quarterly report for TSP, SCSP and NEH programmes, Statewise achievement reports and budget utilization information was obtained from all centres for monitoring. Discussions were held with the Vice-Chancellors, Directors of Research and Head of Divisions of the SAUs of the concerned centres as well as with the scientists of AICRP Tuber Crops for the smooth and fruitful conduct of the project programmes. The PC also visited farmers' fields under different AICRP TC centres. The Project Coordinator visited the following centres personally to review the work activity critically and rendered proper guidance to proceed further.

Sl.No.	Place of visit	Date
1	RS, ICAR-CTCRI, Bhubaneswar	17-19 January 2023
		2-4 February 2023
		26-29 June 2023
		1-6 December 2023
2	MPUAT, Udaipur	30 January 2023
3	BAU, Ranchi	01 February 2023
4	TNAU, Coimbatore	8 June 2023
5	UHS, Dharwad	10 August 2023
6	SKLTSHU, Rajendranagar	24 August 2023
7	CSK HPKV, Palampur	19 September 2023
8	NAU, Navsari	21 September 2023
9	TCSR, Yethapur	07 November 2023

MPUAT, Udaipur

Dr. G. Byju, Project Coordinator and Director ICAR-CTCRI visited AICRP on Tuber Crops centre at MPUAT, Udaipur (Rajasthan) on 30 January 2023. He visited the experiments on greater yam, *Colocasia*, elephant foot yam, sweet potato and germplasm collection at the centre. He also visited experimental field & activities of AICRP on Floriculture as well as AICRP on Fruits at Horticulture Farm, Udaipur. A meeting of Dr. Ajeet Kumar Karnatak, Vice Chancellor, MPUAT, Udaipur and Dr. G. Byju, PC & Director, ICAR-CTCRI was also held in which present scenario of research achievements

of ICAR-CTCRI & MPUAT were discussed along with a consensus for mutual cooperation and collaborations between two institutes through MoU. Dr. G. Byju attended as Guest of Honour in farmers training programme conducted under AICRP on Tuber Crops (SCSP Component) an exhibition of different tuber crops at Directorate of Research, MPUAT, Udaipur was arranged. He highlighted about 68 varieties of different tropical tuber crops like greater yam, *Colocasia*, elephant foot yam, sweet potato and cassava developed by CTCRI along with need of quality planting material and dissemination of climate resilient technologies. Project Coordinator also visited Organic Farming Unit & experiments under ICAR- AINPOF & RKVY on Organic Farming, Mushroom Unit and Soil Science Department at RCA, Udaipur.



Dr. G. Byju, Project Coordinator & Director, ICAR-CTCRI visited Udaipur centre

BAU, Ranchi

Dr. G. Byju, Project Coordinator and Director, ICAR-CTCRI, AICRP on Tuber Crops visited Ranchi centre during 01-02, February 2023. He also made a visit to Department of Horticulture, Integrated Farming System of BAU, Agril. Engg. Department and Plasticulture Engineering and met Dr. O.N. Singh, Vice Chancellor of BAU and Dr. S.K. Pal, Director of the Research. On 2nd February 2023 he visited Choreya village of Chanhoblock, Ranchi district, Jharkhand. Attended awareness-cum-training programme of Scheduled Caste Sub-Plan (SCSP) of AICRP TC. In the training programme, he delivered a talk on scientific production technology of tuber crops and suggested low-cost technologies by which farmers can increase their farm income with the cultivation of tuber crops. He also distributed university fabricated small tools like maize sheller and grubber to the farmers. About 60 farmers were benefitted from this training.



Dr. G. Byju, Project Coordinator & Director, ICAR-CTCRI visited experiment field and selected SCSP village at Ranchi centre



TNAU, Coimbatore

Project Coordinator, AICRP on Tuber Crops and Director, ICAR-CTCRI visited Tamil Nadu Agricultural University, Coimbatore, on 08 June 2023 and reviewed the major AICRP Tuber Crops scheme research activities. He reviewed the trials on URT in sweet potato, IET on elephant foot yam, HDP in Elephant foot yam, MLT on arrowroot and had given suggestions. PC also visited an exhibition arranged on major tropical tuber crops and minor under exploited tuber crops. Finally, he made a review on budget and expenditure (2022-23) of the Coimbatore and Yethapur centres.

UHS, Dharwad

Project Coordinator and Director, ICAR-CTCRI, Dr. G. Byju inaugurated one day training programme of SCSP farmers entitled 'Pest management in sweet potato through integrated approach' organized by AICRP (TC), Regional Horticultural Research and Extension Centre, Dharwad on 10 August 2023. He gave highly insightful suggestions to expand area under sweet potato with recently released sweet potato varieties in Belagavi region and given assurance to release some fund under TSP as most farmers who are engaged in sweet potato cultivation belonging to Schedule Tribe. During training programme, publication on integrated pest management in sweet potato was released and involved in distribution of agricultural inputs to SCSP beneficiaries. Dr. G. Byju, PC & Director, ICAR-CTCRI visited the experimental fields, reviewed the work and given suggestion for improvisation. Director of research, Dr. H.P. Maheshvarappa also participated in the training programme as president of training programme and also visited experimental plots along with the PC & Director, ICAR-CTCRI. Dr. Imamsaheb Jatth, PI (AICRPTC) and other faculty members of RHREC, Dharwad were present in the inaugural function wherein 15 SC farmers were imparted training.



Dr. G. Byju, Project Coordinator & Director, ICAR-CTCRI, inaugurated training programme and visited experimental plot of HDP in MLT arrow root at Dharwad centre



SKLTSU, Rajendranagar

Dr. G. Byju, Project Coordinator and Director, ICAR-CTCRI, Dr. Sudhakar Pandey, ADG (FVS & MP), Dr. Vijay Mahajan, Director, DOGR and Dr. Sheshu Madhav, Director, CTRI visited Vegetable Research Station, Rajendranagar on 24th August, 2023. Dr. A. Bhagwan, Director of Research, Sri Konda Laxman Telangana State Horticultural University, Dr. T. Suresh Kumar, Zonal Head Southern Telangana Climatic region and Dr. D. Anitha Kumari, Principal Scientist (Ento) & Head accompanied the team along with the scientists of Vegetable Research Station, Rajendranagar. Project Coordinator reviewed the ongoing trials under AICRP (Tuber Crops) at Vegetable Research Station, Rajendranagar.



Dr. G. Byju, Project Coordinator & Director, ICAR-CTCRI along with Dr. Sudhakar Pandey, ADG (FVS & MP) visited Rajendranagar centre



Dr G. Byju, Project Coordinator, AICRP on Tuber crops visited AICRP on tuber crops, Palampur centre dated on 19 October 2023. He reviewed the on-going research work under AICRP on tuber crops at Research Sub Station (RSS) Bilaspur of CSKHPKV Palampur. He monitored the progress of experimental trial of elephant foot yam, taro and greater yam. He stressed upon introduction of other major tuber crops such as cassava and sweet potato on farmers' field at commercial scale. He visited two progressive farmers growing and processing tuber crops mainly elephant foot yam and taro on large scale. PC later participated in the one-day training programme entitled 'Integrated crop management of tuber crops' under AICRP on tuber crop

by RSS, Bilaspur as Chief Guest and distributed the training material to the trainee farmers. He advised farmers to adopt AICRP tuber crop technologies to raise their farm income under current scenario of climate change.



Dr. G. Byju, Project Coordinator & Director, ICAR-CTCRI visited fields of natural farming in taro and initial evaluation trials of elephant foot yam at Palampur centre

NAU, Navsari

Project Coordinator visited the NAU centre for monitoring and reviewing of work under AICRP on Tuber Crops, NAU, Navsari on 21 September, 2023. He attended one day training programme on 'Advance production technology of tuber crops' organized by AICRP TC, Department of Vegetable Science, ASPEE College of Horticulture, NAU, Navsari which was inaugurated by Hon'ble Vice Chancellor, Dr. Z.P. Patel. He gave highly insightful suggestions about the introduction of indigenous varieties in tuber crops. Dr. Alka Singh, Dean & Principal, ASPEE College of Horticulture, NAU, Navsari, Dr. C. G. Intwala, Professor (Breeding), Dr. Himani Patel, PI (AICRP TC) and other faculty members of Department of Vegetable Science were present in the inaugural function (25 SC farmers were imparted training). PC visited progressive farmer's field of greater yam, elephant foot yam and tannia of Navsari district also.



Dr. G. Byju, Project Coordinator & Director, ICAR-CTCRI visiting progressive elephant foot yam farmers' field

TCRS, Yethapur

Dr. G. Byju, Project Coordinator & Director, ICAR-CTCRI, Thiruvananthapuram visited Tapioca and Castor Research Station, Yethapur on 07 November 2023 and conducted technical review, visited the AICRP-TC-Cassava experimental fields and participated in ICAR-AICRP on Tuber Crops SCSP training Programme. The scientist in-charge Dr. M. Velmurugan presented the progress of research and extension activities carried out at the centre. In addition to the above, Director (ICAR-CTCRI) inspected the decentralized planting materials multiplication in farmers field.



Dr. G. Byju, Project Coordinator & Director, ICAR-CTCRI visited Yethapur centre

PUBLICATIONS

Research papers

1. Anil K., Kaushik, R.A., Virendra, S., Vinod, S., Abhay, D. and Shaifali, T. 2023. Effect of gibberellic acid and hand pollination on quality parameters of custard apple (*Annona squamosa* L.) cv. arka sahan. *Biological Forum - An International Journal*, **15**(9): 153-155.
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9. Jat, S.L., Virendra, S., Kaushik, R.A., Lakhawat. S.S., Bairwa, H.L., Pilonia S., Verma M., Kumar V. and Meena R. 2023. Shelf life enhancement of capsicum (*Capsicum annuum* L.) under modified atmosphere packaging. *The Pharma Innovation Journal*, **12**(3): 3109-3112.
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11. Kedswin, K.S., Srinivasan, M.R., Saminathan, V.R., Preetha, G. and Thangamani, C. 2023. Pollination potential of *Apis cerana indica* in pumpkin (*Cucurbita moschata* Duchex Poir.) *Biological Forum - An International Journal*, **15**(5a): 181-186.
12. Lakshmi, R.N., Mamatha, K., Bhagavan, B.V.K. and Naidu, M.M. 2023. Standardization of Meta-topolin concentration for maximizing in vitro proliferation in commercial banana cultivars of Andhra Pradesh, India. *International Journal of Environment and Climate Change*, **13**(12): 947-953.
13. Naga Lakshmi, R., Mamatha, K. and Bhagavan, B.V.K. 2023. Integrated crop management for viable production of banana cv. Tellachakkerakeli (AAA) under Godavari alluvial soils of Andhra Pradesh. *The Pharma Innovation Journal*, **12**(12): 1756-1759.
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13. Visalakshi Chandra, C., Sheela, M.N., Suresh Kumar, J., Namrata, A.G. and Senthil, A.S. 2023. Cassava. In: *Production Technology of Underexploited Vegetable Crops*. Kalyani Publishers, New Delhi. pp.552.
6. Velmurugan, M., Manickam, S., Venkatachalam, S.R., Arutchenthil, P., Saravanan, P.A., Ravichandran, V. and Veeramani. P. 2023. *Value addition in tapioca*. TCRS, Yethapur. pp. 25.

Technical folders/ Leaflets/ Booklets/ Pamphlets

Technical bulletins

1. Augustine, J., Damodaran, V. and Sunitha, S. 2023. *A Catalogue of Conserved Colocasia Accessions*. ICAR-CIARI, Port Blair. pp.125.
2. Augustine, J., Damodaran, V., Sunitha, S., Sheela, M.N. and Suresh Kumar, J. 2023. *A Catalogue of Conserved Greater Yam Accessions*. ICAR-CIARI, Port Blair. pp.134.
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4. Jaisankar, I., Augustine, J.B., Damodaran, V., Chakurkar, E.B., Byju, G., Subramani, T., Harinivas, A. and Karunakaran, D. 2023. *Prospects of Nicotiana glauca (Dioscorea alata L.) cultivation in Andaman and Nicobar Islands* (Technical Bulletin No. CIARI/05/2023). ICAR-CIARI, Port Blair. pp. 27.
5. Velmurugan, M., Manickam, S., Venkatachalam, S.R., Arutchenthil, P., Saravanan, P.A., Ravichandran, V. and Veeramani. P. 2023. *Tapioca cultivation*. TCRS, Yethapur. pp. 25.
1. Anitha Kumari, D., Preetham G.R., Veera Suresh, Krishnaveni, V. and Lavanya, A.V.N. 2023 *Bee Keeping in Vegetable Crops (Telugu)*. Hyderabad.
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3. Gopali, J.B., Imamsaheb S.J. and Shridhar D. 2023. *Pest management in sweet potato through integrated approaches (Kannada)*. Dharwad, Karnataka.
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 8. Mahendra K.G. and Virendra S. 2023. How to cultivate muskmelon (Hindi). *Agri Articles*. **3**(05): 221-226.
 9. Mahendra K.G. and Virendra S. 2023. How to cultivate raddish (Hindi). *Agri Articles*. **3**(05): 216-220.

Training manuals/chapters

Popular articles

1. Pradeepika, C., Krishnakumar, T., Sajeev, M.S., Jyoti, A.N., Visalakshi, C., Senthil, S.J., Suresh Kumar, J., Gowda, H. and Namrata A.G. 2023. Smart Snacking- Healthy Snacks from Tropical Tuber Crops. *Kerala Karshakan e-journal*, **11**(5): 27-35.
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4. Mamatha, K., Ramanandam, G., Ravindra, K.K., Kishore K.Ch., Sneha L.R.A. and Viswanath, M. 2023. Taro- Its nutritive values and cultivation practices, *Dr. YSR Rythu Bharosa*, **3**(12): 32-33.
5. Kishore K.Ch., Ramanandam, G., Mamatha, K., Ravindra K.K., Sneha L.R.A. and Viswanath, M. 2023. Integrated nematode management (Telugu). *Dr. YSR Rythu Bharosa*, **3**(12): 28-29.
6. Ramanandam, G., Mamatha, K., Ravindra K.K., Sneha L.R.A., Kishore K.Ch. and Viswanath, M. 2023. Cultivation practices for elephant foot yam (Telugu). *Dr. YSR Rythu Bharosa*, **3**(12): 20-21.
7. Gopali, J.B. and Imamsaheb S.J. 2023. Integrated pest management in sweet potato, *Krishi Munnade (Kannada)*, **36**(10): 22-23.
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Awards and recognitions

1. Dr. Mamatha K. (AICRP TC, Kovvur centre) and Janaki M. (AICRP TC, Peddapuram centre) received best AICRP TC centre award for the year 2022-23 during the 23rd Annual group meeting of ICAR - AICRP on Tuber crops held at BCKV Kalyani held during 10- 12 May 2023.
2. Dr. Veera Suresh (AICRP TC Rajendranagar centre) received 1st Prize in Revenue generation at 23rd Annual Group Meeting of ICAR AICRP on Tuber crops at BCKV, Kalyani.

3. Dr. Mamatha K. (AICRP TC, Kovvur centre) received best research paper award for the oral presentation during the *National Conference on Tropical Tuber Crops for Sustainability, Tradition, Agri-Food System and Resilience* held at ICAR-CTCRI, Thiruvananthapuram from 28-29 November 2023.
4. Dr. J. Suresh Kumar (AICRP TC, Thiruvananthapuram centre) received CAEFellow CWSS Award-2023 from the Crop and Weed Science Society (CWSS), Kalyani, West Bengal during 6th CWSS International Conference on Agricultural Innovations for Sustainable Development Goals with Special Focus on Natural Farming (AISDGONF-2023) held during 30 September -02 October 2023.
5. Dr. Himani B. Patel (AICRP TC, Navsari centre) received Young Scientist Award 2023 by Prosper Foundation & Agri Amigos Private Limited, Teaching & Research Excellence Awards - 2023 on 12 August 2023.
6. Dr. Himani B. Patel (AICRP TC, Navsari centre) received First Prize Award in *International Conference On Recent Innovations And Technological Advancements In Agriculture, Horticulture, Agricultural Engineering, Sericulture, Food Science, Biotechnology And Rural Entrepreneurship -2023 : AGRI INNOVA -2023* on Rapid Multiplication Technique of Quality Planting Material in Greater Yam: Minisett by The Indian Agriculture College, Radhapuram, Tirunelveli District, Tamil Nadu, on 12 August 2023.
7. AICRP TC, NAU, Navsari received certificate and memento for the exhibition organized in connection with *National Conference on Tropical Tuber Crops for Sustainability, Tradition, Agri-Food Systems & Resilience (NCTTC 4 STAR 2023)* during 28-29 November 2023 at ICAR-CTCRI, Thiruvananthapuram, Kerala.
8. Dr. YSRHU-HRS, Kovvur (Dr. Mamatha K.) ranked 3rd for planting material production and revenue generation for the year 2022-23 during the 23rd AGM of ICAR-AICRP on Tuber crops.
9. Dr. Veera Suresh (AICRP TC Rajendranagar centre) received appreciation award for Co-PI, in support of project organic seed production and project model organic farming in UHS, Bagalkot on 23 December 2023,
10. Dr. Veera Suresh (AICRP TC Rajendranagar centre) received young scientist Award RVSKVV, Gwalior 28-29 December 2023, RVSKVV, Gwalior, IDP NAHEP, ICAR-IISS, Bhopalin collaboration with CIMMYT, Mexico, IRRI, Phillipines, ICRISAT, Hyderabad, during International Conference on One Health One World.
11. Dr. Surajit Mitra (AICRP TC Kalyani centre) received Best research paper award(oral) for the paper entitled New developments in post-harvest management and processing of tropical tuber crops for food and nutrition security presented in the *National Conference on Tropical Tuber Crops for Sustainability, Tradition, Agri-Food Systems & Resilience* held at ICAR-CTCRI, Thiruvananthapuram, Kerala during 28-29 November 2023.
12. Thangamani, C. (AICRP TC, Coimbatore centre) received Best paper authored award by Agricultural Scientific Tamil Society (SciTSA), New Delhi for contribution of Tamil Research Papers to Tamil Conference during 2023.
13. Thangamani, C. (AICRP TC, Coimbatore centre) received Eminent Scientist award by SGT University, Gurugram Just Agriculture Edu. Group, ISAHRD, Chandigarh for contribution in Horticulture (Vegetable Science), 2023.
14. Thangamani, C. (AICRP TC, Coimbatore centre) received Best research paper award (Poster) by Indian Society for Root Crops & Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala for the paper titled Influence of smaller seed corms and spacing on corm yield & yield of elephant foot yam in the *National Conference on Tropical Tuber Crops for Sustainability, Tradition, Agri-Food Systems & Resilience* held at ICAR-CTCRI, Thiruvananthapuram, Kerala during 28-29 November 2023.

SUMMARY OF PUBLICATIONS

Publications	Numbers
Research papers	40
Research paper presentations in Conference/Seminar/Symposia/Workshop	47
Books	2
Book chapters	13
Technical bulletins	6
Technical folders/Leaflets/Booklets/Pamphlets	14
Popular articles	9
Training manuals/Chapters	4
Awards and recognitions	14
Total	149

BUDGET (2023-24)

Head	Pay and Allowance	Contingency	Capital	Total
ONEH	314.86	150.00	2.00	466.86
NEH	-	47.00	-	47.00
TSP	-	8.81	-	8.81
SCSP	-	49.91	-	49.91
Total	314.86	255.72	2.00	572.58

STAFF POSITION (2023)

Head Quarters

Project Coordinator : Dr. M.N. Sheela (upto 22.01.2023)
: Dr. G. Byju (from 23.01.2023)

Scientists

Agronomy : Dr. S. Sunitha (upto 05.02.2023)
Agricultural Statistics : Dr. J. Sreekumar (from 06.02.2023)
Vegetable Science : Dr. J. Suresh Kumar (upto 31.05.2023)
Nematology : Dr. H. Kesava Kumar (from 01.06.2023)
Agricultural Statistics : Vacant
Personal Assistant : Mr. M. Padma Kumar (upto 31.05.2023)
Senior Clerk : Vacant
Skilled Support Staff : Vacant

AICRP Tuber Crops Centres

Assam Agricultural University, Jorhat, Assam

Principal Investigator : Dr. Sheriful Alam (Horticulture)
Co- Principal Investigator : Mr. Sanjib Sharma (Horticulture)
Field man : Mr. Monoj Bharali

Birsa Agricultural University, Ranchi, Jharkhand

Principal Investigator : Dr. S. Sengupta (Horticulture)

Bidhan Chandra Krishi Viswavidyalaya, Kalyani, West Bengal

Principal Investigator : Dr. Jayanta Tarafdar (Plant Pathology) (upto 22.11.2023)
: Dr. Surajit Mitra (Horticulture) (from 23.11.2023)

Chaudhary Sawan Kumar Himachal Pradesh Krishi Viswavidyalaya, Palampur, HP.

Principal Investigator : Dr. Manpreet Kaur (Vegetable Science)

Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra

Principal Investigator : Dr. Pradnya S. Gudadhe (Horticulture)

Agricultural Assistant : Mr. Vikas Maruti Kshirsagar

Dr. YSR Horticultural University, Venkataramannagudem, Andhra Pradesh, Kovvur

Principal Investigator : Dr. K. Mamatha (Horticulture)

Technical staff : Mr. T. Gouri Sankar

Peddapuram

Principal Investigator : Dr. M. Janaki (Horticulture)

Technical staff : Smt. A. Pavani Priyanka

Indira Gandhi Krishi Vishwavidyalaya, Jagdalpur, Chhattisgarh.

Principal Investigator : Dr. Padmakshi Thakur (Vegetable Science)

Technical Assistant : Upendra Nayak

Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan

Principal Investigator : Dr. Virendra Singh (Horticulture)

Technical Assistant : Vacant

Navsari Agricultural University, Navsari, Gujarat

Principal Investigator : Dr. Himani Patel (Vegetable Science)

Sr. Technical Assistant : Mr. G. B. Desai

Sri Konda Laxman Telangana State Horticultural University, Hyderabad, Telangana

Principal Investigator : Dr. D. Veera Suresh (Plant Pathology)

Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, Coimbatore

Principal Investigator : Dr. C. Thangamani (Horticulture)

Asst. Agricultural Officer : S. Kaviyarashi

Yethapur

Principal Investigator : Dr. M. Velmurugan (Horticulture)

University of Horticultural Sciences, Bagalkot, Karnataka

Principal Investigator : Dr. Imam Saheb Jatth (Vegetable Science)

Voluntary Centres:
ICAR Research Complex for NEH Region, Shillong, Meghalaya

Principal Investigator : Dr. Hammylliende Talang (Horticulture)

Co-Principal Investigator : Dr. V.K. Verma

Regional Station, ICAR Research Complex for NEH Region, Lembucherra, Tripura

Principal Investigator : Dr. Biswajith Das (Horticulture)

Co-Principal Investigator : Dr. H. Lembisana Devi

ICAR-Central Island Agricultural Research Institute, Port Blair, A & N Islands

Principal Investigator : Dr. B. Augustine Jerard (Horticulture) (upto 17.09.23)

: Dr. I. Jaisankar (Agroforestry) (from 18.09.23)

Co-Principal Investigator : Dr. V. Damodaran (ACTO) (upto 17.09.23)

Central Agricultural University, Imphal, Manipur

Principal Investigator : Dr. A.K. Bijaya Devi (Horticulture)

Co-Principal Investigator : Dr. Ngangbam Piloo (Horticulture)
Co-Principal Investigator : Dr. M. Chanchan

Dr. Rajendra Prasad Central Agricultural University, Kalyani, Bihar

Principal Investigator : Dr. A. Narayan (Plant Breeding)
Co- Principal Investigator : Dr. R.S. Singh (Agronomy)
Co- Principal Investigator : Dr. Tanveer Alam (Entomologist)
Field man : Sri. Ravindar Singh

ICAR -Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala

Principal Investigator : Dr. M.N. Sheela (Plant Breeding) (upto 05.06.2023)
: Dr. Susan John (Soil Science) (from 06.06.2023)
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Co- Principal Investigator : Dr. S. Sunitha (Agronomy)
Co- Principal Investigator : Dr. A. Asha Devi (Genetics)
Co- Principal Investigator : Dr. Asha K.I. (Economic Botany)
Co- Principal Investigator : Dr. Shirley Raichal Anil (Genetics)
Co- Principal Investigator : Dr. V.S. Santhosh Mithra (Computer Science & App.)
Co- Principal Investigator : Dr. J. Suresh Kumar (Vegetable Science)

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Co-Principal Investigator : Dr. Kalidas Pati (Vegetable Science)
Co-Principal Investigator : Dr. V.B.S. Chauhan (Vegetable Science)

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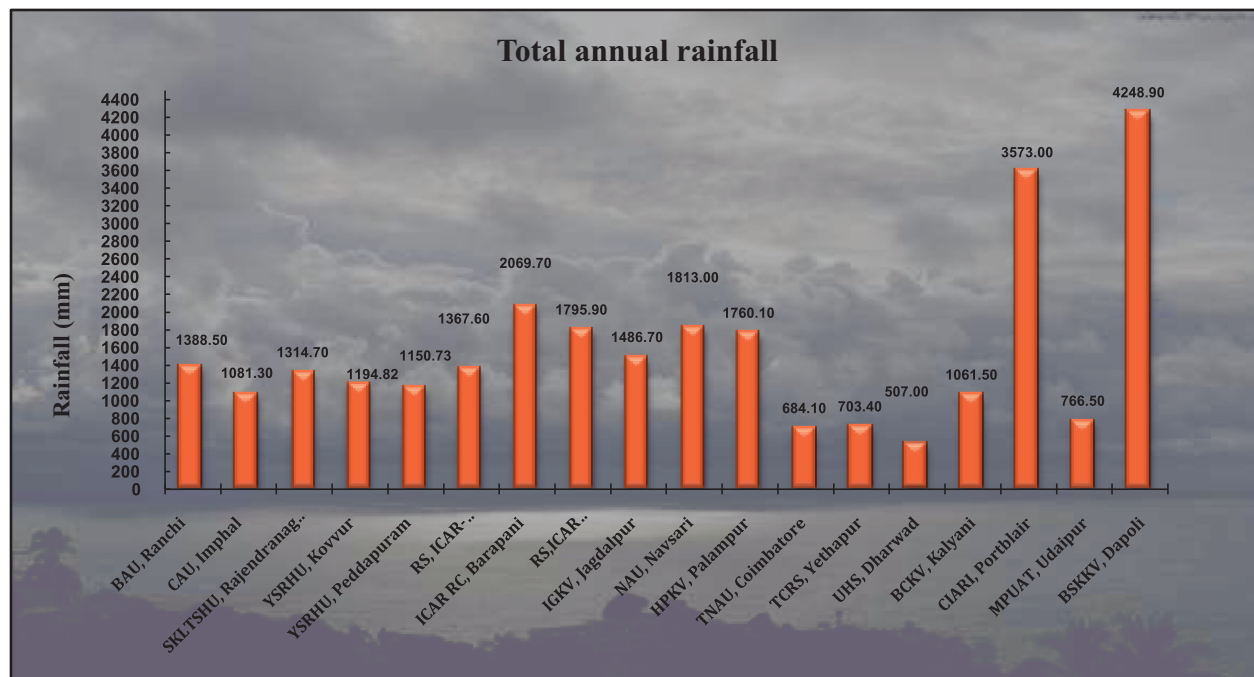
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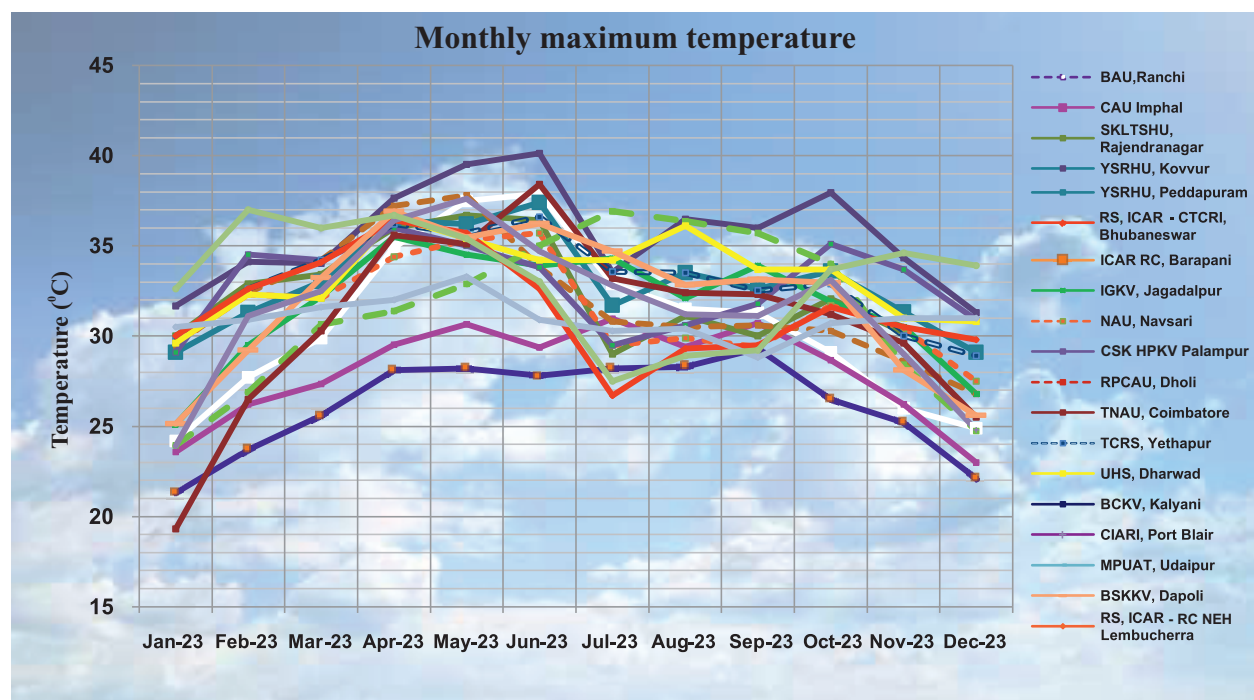
Chaudhary Sawan Kumar

Himachal Pradesh Krishi Viswavidyalaya
Research Sub-station, Berthin Tehsil, Jhandutta
District, Bilaspur, Himachal Pradesh- 176 062
Tel. 8544721418
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mkaur1606@hillagric.ac.in

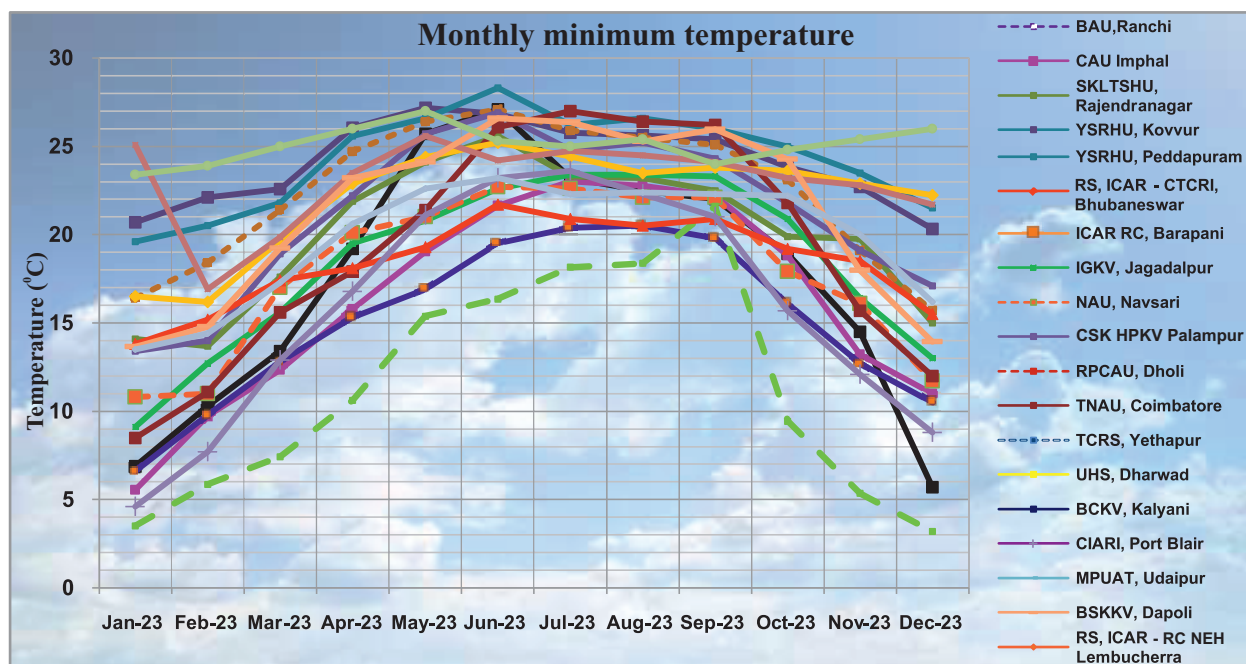
WEATHER DATA (2023)



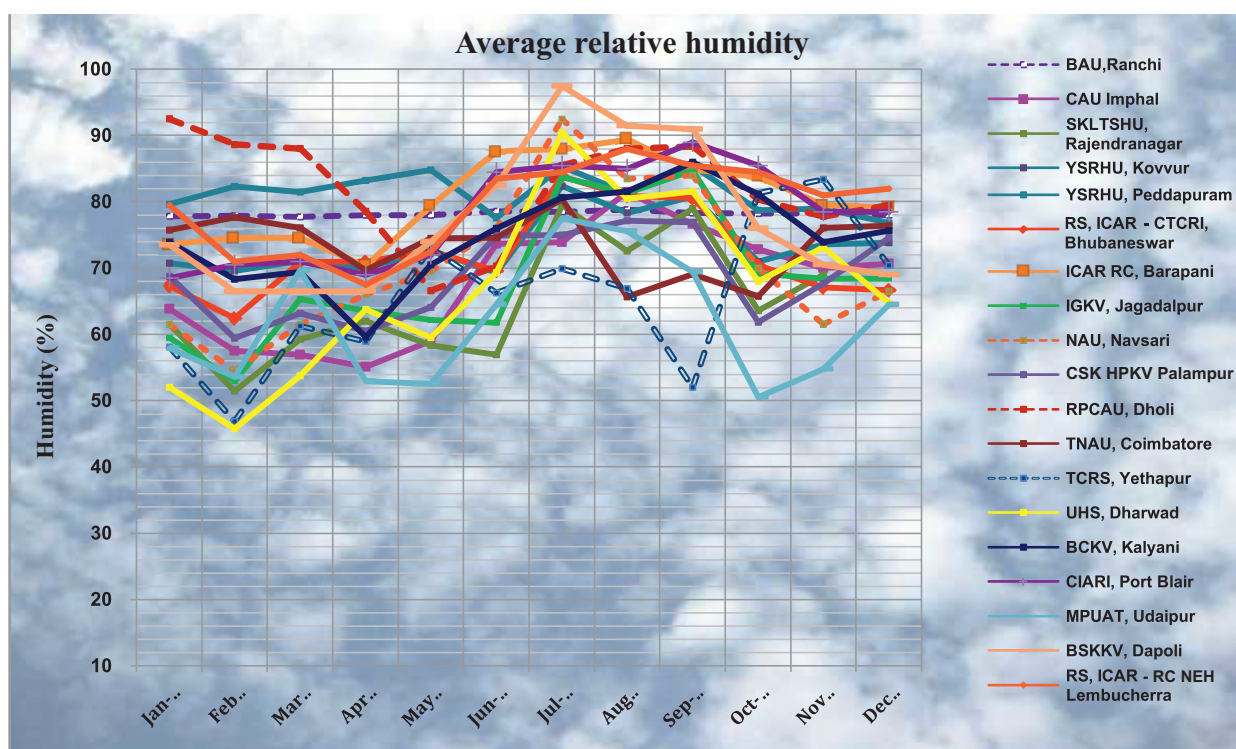
Total annual rainfall received at different AICRP TC centres



Monthly maximum temperature at different centres



Monthly minimum temperature at different centres



Average relative humidity at different locations

‘Produce Tuber Reduce Hunger’



हर कदम, हर डगर

किसानों का हमसफर

भारतीय कृषि अनुसंधान परिषद

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