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VANIJYA KRISHI

Newsletter of
ICAR-National Institute for Research on Commercial Agriculture
(Formerly ICAR-Central Tobacco Research Institute)

From the Director's Desk

Advancing Sustainable Tobacco Production in a Changing Policy Landscape

Sustainable tobacco production is growing quality tobacco efficiently while minimizing the negative impact on the environment, ensuring economic viability, social security, and overall welfare of farmers. The need for sustainable tobacco farming emanates from i) environmental concerns - a huge quantity of wood consumption for leaf curing, leading to deforestation, incessant cultivation exhausts soil nutrients faster, excessive use of fertilizers, pesticides,and their adverse effects ii) health and social issues-prolonged exposure to nicotine, pesticides, and chemicals harms farmers and farm labourers. In some regions, tobacco farms depend on child labour, raising social sustainability concerns. iii) economic sustainability issues, viz., volatile prices, high input costs, and paucity of labour, would harm farmer livelihoods.

Global frameworks are shaping this transition. The WHO-Framework Convention on Tobacco Control (FCTC) calls on governments to promote sustainable alternatives and incentivize crop diversification, renewable-energy curing, and soil health improvement. COP-10 (2024) placed the environmental footprint of tobacco at centre stage, urging regulation across the value chain-from inputs and curing fuels to waste management. Across the world, industry and governments are piloting solutions. In China, lower-carbon curing and energy transitions are growing at a rapid pace. Electric flue-curing barns have expanded rapidly (~17,000 units, 2024) with monitoring frameworks to measure performance and accelerate the phase-out of coal. In Africa, rocket barn technology for higher energy efficiency from Kutsaga, Zimbabwe, reported ~0.48-0.64 kg fuel per kg of tobacco vs ~1.2 kg in coal tunnels, minimizing energy use and curing-related CO_2. Automation on farms and barns, such as AI for curing control, new lightweight neural-net models recognize curing stages in bulk barns to reduce misclassification, which aids in saving energy and improving leaf quality. Solar integration (distributed solar + smart load management) of flexible power systems for flue-curing to reduce peak demand and progress toward "zero-carbon" power for curing on the research stage. On-farm water harvesting and irrigation (farm-pond rainwater capture in India) aim to buffer climate variability, improve dry-season irrigation, and reduce pressure on groundwater. New research on tobacco waste exploring thermochemical/biochemical routes to convert tobacco crop residues into value-added products, pointing to future circularity plays beyond composting.

For making tobacco production highly sustainable, the policy and planning continued to evolve,such as the EU action plan (policy, on-farm technology, finance,and monitoring). The EU single-use plastics directive explicitly targets tobacco products with plastic filters, enforcing Extended Producer Responsibility (EPR) and clear labelling. The Tobacco Products Directive (TPD) and its revisions keep tightening marketing and product rules. In line with the Common Agricultural Policy (CAP), the mapped national strategic plans support on-farm energy upgrading, grants for diversification, and training for good agricultural practices. The policy support decarbonisation of curing measures, such as electric flue-curing (grid + renewables) and hybrid solar-electric systems, rooftop or field PV,and smart load management,are expected to realize a 40-90% reduction during curing, depending on baseline and renewables share. In addition, promoting precision nutrient and water management practices to reduce agrochemical runoff and water stress can be incentivised through subsidizing these programmes. Waste valorisation pilots, composting stalks, and exploring biochemical valorisation of processing residues are in the research stage. For traceability and labour due diligence, farm-level traceability (parcel IDs, fuel logs, worker registers) enables buyers to verify deforestation-free and fair labour commitments.

In this backdrop, the ICAR-NIRCA focuses research on advancing sustainable tobacco production by developing high-yielding, climate-resilient varieties, resistant to biotic and abiotic stresses through classical, molecular breeding, and genomic tools. Promoting bio-based Integrated Pest and Disease Management (IPDM) to reduce pesticide use by 50%. Implementing online fertilizer recommendation systems, biodegradable mulches, and drip irrigation to enhance nutrient and water efficiency and curb runoff/erosion, alongside the introduction of solar thermal, LPG-based, and electric curing systems to cut fuel wood use by 40-50% and emissions/costs by 15-20%. Encouraging crop diversification through intercropping to boost biodiversity, soil fertility, and farmer income, labour-saving tools like suckericide applicators, harvesting machines. Expanding farmer training and other outreach programmes to promote climate-smart practices and nutrient-efficient lines, supporting millions of farmers and balancing economic viability, farmers' prosperity, with environmental stewardship.

Thus, sustainability in tobacco production is no longer optional - it is central to conserve natural resources, protect farmer health, and align with evolving global regulations through proactive adoption of cleaner technologies and smart farming practices to ensure long-term competitiveness of Indian tobacco.

Published by : **Dr. M. Sheshu Madhav,** Director, ICAR-NIRCA, Rajahmundry-533105, AP
Editorial Committee : **Chairman -** **K. Viswanatha Reddy;** **Members -** **B. Rajasekhar Reddy, K. Gangadhara, B. Hema, H.S. Mahesha;** **Assistance -** **Md. Elias**

Research Highlights

CTRI NAVYA

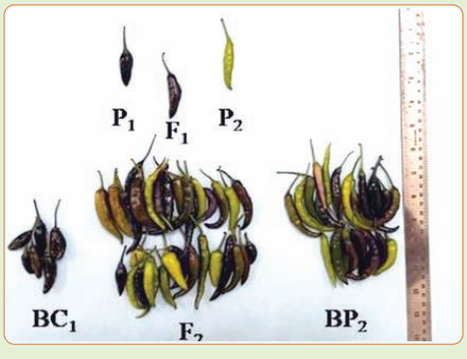
An improved high yielding variety of FCV tobacco released for Karnataka Light Soils (KLS) region in 93rd CVRC through Gazette Notification No. SO 2128 (E) dated 13.05.2025. CTRI Navya has higher bright leaf percentage (>80%) and withstands heavy rainfall with even maturity, good quality leaves and longer colour retention. The variety gives an average of 20% increment in cured leaf yield per ha which converts into around Rs.1,00,000/ha in monetary terms.

Identification of anthocyanin rich selections and their chemo-profiling in chilli

Anthocyanin rich chilli selections (DinCh 68-10-3, DinCh 68-10-16, DinCh 68-10-5, DinCh 68-10-9) were identified from single plant selection of a random mating chance segregant of Chilli Local Manipur. Highest anthocyanin (Cyaniding-3-Glucoside) was found in DinCh 68-10-3 (645.58 $\mu g g^{-1}$). The major anthocyanins present in the pericarp of all lines were Cyanidin, Malvidin, Delphinidin-3-O-glc, Delphinidin-3-(p-coumaroyl)-rutinoside-5-glucoside, Pelagronidin 3,5–diglucoside, Malvidin 3-hexoside.

Genetics of chilli fruit skin colour (black) in Dinhata Local 1

Crosses were attempted between black line (Dinhata Local 1) & green fruited line (Pusa Sadabahar). The F_1 fruits were black colour depicting black is dominant over green. In F_2 generatoin, fruits were segregated into 9:3:4 (black 42: mixed with black and green 14: green 22) suggesting recessive epistasis indicating involvement of two genes for governing the trait.



Identification of orange chilli selections

Single plant selections were carried out from progenies of variable population of Dalle-2 and MC collected from Okrabari village, Dinhata. Three orange fruited selections (DinCh 249-2-1-1, DinCh 249-2-5-5 and DinCh 252-12-6) were identified and selfed for further evaluation in next season.

Identification of high yielding turmeric line for yield and contributing traits

The highest total fresh rhizome weight per plant was found in Assam Collection 2 (1.0 kg) followed by Assam Collection 1 (806 g) and Duggirala Red (658 g). Colour profiling of turmeric lines revealed dark orange lines (MaldaPutuya 2 Local, TCP-223), bright orange lines (TCP-115, Assam Collection 2).

- Genome editing using CRISPR/Cas is being employed to reduce the TSNA content in burley cultivar Banket-A1 to safe guard the health of the consumers. Four putative edited lines showed sequence insertion (T/A) at the desired target site of CYP82E4.
- A total of 965 unique single hit SSR's were identified from the available database, and they were mapped to the 24 chromosomes. These SSR's were used to study the polymorphism among the selected 12 FCV and 12 Non-FCV genotypes. It was found that a total of 248 SSR's in FCV and 159 SSR's in non-FCV tobacco genotypes were polymorphic.
- In the F_2 population derived from FCJ-11 (Fusarium wilt resistant) and FCH-222 (Fusarium wilt susceptible), the resistance to *F. oxysporum* isolate NN Halli found to be controlled by two homozygous recessive genes with digenic inheritance (9:3:3:1).
- Established a sick field phenotyping tool for *Orobanche* infection. Seasonal studies identified October-February as optimal for host-parasite interaction, and ITS sequencing confirmed *Orobanche cernua* is the infesting species in tobacco.

Germplasm Field Day on Commercial Crops (Tobacco, Ashwagandha and Chilli)

A Germplasm Field Day was organized on 19th February 2025, at the Black Soil Research Farm, Katheru, ICAR-NIRCA, Rajahmundry. Focusing on the importance of the germplasm of commercial crops for their conservation, evaluation, and utilization, Dr. M. Sheshu Madhav, Director, ICAR-NIRCA, rechristened the future research programs of commercial crops, harmonizing the Institute's new mandate. Dr. K. Sarala, Head, Division of Crop Improvement, outlined the germplasm management activities of three commercial crops (Tobacco, Ashwagandha and Chilli) through different projects. Dr. Rajappa J.J. deliberated on the various aspects of tobacco crop germplasm, followed by Dr. B. Rajasekhara Reddy on Chilli and Ashwagandha germplasm management and Dr. K. Prabhakara Rao on germplasm accessions used in seed production. The event was attended by about 60 participants, including Scientists, Technical Officers, Research Scholars, Students and Staff. The germplasm collections showcased at the Field Day represented around 1200 accessions of tobacco germplasm, 350 accessions of Ashwagandha and 50 accessions of Chilli.

Participants had the opportunity to observe the diverse morphological traits and adaptability of the various accessions in the field. This event not only facilitated knowledge exchange among researchers but also highlighted the importance of preserving and utilizing genetic diversity in the improvement of commercial crops.

- A novel method has been established for extracting nicotine from tobacco waste. This process utilizes alkaline leaching combined with non-polar solvent extraction, resulting in an efficient recovery system. The newly developed method achieved a nicotine recovery rate of 99.43% and produced nicotine with a purity level of 99.33%. These results highlight the effectiveness and precision of the extraction technique.
- Cellulose was extracted from chilli pedicle utilizing green extraction method. The thin edible film was prepared from chilli pedicle extract and chilli cellulose stalk obtained from hydro dynamic cavitation. In food industry this will be an innovative source of packaging material which can be cost effective and also directly related to sustainable development goal of waste valorization.
- Ultrasonication assisted green extraction of capsanthin from chilli was developed. The extraction technology has the capability to extract the active component very efficiently having 82-84% recovery of capsanthin. The bench scale know how of purified capsanthin by adsorbents is more effective than the conventional one. The biocolorant can be used as an alternate source of synthetic colorant in food industry in terms of natural additive in confectionary items, ice creams etc. This will have further nutraceutical values in future.
- LC-MS/MS based quantification method developed for anthocyanin, from black chilli, herbicides, namely sulfentrazone and clomazone, flubendiamide pesticide residue in tobacco for determination of pre harvest interval (PHI). Development of multi pesticide residue analysis (~1016 pesticides) in tobacco by GC-MS by single ion monitoring (SIM) methods.
- Characterization of castor oil derived oil fraction denoted that the presence of octanol derivatives present in castor oil monitored in GC-MS, and NMR. Estimation of 2-octanol and 2–octanone done in GC-MS from castor oil for scaled up standardized synthetic root.
- Analysis of volatiles from different *Nicotiana* species and insect infected plant samples (aphid+plant) in GC-MS revealed the presence of important chemical such as Tetradecane, 3-methyl, important kariomone, volatile emissions from plant and insect cuticles; Azuleno[4,5-b]furan-2(3H)-one, 9-(acetyloxy)-6- [(acetyloxy) methyl] decahydro-6-hydroxy-9a- methyl-3-methylene-, Furanone may be released from plant and insects in response of defense mechanism. The TSNA and alkaloids profiling of *Spodoptera litura* and white fly of different body parts and excreta revealed that there is a meager presence of TSNA.
- Preharvest treatments *viz.*, gibberellic acid spray @ 50 ppm, potassium nitrate spray @ 1%, Micronutrient spray @ 0.02%, Magnesium Sulphate spray @ 1%, Potassium silicate @ 0.2% and neem oil spray @ 1% thrice at 15 days intervals from first flush pod formation stage enhanced chilli yield. Among the preharvest treatments, Gibberellic acid @ 50 ppm and neem oil spray @ 1% showed promising improvement in total carotenoid content followed by NAA @ 40 ppm, Potassium Nitrate spray @ 1% and magnesium sulphate spray @ 1%. High capsaicin content was recorded in Gibberellic acid spray @ 50 ppm and potassium nitrate @ 1% treatments followed by magnesium sulphate spray @ 1%.
- Standardized new value added and functional nutraceutical snack products viz., Turmeric Protein bars, Turmeric Flakes, Aswagandha and Turmeric Biscuits, Turmeric and Aswagandha Cake, Turmeric Golden Milk/ Latte, Chilli Chocolate and NIRCA Nutri Powder. NIRCA nutri laddu was developed and standardized and popularized through NIRCA nest for health promotion and disease prevention among pre-school children, pregnant and lactating mothers.
- Identified the value added products having scope for exports in turmeric and chillies and found no variations in the perceptions of traders and scientists. Further identification of determinants and priorities for export promotion in turmeric and chillies found no variations in the perceptions of traders, scientists and farmers.
- The study on the marketing efficiency of tribal FPOs engaged in turmeric marketing in the ASR district of Andhra Pradesh showed that the marketing channel involving village traders is the most prevalent, with a 65% adoption rate, mainly due to its convenience and the assurance of immediate cash returns for tribal farmers.

STALLS ARRANGED

Kisan Mahotsav was organized by the Telangana State Government on 21st April 2025 at Giriraj College, Nizamabad. As part of the event, ICAR-NIRCA set up a stall showcasing innovative value-added products from turmeric, ashwagandha and chilli. The stall attracted good attention, and Shri Palle Ganga Reddy, Chairman, National Turmeric Board, visited and appreciated the exhibits.

Rice husk ash based new functional organic fertilizer development and trial in turmeric in terai zone of West Bengal

Rice husk ash (RHA) based new fermented product (RHA-K-FOF) was developed (Fig 1a) comprising primarily RHA, K-Solubilising microbes (KSM) and other secret ingredient. The product was tested in three different varieties of turmeric for two years and compared with standard package of practices followed with RDF in terai region of West Bengal. Excellent yield response and color content is promising for turmeric cultivation in this terai zone with this new product. Further, the product was analyzed through FTIR and distinct functional groups detected from the FTIR spectra (Fig 1b).

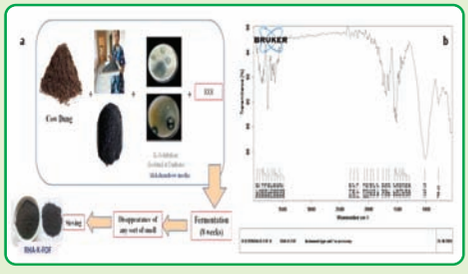


Fig 1a & 1b. Schematic diagram of RHA based potassium (K) enriched new functional organic fertilizer (FOF) development and FTIR spectra of new product RHA-K-FOF.

Metabolic fingerprinting of RHA-K-FOF was assessed through BIOLOG Ecoplate™ and the microbes present in new product (RHA-K-FOF) were found to prefer to utilize the recalcitrant group of substrates at a faster rate. Thus, it can be inferred that the microbes present in the fermented product can break complex compounds and mineralise nutrients occluded/trapped/ fixed in soil and help the turmeric plant to access more nutrients from soil.

Sixty three years long term manurial trial in *Motihari* tobacco

A long term field experiment is being executed since 1961-62 with ten different treatments comprising N, P, K and FYM. The treatment with NPK+FYM with 112 kg: 112 kg: 112 kg and 10 ton FYM/ha was observed with highest green leaf, cured leaf and 1st grade leaf yield persistently. In during last 23 years data analysis, Green leaf yield (GLY) trend, irrespective of 10 different treatments explained a significantly decreasing trend. The range of GLY ranges from 4846 to 8720 kg/ha. Although the best treatment (NPK+FYM) maintained to be highest production treatment; there is a gross reduction of fresh green leaf yield in *Motihari* tobacco as analyzed during these 23 years of data. Grossly a 34.6% reduction in yield is observed (Fig 2).

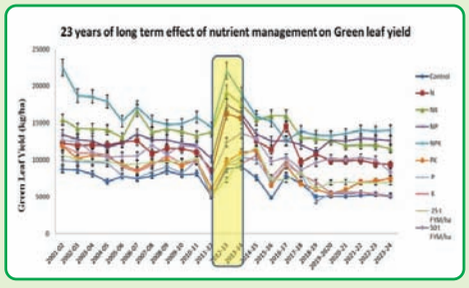


Fig 2. Green leaf yield (GLY) trend over last 23 years of study

The treatments containing nitrogen alone or in combinations were observed with higher level of 1st grade leaf yield than the treatments which are devoid of Nitrogen. Also irrespective of treatments, a gradual decreasing trend in terms of 1st grade leaf yield is very prominent from the trend analysis during last 23 years of different nutrient management in *Motihari* Tobacco (Fig. 3).

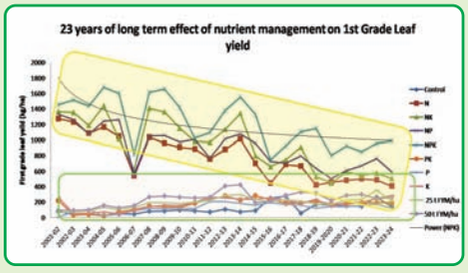
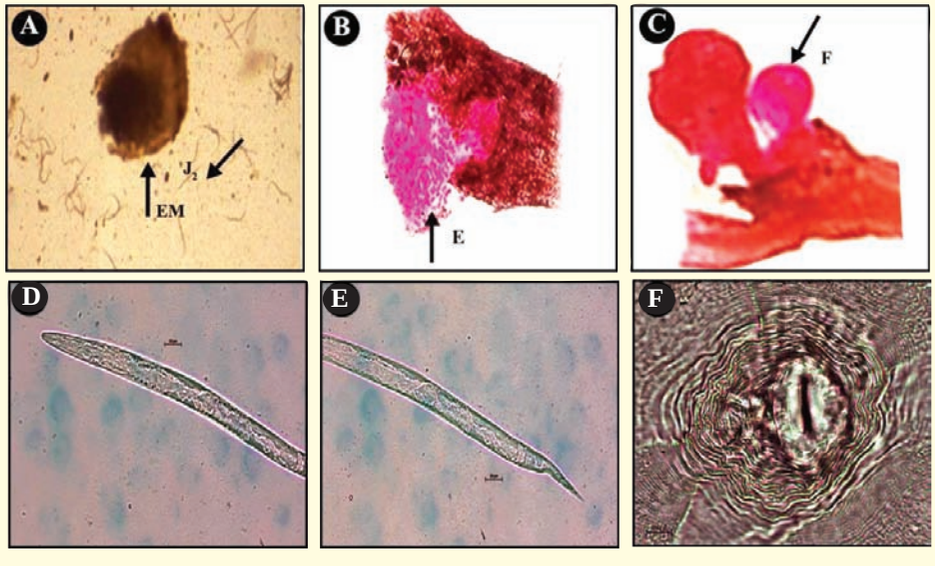


Fig 3. 1st grade leaf yield (FLY) trend over last 23 years of study

Nematode Infestation in Tobacco: Occurrence, Identification, Genetic Profiling and Implications

M. Venkatesan, W. Chandramani, T. Sirisha, K. Rajasekhara Rao and M. Sheshu Madhav

Root-knot nematodes (*Meloidogyne* spp.) are among the most destructive biotic factors affecting global crop yields, causing major economic losses. Limited information available on their impact on Flue-Cured Virginia (FCV) tobacco in the Northern Light Soils (NLS) region of Andhra Pradesh. A survey (2023–2024) covering 27 villages across five auction platforms revealed the highest infestation in Koyyalagudam (33%), followed by Devarapalli (32%), Jangareddygudam II (22%), Gopalapuram (9%), and Jangareddygudam I (4%). Morphological identification (perineal pattern) and molecular characterization (PCR using universal primers, 28S rRNA D2/D3 sequencing) confirmed all 27 populations as *Meloidogyne incognita*. PCR produced an 892 bp fragment, and sequences were deposited in GenBank (Accession: PV435493) with 99.44–99.89% similarity to known *M. incognita* isolates. This study provides the first detailed account of *M. incognita* prevalence and distribution in FCV tobacco in the NLS region, supporting future management strategies.



Morphological traits observed in specimens of *Meloidogyne incognita*

(A) J_2-Second-stage Juveniles, EM-Egg mass; (B) E-Eggs released from egg mass
(C) Adult female of *M. incognita*;
(D) Anterior region of J_2 (E) Posterior region of J_2
(F) Perineal patterns of *M. Incognita* obtained from females extracted in collected roots of FCV tobacco plant

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Software developed

Developed an android based bilingual (English & Telugu) static mobile application on Soil Test Based Fertilizer Recommendation System for a targeted yield of FCV Tobacco in Northern Light Soils Region and hosted in google play store entitled “NLS- Fertilizer Recommendation” with URL https://play.google.com/store/apps/details?id=com.nirca.nls

MoUs Signed

S. No.	Date of Entry in MoU	Period	Purpose	Company Name
1	02.04.2025	1 Year	Development of Chilli Hotness Sensor	CSIR-CSIO
2	06.05.2025	5 years	Development and Evaluation of Tobacco Leaf Harvesting	SURINOVA, chennai
3	09.05.2025	1 Year	Electric hot air chamber with humid control run through IoT based system for FCV Tobacco Leaf curing	Owl Techno, Hyderabad

MoU with Owl Techno, Hyderabad

NABARD Projects Launching Programme

ICAR-NIRCA conducted launching programme of NABARD-supported projects on chilli and turmeric on 25th June 2025 at ICAR-NIRCA, Rajahmundry. These initiatives aim to introduce scientific post-harvest processing technologies tailored to the specific needs of chilli and turmeric farmers and FPOs.

Viksit Krishi Sankalp Abhiyan (VKSA-2025)

Scientists actively participated in pre-kharif VKSA Programmes held from 29 May-12 June 2025. The visits aimed at educating and mobilizing farmers on climate-resilient and sustainable practices before the onset of the kharif season. The visit created awareness, encouraged preparedness, and demonstrated technologies that helped in crop productivity improvement and farm profitability in the identified villages of the different districts.

SCSP/ TSP/NEH Programmes

ICAR-NIRCA implemented SCSP, TSP and NEH programmes at Head quarters and research stations. Different capacity building programmes were conducted and critical inputs were distributed to the beneficiaries

SCSP at Bobbilanka

TSP at Jeddangi

SCSP at Hunsur

MEETINGS/ TRAININGS/ SEMINARS

INNOVATORS MEET

April 8, 2025 marked a key moment for agri-innovation as ICAR-NIRCA hosted its Innovators Meet steered by the visionary leadership of Dr. M. Sheshu Madhav, Director, ICAR-NIRCA and Chairman, ITMU. This dynamic event, organized by the Institute Technology Management Unit (ITMU), brought together a diverse mix of around 230 researchers, agri-entrepreneurs, startups, industry experts, FPOs, NGOs, and policy makers to fuel innovation and collaboration in the agri-sector. A total of 22 exceptional innovators were honoured for their contributions across various fields in Agri-tech and rural enterprise.

TURMERIC STAKEHOLDERS CONCLAVE

ICAR-NIRCA hosted a Turmeric Stakeholder Conclave on 11th April 2025 to boost India's turmeric sector. Around 200 participants viz., farmers from key turmeric-growing regions of Andhra Pradesh (Lambasingi, Paderu, Ravulapalem, Duggirala and Peravali), farmers producer organizations, women entrepreneurs, industry leaders, NGOs, and self-help groups came together for this mega event. The conclave also featured, innovative value-added turmeric products and diverse turmeric varieties on display.

ICAR-NIRCA FORMATION DAY

ICAR-CTRI, as a leading institute in the Indian tobacco sector, has embarked on a new chapter as the ICAR-National Institute for Research on Commercial Agriculture (ICAR-NIRCA) as on 21st January, 2025. Shri Bhupathi Raju Srinivasa Varma, MoS of Heavy Industries and Steel, graced as the Chief Guest, renaming the building and unveiling the new logo, marking a significant milestone. Dr. M. Sheshu Madhav, Director, outlined the transformation from ICAR-CTRI to ICAR-NIRCA and future research initiatives to support the Vikasit Bharat initiative. He underscored the institute's goal to become a center of excellence in commercial agriculture. Dr. T.R. Sharma, DDG (CS), ICAR, praised the institute's seven decades of excellence in tobacco research and urged scientists to pursue innovative studies on mandate crops. Dr. Shaik N. Meera, Director, ICAR-ATARI-Zone X, Hyderabad, envisioned ICAR-NIRCA excelling through the integration of AI and BCT with advanced research and market intelligence. The publication "Redefining Research: Transformation from CTRI to NIRCA" was released during the event.

NIRCA Nest Inaugurated

NIRCA'S Nest, a sales outlet of NIRCA was established at ICAR- NIRCA and duly inaugurated by Dr. Tilak Raj Sharma, Deputy Director General (Crop Science), ICAR on 21.01.2025. Dr. T.R. Sharma, DDG (CS) and Dr. M. Sheshu Madhav, Director, ICAR-NIRCA have highlighted the need of the sales counter and fulfilment of a long-standing demand of the public in utilizing the value added products of Turmeric, Ashwagandha and Chilli, the mandated crops of ICAR-NIRCA.

The Institute has proper mechanism for sale of the developed products through this sale counter where the farmers, farm women, homemakers and entrepreneurs can utilize this service by easy access to the quality products, while visiting the Institution.

The products available at the sales counter include Turmeric Powder, Turmeric Capsules, Ashwagandha Capsules, Ashwagandha Powder, Green Tea Bags, Curcumin-Beverage Mix, Dhoop Sticks, Dhoop Cups, Turmeric Sambrani, Mango Bars, Amla Candies, Turmeric Sandal Soaps, Turmeric Cup Cakes, Turmeric Flakes, Turmeric Sandal Soaps, Tomato-Chilli Sauce, Red Chilli Flakes, Red Chilli Minced, Green Chilli Flakes, Green Chilli Minced, Turmeric-Ashwagandha Biscuits, Turmeric Oatmeal Protein Bars, NIRCA Nutri Powder, Masala Chilli Powder and Turmeric Ginger Pickle.

For a period of six months, an amount of Rs. 68,931 /- (sixty eight thousand nine hundred and thirty one only) have been deposited in ICAR-NIRCA Account through digital transactions.

Indian Turmeric: Production and Export Landscape

M. Sheshu Madhav, K. Viswanatha Reddy, L.K. Prasad, H. Ravisankar

Introduction

Turmeric is an ancient spice indigenous to the Indian subcontinent, where it has been cultivated for over 4,000 years. First domesticated in India, turmeric became an integral part of Ayurvedic medicine, religious rituals, and cuisine. Ancient texts, such as the Atharva Veda (circa 1500 BCE), highlight its healing properties. Over time, turmeric spread from India to regions including China, Africa, and the Middle East through trade routes. Arab traders were instrumental in introducing turmeric to Europe. The name "turmeric" is derived from the Latin phrase "terra merita," meaning "meritorious earth," which refers to the color of ground turmeric resembling a mineral pigment. Today, India stands as the world's largest producer, consumer, and exporter of turmeric, contributing around 80% of global production. Indian turmeric is renowned for its superior quality, primarily due to its high curcumin content, making it increasingly popular for medicinal and cosmetic applications.

Turmeric is an essential ingredient in Indian cuisine, known for its vibrant yellow color and distinctive flavor that gives curries their signature taste. In India, the average annual per capita consumption of turmeric is ~343 grams. Consumption patterns vary significantly across different regions: South India: Turmeric is widely used in daily cooking and holds religious significance. It is often incorporated into various dishes, including traditional recipes like Patholi, for cooking. Northeast India: Turmeric is valued for its organic and medicinal properties, particularly in the Lakadong variety, which is renowned for its high curcumin content and health benefits. North India: In this region, turmeric is commonly found in spice blends (masalas), added to milk, and utilized in Ayurvedic practices. Beyond its culinary applications, turmeric has a long history of use in traditional medicine. It is recognized for its anti-inflammatory properties and is commonly used to treat digestive issues, liver problems, skin diseases, and wounds.

Production Landscape

Turmeric is cultivated in about 20 states in India, with the major producing states being Maharashtra, Telangana, Karnataka, Tamil Nadu, Andhra Pradesh, Madhya Pradesh, and Odisha. Together, these states account for nearly 84% of the country's turmeric production. Over the past five years, the area under turmeric cultivation has yielded an average of 11.56 lakh tonnes from 3.10 lakh hectares, resulting in an average productivity of 3.72 t/ha. Productivity levels varied significantly among the major producing states during this period. While Maharashtra is the leading producer, its productivity hovers around 3.76 t/ha. In comparison, Telangana leads with a productivity of 7.04 t/ha, followed by Karnataka at 6.16 tonnes and Tamil Nadu at 5.02 t/ha. Conversely, Andhra Pradesh and Odisha exhibit lower productivity levels, recording averages of 2.24 t/ha and 1.95 t/ha, respectively, which are significantly below the national average of 3.72 t/ha. This disparity highlights the urgent need for technological and policy interventions to enhance productivity in Andhra Pradesh and Odisha while sustaining productivity levels in other major states.

Export Landscape

Turmeric ranks third in the spice exports. India dominates the global turmeric export market, contributing around 70% of total exports and covering more than 150 countries. Major turmeric-importing countries are Bangladesh, USA, UK, Germany, UAE, Malaysia, Morocco, and Iran. The volume and value of turmeric exports increased from 1.38 lakh tons (₹ 1287 crores) in 2019-20 to 1.62 lakh tons (₹ 1876 crores) in 2023-24. Majority of exports are in unprocessed form (70%) which includes only 10% of high curcumin types. The demand for turmeric is increasing across the globe and shifting towards turmeric with high curcumin content and organic varieties. Developed markets like EU and the USA are emerging as key centres for the consumption of high-quality turmeric that meets stringent sanitary and phytosanitary (SPS) and quality standards. Hence, the Indian turmeric supply chain needs to align with this growing demand for high curcumin content. Overall, turmeric industry is projected to grow at a CAGR of approximately 7% from 2024 to 2030 while turmeric market is estimated to grow at a CAGR of 5.7% driven by increased adoption in functional foods, Ayurveda, and dietary supplements. The curcumin market is expected to grow at a CAGR of 14.5% from 2021 to 2030, with significant applications in the pharmaceutical sector. These statistics indicate robust growth across various facets of the turmeric industry, indicating its expanding domestic and international demand. Despite the growing demand, the trade faces several challenges such as logistical challenges, climate change and emerging competitors Vietnam, Fiji and Myanmar, and trade barriers in some countries limit the market access. On the other hand, India imports 0.24 lakh tonnes of turmeric accounting ₹ 246 crores, which needs to be substituted with the domestic types to minimize the import bill on agri-commodities.

KRISHI VIGYAN KENDRAS

KVK, Kalavacharla

- Skill Training of Rural Youth (STRY) on scientific management of sheep and goats (2-8th January, 2025).
- Skill Training of Rural Youth (STRY) on Plant Protection Techniques in Agricultural and Horticultural Crops (1-7th February, 2025).
- SC SP- Exposure visit of farmers and farm women to KVK, Kalavacharla on 20.03.2025.
- Inauguration of Shrestha green farms FPO's Sales Outlet at Ramarao peta, Kakinada on 12.04.2025.
- Exposure visit to Diploma in Agricultural Extension Services for Input Dealers (DAESI) students from Kakinada on 19.05.2025.
- Inauguration ceremony of Viksit Krishi Sankalp Abhiyan, 2025 (Kharif) on 29.05.2025 at MDO office, Korukonda
- Plantation drive, distribution of farm machinery and awareness program as a part of Viksit Krishi Sankalp Abhiyan, 2025 (Kharif) on 05.06.2025.

KVK, Kandukur

- Six-day skill development training on "Value Addition to Fruits and Vegetables for Entrepreneurship Promotion" at KVK, sponsored by ATMA under STRY from 20-25, Jan, 2025.
- Five field days on IPM in chilli, TCGS-1694 in groundnut, ICM in redgram, IDM in chickpea and LCA-643 in chilli.
- One day workshop on Protection of Plant Varieties Rights (PPV&FRA) Act-2001 on 28.03.2025 with 150 farmers and enlightened them on farmers rights on new varieties.
- Scientific Advisory Committee meeting on 30.04.2025 under the Chairmanship of Dr. M. Sheshu Madhav, Director, ICAR-NIRCA to finalize the action plan for 2025-26.
- Two agricultural exhibitions at KVK and created awareness on latest agricultural technologies to 435 farmers.
- Vikasit Krishi Sankalp Abhiyan (VKSA) – Pre-kharif campaign for 15 days from 29.05.2025 to 12.06.2025 covering 15 mandals, 50 villages and 15000 farmers.

PERSONNEL

S.N.	Name & Designation	Promotion/ Retirement/ Transfer	Place of Posting	w.e.f.
APPOINTMENTS / PROMOTIONS				
1.	Dr. K. P. Ragavendra, Sr. Scientist	Transferred from ICAR-CICR, Nagpur	ICAR-NIRCA RS, HUNSUR	03.02.2025
2.	Sri Ayush Kasyap, Technician	New Appointment	ICAR-NIRCA RS, Dinhata	20.02.2025
3.	Sri Raj Kumar Jha, Technician	New Appointment	ICAR-NIRCA RS, Dinhata	03.03.2025
4.	Sri Montosh Roy, Technician	New Appointment	ICAR-NIRCA, Rajahmundry	05.03.2025
5.	Sri Sanjib Sarkar, Technician	New Appointment	ICAR-NIRCARS, Vedasandur	05.03.2025
6.	Sri Kuldeep Patidar, Administrative Officer	New Appointment	ICAR-NIRCA, Rajahmundry	17.03.2025
7.	Sri Deepak Kumar Patel, Technician	New Appointment	ICAR-NIRCA RS, Guntur	28.04.2025
8.	Sri P V Satyanarayana, Administrative Officer	Promotion	ICAR-NIRCA RS, Vedasandur	05.05.2025
9.	Dr. Ajmal K.K, S.M.S	New Appointment	ICAR-NIRCA-KVK, Kalavacharla	29.05.2025
10.	Dr. B. Rajasehkar Reddy, Sr. Scientist	Appointed as Senior Scientist under DR Quota	ICAR-NIRCA, Rajahmundry	11.06.2025
11.	Dr. K. P. Singh, Sr. Scientist	New Appointment	ICAR-NIRCA RS, Dinhata	19.06.2025
RETIREMENTS / RESIGNED				
1.	Sri Y Venkateswara Rao, Tech. Officer	Retirement	ICAR-NIRCA RS, Jeelugumilli	28.02.2025
2.	Sri M. S. Asokan, Tech. Officer	Retirement	ICAR-NIRCA, Rajahmundry	28.02.2025
3.	Smt. J.V.R. Satyavani, Chief. Tech. Officer	Retirement	ICAR-NIRCA-KVK, Kalavacharla	31.03.2025
4.	Sri Pragada. Krishna, Technician	Retirement	ICAR-NIRCA, Rajahmundry	31.03.2025
5.	Smt. Jayamma,S.S.S	Retirement	ICAR-NIRCA RS, Hunsur	31.03.2025
6.	Sri B. Koteswara Rao, Technician	Retirement	ICAR-NIRCA, Rajahmundry	30.04.2025
7.	Sri Ch. Koteswara Rao,S.S.S	Retirement	ICAR-NIRCA-KVK, Kalavacharla	30.04.2025
8.	Smt. V. Bhagyalakshmi, Sr. Admn. Officer	Retirement	ICAR-NIRCA, Rajahmundry	31.05.2025
9.	Sri T. Sankara Rao,S.S.S	Retirement	ICAR-NIRCA RS, Guntur	31.05.2025
10.	Sri N. Sreedhar, Chief. Tech. Officer	Retirement	ICAR-NIRCA, Rajahmundry	30.06.2025
11.	Dr. Ravindra Harish Sontake, S.M.S	Resigned on his selection to the post of ARS Scientist	ICAR-NIRCA-KVK, Kalavacharla	30.06.2025

Vanijya Krishi, a half yearly Newsletter of ICAR - NIRCA. This publication gives an insight in to the major events of the Institute besides highlighting the salient research findings for the benefit of various stakeholders in commercial agriculture sector.
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