

RESEARCH HIGHLIGHTS

Tobacco Cultivar development

- **Tobacco Varieties released/ identified:**
 - A high yielding (3740 kg/ha) Bidi tobacco hybrid GABTH-2 was identified for bidi tobacco growing areas of Middle Gujarat and Andhra Pradesh.
 - A high yielding (4976 kg/ha) Rustica tobacco variety GCT-5 was identified for Rustica tobacco growing areas of North Gujarat.
 - A high yielding Burley tobacco variety YB 22 was identified for burley tobacco growing areas of Andhra Pradesh.
 - Variety release proposals of two FCV tobacco varieties (FCJ 11, FCR 15) and one bidi variety (ABD 132) were submitted to AP State Seed Sub Committee on Varietal Release.
- **Pre-breeding lines:** F3 population of the Inter-specific hybridization of *N benthamiana rependa* and Kanchan raised and morphologically promising plants selected for developing pre-breeding lines.
- Three FCV tobacco lines viz., KB32, FB50, KB67 and two FCV tobacco hybrids, KLSH26, KLSH 27 were contributed for multilocation testing.
- Burley tobacco lines YB-37 and Burley-5 recorded 19% and 7% higher yields than Banket A1 in on-farm trials.
- **DUS Guidelines:** Task force committee constituted reviewed the Draft DUS guidelines developed by ICAR-CTRI for registration of FCV and bidi varieties and the report submitted for approval.
- **Germplasm Maintenance:** ICAR-CTRI is maintaining a total Number of 3386 germplasm accessions of different tobacco types for varietal improvement.
- **Germplasm registration:** Eight germplasm entries viz., NLCR-6-10 (high leaf no.), 1/135 (high Solanesol), JS 117, V-4914 (TMV resistance), HV.2000-6 (Caterpillar resistance), BSR-1 (Black shank resistance), F6-2-2 (High seed yield) and Jayalakshmi (white flower & seed) were registered.
- **Tobacco Seed Supply:** A total quantity of 7594 kg truthfully labelled seed of different cultivated tobacco varieties was supplied to farmers through ICAR-CTRI, Rajahmundry and its Research stations during 2021 season to meet seed requirement of >90% tobacco farmers in Andhra Pradesh, Karnataka, Tamil Nadu and West Bengal.

Crop Intensification and Diversification

- Among the different crops and cropping systems studied, chilli followed by turmeric are remunerative crops in FCV tobacco growing Vertisols of Andhra Pradesh.
- Chewing tobacco+ Annual moringa recorded the highest net return and Chewing tobacco-Aggregatum onion cropping system recorded a higher net returns followed by chillies and turmeric in the chewing tobacco growing areas of Tamil Nadu.

- Three castor hybrids were evaluated for yield among which DCH-66 and ICH-66 were superior in rainfed areas of Prakasam district.
- Korra and cluster bean are performing better as inter crops in castor under rainfed conditions of Prakasam district compared to green gram, black gram, ground nut and sesame.

Agronomic Interventions

- Application of gypsum @ 2.5 t/ha + FYM @ 7.5 t/ha in the seedling rows/line at planting time resulted in 10.4% increase in productivity and 4.2% increase in bright grade production in red sandy soils of Karnataka Light Soils.
- Drought management practices like high density planting with 90 x 50 cm, starter dose of calcium nitrate fertilizer application at 25 kg/ha at planting & foliar nutrition of N and K through potassium nitrate at 2.5% twice at 45 and 55 DAT are recommended for FCV tobacco grown in Karnataka Light Soil which resulted in 13.4% increase in the cured leaf productivity with an ICBR ratio of 2.86.
- Balanced NPK fertilization at @ 112 kg N+ 112 kg P₂ O₅ + 112 kg K₂ O /ha plus 50 kg N+ 20 kg P₂ O₅ + 50 kg K₂ O /ha in the form of 10t FYM/ha increased cured yield by 2-fold and first-grade leaf yield by 8.3-fold compared to control in Motihari tobacco grown in West Bengal.
- Planting turmeric in last week of April resulted in higher rhizome weight, and total dry weight of turmeric in North Bengal condition.

Integrated Management of Biotic stress

- New insecticides pyridalyl 10 EC @ 150 g a.i./ha and spinetoram @ 45 g a.i./ha were highly effective in protecting tobacco seedlings as well as planted FCV tobacco from *S. litura* damage.
- Integrated module with Jowar as barrier crop, one spray of Neemazal at 20 DAP, one spray of pymetrozine at 40 DAP and one spray of flonicamid at 60 DAP exhibited progressive reduction of whitefly infestation.
- IPM module with 2 rows of marigold, bird perches @ 20/ha, hand picking of larvae for every 5 days, spraying of NSKE 2% at 25 DAP, spraying Ha NPV @ 250 LE/ha at 40 DAP and one spray of chlorantraniliprole 18.5 SC @ 0.005% at 55 DAP exhibited 85% reduction of infestation by tobacco budworm, 6.03% increase of cured leaf yields.
- Method standardization for analysis of chlorantraniliprole residues was done. Field Residue Trial (FRT) with chlorantraniliprole 18.5 SC as per the CORESTA FRT protocol indicate that a PHI of 12 days is required to produce FCV tobacco with acceptable levels of chlorantraniliprole residues in cured tobacco leaf.
- Ground beetles, *Mesomorphus villiger* population was estimated through pitfall traps and correlated with weather parameters. They had significant negative correlation with morning temperature, evening relative humidity and evaporation. Whiteflies, *Bemisia tabaci* population was estimated using yellow sticky traps. They had negative correlation with morning and evening relative humidity and rainfall.

- Cowpea and chickpea intercropping modules have the highest number of arthropods followed by IPM in terms of numbers. With the help of biodiversity indices, it was found that IPM module had the highest number of species (13), Shannon Weiner index (2.04), Simpson (0.82) and evenness indices (0.59).

Natural Resource Management

- Solar thermal interventions viz., polycarbonate roof chamber, solar hot air circulation, solar hot water circulation along with electrical blower will be able to reduce the wood consumption up to 43%. By integration of these interventions along with LPG gas the wood saving was up to 47%.
- Soil fertility thematic maps of FCV tobacco growing Karnataka Light Soils (Hunsur region) were completed.
- A total number of 560 soil health cards were prepared and distributed to farmers.
- Empty fruit bunch waste from oilpalm as a fuel for curing FCV tobacco will save 15.6 % of wood fuel in NLS region.

Farm Mechanization in tobacco

- Tobacco transplanter fabricated by ICAR-CIAE RS, Coimbatore was tested at CTRI, Rajahmundry.
- Construction of Loose leaf Barn for curing FCV tobacco is in progress at CTRI RS Kandukur for its evaluation.

Agricultural Extension and Economics

- Support from government for community approach, establishing farmer organizations in each village to implement the management measures, supply of degradable mulch material to fields, deep inversion ploughing for soil solarization, identification of new chemicals for seed treatment in management and biological methods are some of the suggestions expressed by farmers for orobanche management.
- In export forecast scenario, with marginal increase in export-production ratio, export volume of high value commercial crops (turmeric and chilli) can be enhanced significantly (2.3 lakh tons/annum) and anticipated to bring the sizeable foreign exchange revenue to the tune of Rs.3211 crore annually to the Indian economy.

Technology outreach activities

- A total of 55 capacity building programmes were conducted to the farmers and line departments on scientific tobacco management practices. Training programmes
- ICAR-CTRI conducted three training programmes on Field level production constraints and their management for sustainable production of burley tobacco in Andhra Pradesh to the Technical team, M/s. GPI Ltd., Ongole on 18.10.2021, 18.11.2021 and 3.12.2021. ICT in Tobacco
- An android based static mobile app was developed on Good Agricultural Practices of FCV tobacco in English and Telugu languages and hosted in Google Play Store with title as "CTRI-FCV Tobacco".

KRISHI VIGYAN KENDRA

Kalavacharla

- A total of 9 technologies were assessed (OFTs) and 14 demonstrations (FLDs) were conducted in farmers' fields during the year 2020-21.
- Important training programmes conducted include Use of Laser Guided Land Leveler, Plastic Mulch in Vegetables Production, Value Addition to Finger Millet and elephant foot yam, Feed Ration Formulation & Management in Milch Animals, Sheep & Goat Intensive Farming.
- Exposure visits were organized on Cashew Processing and Milky Mushroom Production.
- Skill Training of Rural Youth (STRY) on Nursery Management-Production of Seedlings was conducted.
- KVK-Kalavacharla is identified as CBBO for formation of FPOs in Panduru and Karapa villages of Kakinada Rural Mandal specialised for preparation of Mango Jelly and Mango Pickles under the theme Horticulture and Value addition. Farmers mobilization was done in collaboration with AP Horticulture Dept, NABARD and AP Food Processing Corporation.

Kandukur

- The Krishi Vigyan Kendra, Kandukur has organized five On farm testing of technologies, eight front line demonstrations and eight capacity building programmes

All India Network Project on Tobacco

- Two high yielding varieties (Bidi:GABTH2 and Rustica: GCT 5) were identified by variety release committee.
- A total Number of 145 lines were tested in multilocation trials and superior lines were identified.
- Three crop production and protection technologies were released.
- Technology outreach activities viz., Front Line Demonstrations (18), training programmes (12) were conducted.
- A total quantity of 7,599 kg tobacco seed (Bidi and Rustica) was supplied to farmers.
- Germplasm lines of different tobacco types were maintained at different centres.

Service Functions

- Analytical Service Units (Leaf quality evaluation laboratory, Soil testing laboratory, Smoke laboratory, Seed testing laboratory) are providing service to Tobacco Board, trade and AINPT centres apart from CTRI research stations. During 2021-22, a total number of 1377 samples were analysed and a total amount of Rs. 5,12,356/- was realised.

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- SW-14895/2021 : Knowledge based system for tobacco weed management.
- SW-14404/2021: Expert System for Identification and Management of Plant Nutrient Disorders in Flue-Cured Tobacco (*Nicotiana Tabacum* L.).
- SW-14310/2021: Soil Test Crop Response Based Fertilizer Recommendation System for a targeted yield in FCV Tobacco.

Awards and Recognitions

- A total number of six awards were received by the scientists. Dr. D. Damodar Reddy, Director, ICAR-CTRI has been elected as the Fellow of National Academy of Agricultural Sciences (NAAS), New Delhi.

Infrastructure

- Administrative building of Krishi Vigyan Kendra, Kandukur, Prakasam Dist. was built with a total financial outlay of Rs 199.8 lakhs.

Research Collaborations

- ICAR-CTRI signed two MoUs with Dr. Y.S.R. Horticultural University, Venkataramannagudem, West Godavari Dist, AP and Acharya N.G. Ranga Agril. University, Guntur, AP for facilitating post graduate research programmes.
- ICAR-CTRI signed MoU with Agricultural College, Rajahmundry for seed production of popular rice varieties in the low land area of BSR Farm, Katheru.

Functional Industry-Institutional Linkages

- Functional linkage established between ICAR-CTRI and M/s GPI Ltd., Guntur for consultancy services on Sustainable Burley Tobacco Production.
- Functional linkage established between ICAR-CTRI and M/s Fertis. India Pvt. Ltd., Hyderabad for Development and Evaluation of Customised Fertilizers for FCV Tobacco Grown under Irrigated and Rainfed Conditions.
- Functional linkage established between ICAR-CTRI and Tobacco Board & M/s. ITC Ltd. for evaluation of loose leaf barn at CTRI RS Kandukur

Capacity Building programmes

- Two online training programmes were conducted for technical and administrative staff of ICAR-CTRI viz., “Sensitization of Technical staff for improving their contribution to quality research” on 19.3.2021 and “Enhancing the functional competence of administrative personnel” on 20.3.2021. Scientists and staff members (70 No.) have undergone training at different institutes during 2021 for upgradation of skills.

Celebrations of India @ 75: Azadi Ka Amrit Mahotsav

As a part of the Azadi Ka Amrit Mahotsav, the following programmes were conducted at ICAR-CTRI, Rajahmundry.

- Kisan Ghosti on “Integrated Soil Fertility Management and Balanced Use of Fertilizers” in virtual mode on 18.6.2021.
- Tree Plantation and Awareness Programme was conducted at ICAR-CTRI, Rajahmundry and its Research Station at Kandukur, Andhra Pradesh on the occasion of ICAR’s Foundation Day on 16-07-2021.
- A programme on ‘Food and Nutrition for Farmers’ was organized on 26.08.2021 at ICAR-CTRI, Rajahmundry, its Research Stations. Awareness was created to 1500 farmers through Farmers WhatsApp groups.
- ICAR-CTRI live streamed the curtain raising event of ‘International Year of Millets-2023’ inaugurated by Sri Narendra Singh Tomar, Union Minister of Agriculture and Farmers Welfare, Govt. of India on 17-9-2021. In continuation ‘Poshan Vatika Mahabhiyan and Tree Plantation’ programme was conducted with Chief Guest Sri Margani Bharat, Member of Parliament, Rajahmundry.

- Farmers Interface Meeting on “Climate Resilient Crop Varieties and Agrotechnologies” was organized on 28.09.2021. Live streaming of the Hon’ble Prime Minister’s interaction with farmers and dedication of 35 crop varieties to the nation was done.
- Mahila Kisan Diwas was conducted on 15.10.2021 at Venkatarama nagarm village of East Godavari district.
- World Food Day was celebrated on 16.10.2021 at ICAR-CTRI with the theme Safe food now for a healthy tomorrow

As a part of celebration of the Azadi Ka Amrit Mahotsav, ICAR-CTRI, Rajahmundry has organized following lecture series.

- Lecture on “Food Loss and Waste Reduction Policies” by Dr. B. Rajender, IAS, Minister (Agriculture), APR to FAO, WFP & IFAD, Embassy of India, Rome, Italy on 11.11.2021.
- Lecture on ‘Self Reliant India through Self Sufficient Agriculture’ by Dr. J.P. Sharma, Vice Chancellor, SKUAST- Jammu on 4.12.2021.

NEH Programme

- ICAR-CTRI, Rajahmundry and All India Network Project on Tobacco implemented the NEH programme in collaboration with ICAR-RC for NEH, Umaim, Meghalaya. The programmes include trainings on Integrated Agri-Horti Farming System, Soil health management, livelihood improvement through backyard poultry, post-harvest management and value addition, integrated fish farming.

Tribal Sub-Plan

- ICAR-CTRI implemented the Tribal Sub-plan at CTRI RS, Jeelugumilli, Hunsur, Vedsandur and Dinhata. Trainings/ Awareness programs on scientific management of different crops, post-harvest management and animal husbandry were conducted and critical inputs supplied. A total number of 510 farmers were covered under this programme.

SCSP Programme

- ICAR -CTRI and research stations and KVK implemented the SCSP programme. Different interventions encompassing the Awareness programmes/ training programme, supply of critical inputs such as seed, fertilizer, animal feed, battery operated sprayers, tarpaulins were supplied to the beneficiaries (>10000).

GOI’ Programmes

- National Science Day was celebrated at ICAR-CTRI, Rajahmundry on 28.02.2021.
- International Women’s Day was celebrated on 8th March, 2021 at ICAR-CTRI, Rajahmundry, CTRI Research Station, Kandukur and KVK, Kalavacharla.
- ICAR-CTRI observed Parthenium Awareness Week during 16-22 August, 2021.
- World Soil Day was organized at ICAR-CTRI, Rajahmundry with the theme of ‘Halt soil salinization, Boost soil on productivity’. Soil Health cards were distributed to farmers.
- Vigilance Awareness Week was conducted at ICAR-CTRI, Rajahmundry (26.10.2021 to 01.11.2021).
- Special Swachhta National Campaign during 2-31, October, 2021 and Swachhta Pakhwada during 16-31 December, 2021 was observed at ICAR-CTRI, Rajahmundry.
- Hon’ble Prime Minister’s address on Natural Farming was live telecasted during the valedictory function of Vibrant Gujarat on 16-12-2021.