KVKS IN ACTION: INNOVATION, PRACTICE AND IMPACT

25 GOOD PRACTICE NOTES FROM ICAR-ATARI ZONE X



ICAR-AGRICULTURAL TECHNOLOGY APPLICATION RESEARCH INSTITUTE (ATARI)

Zone-X, CRIDA Campus, Santoshnagar, Hyderabad - 500059,
Telangana, India

ISO 9001:2015 Certified

PUBLISHED BY

Director, ICAR-Agricultural Technology Application Research Institute (ATARI), Zone-X

CRIDA Campus, Santosh Nagar, Hyderabad – 500059
Tel: +91-40-24006500; 24530300; Fax: +91-40-24533543
Email: zcu5hyd@gmail.com; diector.atari-hyd@icar.org.in
Web: https://atari-hyderabad.org.in

KVKs in Action: Innovation, Practice and Impact 25 Good Practice Notes from ICAR-ATARI Zone X

Editors:
Shaik N. Meera,
Rasheed Sulaiman V,
D Alagu Niranjan,
J V Prasad and
T R Sahoo

All rights are reserved. No part of this book shall be reproduced or transmitted in any form by print, microfilm, or any other means without written permission of the Director, ICAR-ATARI, Hyderabad. Not for sale / commercial use. Ownership of images belong to the respective copyright holders.

Suggested Citation: Shaik N. Meera, Rasheed Sulaiman V, D Alagu Niranjan, J V Prasad, and T R Sahoo, eds. 2026. *KVKs in Action: Innovation, Practice and Impact: 25 Good Practice Notes from ICAR-ATARI Zone X*. ICAR-ATARI.

ISBN: 978-81-954708-6-0

Printed at:
Printography, Ranigunj, Secunderabad-500 003. Ph: 9848924254

September 2026

KVKs in Action:
Innovation, Practice and Impact
25 Good Practice Notes from ICAR-ATARI Zone X



भाकृअनुप-कृषि तिकनीकी अनुप्रयोग अनुसंधान संस्थान (अटारी)
ICAR-Agricultural Technology Application Research Institute (ATARI)
Zone-X/क्षेत्र 10, क्रीडा परिसर/CRIDA Campus, संतोषनगर/Santoshnagar, हैदराबाद/
Hyderabad - 500059

Centre for Research on Innovation and Science Policy (CRISP)
Road No 10, Banjara Hills, Hyderabad 500034

September 2026

About the Editors



Dr Shaik N. Meera, Director, ICAR-Agricultural Technology Application Research Institute (ATARI), Zone X, Hyderabad



Dr Rasheed Sulaiman V, Director, Centre for Research on Innovation and Science Policy (CRISP), Hyderabad



Dr D Alagu Niranjan, Research and Knowledge Management Officer, Centre for Research on Innovation and Science Policy (CRISP), Hyderabad



Dr J V Prasad, Principal Scientist (Entomology), ICAR-Agricultural Technology Application Research Institute (ATARI), Zone X, Hyderabad



Dr T R Sahoo, Senior Scientist (Vegetable Sciences), ICAR-Agricultural Technology Application Research Institute (ATARI), Zone X, Hyderabad

भारतीय कृषि अनुसंधान परिषद
कृषि अनुसंधान भवन–1, पूसा, नई दिल्ली-110012
Indian Council of Agricultural Research
Krishi Anusandhan Bhawan-I, Pusa, New Delhi–110012

Ph.:91-11-25843277 (O)
E-mail: ddg-extn.icar@gov.in

डॉ. राजबीर सिंह
उप महानिदेशक (कृषि विस्तार)
Dr. Rajbir Singh
Deputy Director General (Agricultural Extension)



FOREWORD

Krishi Vigyan Kendras (KVKs) are an important part of India's frontline agricultural extension system. They connect agricultural research with field extension system and farmers by testing and demonstrating new technologies and practices under real field conditions. This helps farmers understand and adopt suitable technologies with greater confidence.

I am pleased to note that this publication on Good Practices from the Krishi Vigyan Kendras of ICAR-ATARI, Zone X, Hyderabad goes beyond the conventional documentation of success stories. It presents not only the results of different interventions but also the process that led to those results. It highlights the local problems, the approach adopted, farmers' participation, challenges faced, adaptations made, benefits realised, and the scope for sustaining and scaling up these good practices.

The cases presented in this document cover a wide range of themes, including crop and resource management, livestock-based livelihoods, nutrition, women's empowerment, entrepreneurship, value addition, seed systems, mechanisation, climate resilience and community-based enterprises. Many of these experiences show how KVK interventions have moved from field validation to wider adoption and locally sustained systems.

A valuable feature of these stories is their emphasis on lessons learned and replicability. They show that effective extension is not merely about transferring technology. It also involves listening to farmers, demonstrating solutions under local conditions, providing regular technical support, building partnerships and enabling farmer-to-farmer learning. This makes the publication a useful learning resource for KVKs and extension professionals across the country.

I congratulate the Team ATARI, Zone X, Hyderabad, under the leadership of Dr. Shaik N. Meera, Director, for bringing together this valuable compilation. I also acknowledge Dr. Rasheed Sulaiman V., Director, Centre for Research on Innovation and Science Policy (CRISP), and his team for their valuable support and professional inputs in preparing this publication. I further appreciate the contributions of the KVK scientists, host institutions, partner organisations and, above all, the farmers, farm women, rural youth and entrepreneurs whose experiences form the foundation of this publication.

I am confident that this publication will encourage KVKs to learn from each other, replication of proven approaches and better documentation of field-level innovations.

(Rajbir Singh)

Date: 10th September 2026
Place: New Delhi

Acknowledgements

ICAR-ATARI (Zone X), Hyderabad, and the Centre for Research on Innovation and Science Policy (CRISP), Hyderabad, jointly developed this publication.

We sincerely thank all those who contributed the Good Practice Notes from the KVKs, making this compilation possible.

We are grateful to Nimisha Mittal, CRISP, for reviewing the initial drafts of the Good Practice Notes, and to Anthony Christopher, CRISP, for designing and laying out the publication.

We also express our sincere appreciation to the Heads of Institutions of the participating KVKs—including Vice Chancellors of Universities, Directors of Extension, and Chairpersons of Host Institutions—for their support and encouragement in documenting these experiences.

We are grateful to Dr Rajbir Singh, Deputy Director General (Agricultural Extension), ICAR; Dr Rajarshi Roy Burman, Assistant Director General (Agricultural Extension), ICAR; and Dr Ranjay Kumar Singh, Assistant Director General (Agricultural Extension), ICAR, for their guidance.

Editors

Introduction

CONTEXT

The Indian Council of Agricultural Research (ICAR) established the Krishi Vigyan Kendras (KVKs), beginning with the first KVK in 1974, as an important institutional innovation in India's agricultural research and extension system. Over the years, the network has expanded substantially, and today the country has **731 KVKs spread across diverse agro-ecological and socio-economic regions**.

The KVKs were conceived as district-level institutions that could bring science closer to farmers by testing technologies under local conditions, building capacities, demonstrating improved practices, and supporting the adaptation and application of knowledge. Over time, their role has expanded far beyond technology demonstration alone. Many KVKs today engage with farmers, farm women, rural youth, producer groups, entrepreneurs and local institutions on a wide range of issues related to productivity, resilience, livelihoods, nutrition, mechanisation, value addition, enterprise development and natural resource management.

Yet, we sometimes wonder whether all those concerned fully understand and appreciate the role and contribution of KVKs. In practice, different stakeholders often have different expectations of KVKs. Some view them primarily as technology demonstration centres, others as training institutions, while many farmers see them as trusted sources of scientific advice and problem-solving support. This diversity of expectations itself reflects the breadth of functions that KVKs perform at the district level.

CHALLENGE

KVKs vary widely in their hosting arrangements, leadership, funding, partnerships, infrastructure and operational environments. Their performance is also closely linked to the nature of farming systems in their districts, the problems that farmers and rural communities face, the institutional ecosystem in which they function, and the opportunities available for livelihood improvement.

While all KVKs contribute to agricultural development mainly by introducing, testing, refining, and promoting new knowledge, technologies, and enterprises through training, demonstrations, and advisory support, some KVKs have gone beyond these conventional functions and achieved notable results. In many instances, they have helped create new livelihood opportunities, support local enterprises, strengthen farmer institutions, introduce locally appropriate technologies, improve access to quality inputs, and build effective partnerships with government departments, research institutions, civil society organisations, and the private sector.

However, these experiences are not always adequately documented or shared with the wider extension and research community. Much of the valuable learning generated through years of field engagement often remains with individual KVK teams or within a limited geographical area. A lack of expertise in systematically documenting these experiences, a lack of suitable platforms for sharing them, limited time for reflective documentation, or a combination of these factors might have contributed to this situation.

As a result, many useful lessons on what worked, why it worked, what challenges emerged, how these were addressed, and what conditions are necessary for replication remain underutilised.

ADDRESSING THE CHALLENGE

Almost two years ago, the ICAR-Agricultural Technology Application Research Institute (ATARI)-Zone X, which covers the states of Telangana, Andhra Pradesh, Tamil Nadu and the Union Territory of Puducherry, and the Centre for Research on Innovation and Science Policy (CRISP) began discussions to address this issue jointly.

CRISP has been publishing **Good Practice Notes on Extension** through the Agricultural Extension in South Asia (AESA) network since 2014. These notes have provided a platform for extension professionals to document and share practical experiences in a reflective and learning-oriented manner. Some KVKs have also published their experiences through AESA over the years.

Since 2024, ICAR-ATARI Zone X and CRISP have worked together to help KVKs under ATARI-Zone X document their successes in a way that captures not merely the outcomes, but also the processes, partnerships, adaptations, challenges, and lessons associated with these interventions. The broader objective is to ensure that lessons from these experiences can inform and influence other KVKs and extension organisations facing similar challenges.

To institutionalise this collaboration, ICAR-ATARI Zone X and CRISP signed a Memorandum of Understanding (MoU) in 2025. This collection of **25 Good Practice Notes** from the KVKs has emerged from this collaboration. These Good Practice Notes broadly focus on experiences related to four themes or functions, namely:

- Promoting improved management practices
- Skill development and employment promotion
- Promoting value addition
- Promoting quality production inputs

Within these broad themes, the cases reflect the diversity of roles that KVKs perform. They demonstrate how district-level extension can combine scientific knowledge with local experience, participatory learning, institutional convergence and continuous technical support to address practical problems faced by farmers and rural communities.

In these Good Practice Notes, the authors discuss how they addressed a particular challenge or used an emerging opportunity, the steps and processes they followed, the partnerships they developed, and the benefits and outcomes of their interventions. They also examine how to sustain and scale up these successes.

Importantly, the notes do not present success as a linear or effortless process. The authors also reflect on the challenges encountered during implementation, the adjustments and course corrections that became necessary, and the lessons that emerged from practice. This reflective dimension is particularly important because it allows others seeking to address similar problems to understand **not only what was done, but also how and why certain approaches worked under particular conditions.**

The purpose of these Good Practice Notes is not merely to celebrate the success of individual centres. Each note tells how KVKs are helping push the development trajectory forward—a trajectory that is still evolving. These experiences also show that sustainable change rarely comes from a single institution. KVKs require contributions from farmers, host institutions, State Agricultural Universities, ICAR institutes, line departments, local administrations, civil society organisations, producer institutions, financial agencies, and other development partners to sustain and scale up their efforts. In that sense, these Good Practice Notes are also stories of **partnership, convergence and collective action.**

The KVKs achieved these successes because of their scientific expertise, proximity to farming communities, local credibility and consistent field engagement, even when they faced several operational and institutional challenges. The experiences documented here also reveal the considerable potential within each KVK and what more they could accomplish if they are adequately supported, empowered, and encouraged to take on similar roles.

Another important message emerging from these cases is that the value of a KVK cannot always be understood only through the number of trainings organised, demonstrations conducted or farmers reached. Its contribution is equally reflected in whether farmers gained confidence to adopt a new practice, whether a livelihood became more viable, whether a local institution became stronger, whether a technology continued beyond the project period, whether farmer-to-farmer diffusion occurred, and whether the intervention created conditions for wider and sustained change.

We hope these experiences will encourage more KVKs to systematically document their efforts, reflect on their own practice, and share the lessons emerging from the field. We also hope this publication will help researchers, extension professionals, policymakers, development organisations, and other agriculture and rural development stakeholders better appreciate the diverse and evolving roles of KVKs.

More importantly, we hope these Good Practice Notes will stimulate **cross-learning across KVKs**, inspire adaptation of promising approaches to new contexts, and strengthen a culture in which valuable field experience is systematically converted into knowledge for the wider agricultural extension system.

Editors

Table of Content

1 / Promoting Improved Management Practices

ICAR-KVK Adilabad, Telangana
Promoting Cotton Cultivation under Raised Bed System in Adilabad 1

ICAR-KVK Gaddipally, Suryapet, Telangana
Promoting Integrated Crop Management (ICM) in Chilli 6

ICAR-KVK Zaheerabad, Sangareddy, Telangana
Empowering Rural Households through Backyard Poultry in Sangareddy 11

ICAR-KVK Anakapalli, Andhra Pradesh
Goat Rearing: A Viable Livelihood Intervention for SC Women 18

ICAR-KVK Amadalavalasa, Srikakulam, Andhra Pradesh
Promoting Scientific Fish Farming among Tribal Farmers in Srikakulam 24

2 / Skill Development and Employment Promotion

ICAR-KVK Kanyakumari, Tamil Nadu
Promoting Mechanised Coconut Harvesting in Kanyakumari 31

ICAR-KVK Ariyalur, Tamil Nadu
Enhancing Employment and Income for Rural Women through Cashew Nut Shelling 37

ICAR-KVK Erode, Tamil Nadu
Agro-Ecotourism to Promote Environmental Conservation and Enhance Tribal Livelihoods 43

ICAR-KVK Dindigul, Tamil Nadu
Enhancing Coconut Productivity and Farmer Income through Integrated Management and Mechanised Tree Climbing 51

3 / Promoting Value Addition

ICAR-KVK Undi, West Godavari, Andhra Pradesh
Promoting Honeybee Keeping in West Godavari 57

ICAR-KVK Rudrur, Nizamabad, Telangana
From Production to Prosperity: Strengthening Producer Groups in the Turmeric Sector 62

ICAR-KVK Erode, Tamil Nadu
Exploring Banana Enterprises in Erode District 68

ICAR-KVK Zaheerabad, Sangareddy, Telangana
Empowering SC Women Through Millet Processing and Value Addition 75

ICAR-YFA-KVK Mahabubnagar-I, Telangana
Leveraging FPOs for Quality-Assured Sorghum Production and Enhanced Farmer Income 81

ICAR-KVK Lam, Guntur, Andhra Pradesh
Enhancing Preschool Nutrition with Millets: A Community-Based Intervention 89

ICAR-KVK Thoothukudi, Tamil Nadu
Empowering a Farmer Producer Company for Sustainable Growth 94

ICAR-KVK Utukur, YSR Kadapa, Andhra Pradesh
Crafting Value, Building Careers: KVK Utukur's Entrepreneurship Blueprint for YSR Kadapa District 100

ICAR-BCT-KVK Anakapalli, Andhra Pradesh
Turning Abundance into Advantage: A Livelihood-Centric Approach to Jackfruit Value Addition in Visakhapatnam 106

ICAR-KVK Theni, Tamil Nadu
Promoting Agripreneurship for Value Addition in Theni 112

4 / Promoting Quality Production Inputs

ICAR-KVK Yagantipalle, Nandyal, Andhra Pradesh
A Participatory Seed Production Model in Nandyal for Strengthening Local Seed Systems 119

ICAR-KVK Jammikunta, Karimnagar
Boosting Quality Seed Production of Improved Rice Varieties in Karimnagar District 126

ICAR-KVK Thiruvannamalai, Tamil Nadu
Promoting IIHR Vegetable Special for Enhanced Vegetable Productivity 131

ICAR-KVK Virudhunagar, Tamil Nadu
Promoting Improved Variety of Barnyard Millet 136

ICAR-KVK Darsi, Prakasam, Andhra Pradesh
Promoting Multi-Cut Fodder Varieties in Prakasam District 143

ICAR-KVK Mamnoor, Warangal, Telangana
Promoting Area-Specific Mineral Mixture for Enhancing Milk Yield in Warangal 148

Promoting Improved Management Practices

ICAR-KVK Adilabad, Telangana

Promoting Cotton Cultivation under Raised Bed System in Adilabad

In this good practice note, G Shiva Charan, Y Praveen Kumar, A Poshadri, M Sunil Kumar, D Mohan Das and K Rajashekar discuss how the KVK Adilabad promoted cotton cultivation under the Raised Bed System among farmers in Adilabad.

CONTEXT

In Adilabad district, cotton is grown by small and marginal farmers on approximately 4.0 lakh acres, mainly under rainfed conditions on shallow to deep-black soils. Being an important cash crop, cotton has high market demand, offering considerable potential to increase the cultivated area. However, the region receives nearly 70% of annual rainfall during July–August, with 20–25 rainy days, leading to frequent waterlogging and uneven soil moisture. Consequently, cotton plants experience poor growth during the vegetative, square and boll formation stages, resulting in stunted growth, boll rot and 30–50% yield loss. Conventional flat-bed cultivation is ineffective as it fails to drain excess water and does not suit the undulating land topography. Cultivating cotton under raised bed systems improve drainage, stabilize crop growth, and enhance productivity. The KVK Adilabad functioning under the Professor Jayashankar Telangana Agricultural University (PJTAU) validated the raised bed method, during 2017–18 to 2021–22 and later scaled through Front Line Demonstrations. This technology is currently being adopted by 1,700 farmers across 5,130 acres.

GOOD PRACTICES

Technology Validation

Raised bed technology was validated at the KVK farm during 2019 to 2021 on a 6-acre plot across three Kharif seasons. Comparative trials with flatbed cultivation recorded plant height, branches, squares, and bolls, identifying optimal spacing (180 × 45 cm). Results showed clear superiority of raised beds, providing strong evidence for scaling. Nearly 1,000 farmers visit KVK annually, enabling direct observation and learning.

Participatory Problem Diagnosis & Farmer Mobilisation

KVK scientists initiated field interventions in 2022 by conducting Focus Group Discussions (FGDs) in Talamadugu mandal to identify production constraints, including waterlogging, uneven fields, and yield losses. Farmers ranked problems, and vulnerable farmers with low-lying fields were selected for demonstrations. Field visits to the KVK instructional farm were organised so that farmers could observe raised-bed cultivation, which helped build trust and motivation to adopt it.



Creating Awareness on Raised Bed Technology in Cotton

On-Farm Demonstrations

In 2022–23 and 2023–24, demonstrations were conducted on farmers' fields with half the plots raised-bed and half flatbed. Initially, 10 farmers (25 acres) in three villages were selected based on vulnerability to waterlogging. Local tractor owners were engaged to provide bed-making services, and farmers participated in bed preparation. The intervention expanded to 100 acres, with 20 farmers, the following year. Regular monitoring and field visits ensured correct implementation and built farmer confidence.

On- and off-campus training

KVK organised on- and off-campus training during May 2022, before land preparation for 90 farmers on bed preparation, weed management, and crop establishment, followed by season-long advisory support through regular field visits, advisories on WhatsApp, weather-based advisory bulletins and personal interaction.



Demonstration on Raised Bed System in Cotton

Use Of Digital Tools

A full demonstration video was uploaded on YouTube and shared through WhatsApp and Facebook to reach a wider audience. Contact details for bed-maker service providers were shared for easy access.

Estalishment of Custom Hiring Centres

To further strengthen mechanisation, three Custom Hiring Centres (CHCs) were established under the Technology Demonstration Component - National Innovations in Climate Resilient Agriculture (TDC NICRA) project in three villages. Each CHC was established at an average cost of Rs.4 lakhs and equipped with 9-tine cultivators, 3 MB ploughs, bed makers for land preparation, bullock-drawn seed drills and manual hand push seed drills for seed sowing, battery sprayers for plant protection,



Demonstration on Raised Bed System in Cotton

drip and sprinkler irrigation systems for effective water management and tarpaulins for post-harvest management. These CHCs are operated by one of the farmers from the village with a joint bank account to ensure financial transparency.

CHALLENGES

Upscaling raised bed cotton cultivation in Adilabad district encountered multiple interlinked challenges. Limited availability of bed-making machinery initially constrained timely land preparation, especially during peak sowing periods. At the same time, farmer resistance to shifting from the familiar flatbed method slowed adoption, as many growers were uncertain about the benefits of the new practice. These challenges were further compounded by unpredictable rainfall and weather variability, which increased farmers' risk perception and hesitation to adopt an alternative cultivation system.

The KVK addressed these challenges by adopting the following measures.

Firstly, farmer scepticism was effectively overcome through live on-field demonstrations in waterlogged and low-lying fields, which clearly demonstrated the superiority of raised-bed cultivation over conventional flatbed practices. Continuous field monitoring, season-long advisories, and farmer-to-farmer learning further reinforced confidence. Adoption was accelerated through multi-platform communication that combined training, field visits, and digital outreach, resulting in sustained and scalable adoption of the technology. Secondly, farmers were linked to local service providers by sharing their contact numbers, ensuring timely availability of bed makers.

BENEFITS AND IMPACT

The raised-bed cotton intervention generated substantial technological, economic, and social benefits for farmers in the Adilabad district. Frontline demonstrations conducted over 125 acres during 2022–23 and 2023–24 recorded a 43% yield increase, with raised bed cotton yielding 1,800 kg ha^{-1} compared to 1,260 kg ha^{-1} under conventional flatbed cultivation. Net returns nearly doubled from ₹37,962 ha^{-1} to ₹70,903 ha^{-1}, and the B: C ratio improved from 1.81 to 2.42, despite a marginal increase in cultivation cost.

Over three years, the technology was adopted by 1,700 farmers, expanding to 5,130 acres, indicating strong scalability. Capacity-building initiatives through the KVK trained 90 farmers, strengthening skills in climate-resilient crop management. Qualitatively, farmers exhibited increased confidence, positive behavioural change, and peer-to-peer diffusion. Raised bed cultivation enhanced water-use efficiency and resilience to excess rainfall, contributing to environmental sustainability. Institutionally, 57 local service providers invested in bed makers, improving access to machinery and strengthening rural service delivery systems.

The experience of Mr Dade Rao, a cotton farmer from Palsi K village, highlights this learning. Initially sceptical about raised-bed cultivation, he decided to adopt the practice on two acres after participating in a focus group discussion and observing a demonstration at the KVK Adilabad instructional farm. During the 2022–23 season, he recorded a 28% increase in yield compared to the flatbed method, along with improved crop growth. The visible improvement convinced him of the technology's effectiveness and encouraged wider interest among neighbouring farmers.

SUSTAINABILITY AND SCALING UP

The raised bed cotton technology promoted by the KVK supports sustainable cotton production by effectively addressing waterlogging, improving crop stand, and enhancing resource-use efficiency under erratic rainfall conditions. The practice contributes to stable yields, reduced risk of crop loss, and improved climate resilience, making cotton cultivation more profitable and environmentally sustainable. Continuous extension support, timely advisories, and farmer capacity building have strengthened confidence and ensured sustained adoption. The technology aligns well with climate-smart agriculture principles and has demonstrated long-term viability under rainfed black soil conditions.

Upscaling of raised-bed cotton cultivation can be achieved by making bed-making machinery readily available at the village level and by addressing farmers' hesitation through regular on-field demonstrations. When farmers observe clear results under local conditions, confidence in the technology improves. Convergence with the Department of Agriculture for awareness and training purposes, and with Rythu Vedikas, serves as a local platform to discuss technology with AEOs, helping increase visibility, build farmer confidence, and accelerate adoption of the technology. The growth of local service providers and bed-maker ownership further improves access and supports timely operations. Combined with continuous advisories and communication through multiple platforms, these efforts enable rapid horizontal spread and district-wide scaling of raised-bed cotton cultivation.

LESSONS LEARNED

The promotion of raised-bed technology demonstrated that rainfed cotton farmers are willing to adopt low-risk, climate-smart practices when the benefits are clearly visible. Validation of the technology at the KVK instructional farm helped establish scientific credibility, while on-farm demonstrations enabled farmers to assess performance under real field conditions. Continuous, season-long advisory support played a crucial role in building farmer confidence and ensuring correct implementation. Localised communication through village meetings, exposure visits, demonstration videos, and digital platforms further accelerated awareness and adoption.

Acknowledgements: The authors thank Prof. Aldas Janaiah, Vice-Chancellor of Professor Jayashankar Telangana Agricultural University (PJTAU), Hyderabad, for his support and inspiration, and Dr Shaik N Meera, Director of ICAR-ATARI-Zone-X, Hyderabad, for facilitating tribal livelihood programs and farm productivity through TSP funding to KVK Adilabad.

Authors



G. Shivacharan
Assistant Professor (Agricultural Extension),
College of Agriculture (PJTAU), Rajendranagar
shiv4one@gmail.com



Y. Praveen Kumar
Associate Dean, Agricultural College, Adilabad, (PJTAU)
yadagiri.praveenrao@gmail.com



A. Poshadri
Scientist and Technical Officer to Dean of Agriculture Engineering (Food Science Technology)
poshadri_fst@yahoo.co.in



M. Sunil Kumar
Assistant Professor (Horticulture),
Agricultural College (PJTAU), Adilabad
sunil0529@gmail.com



Mohan Das
Scientist (Agronomy),
KVK Adilabad
mohandasdandu@gmail.com



K. Rajashekar
Senior Scientist (Entomology),
KVK Adilabad
kanjarla28@yahoo.co.in

ICAR-KVK Gaddipally, Suryapet, Telangana

Promoting Integrated Crop Management (ICM) in Chilli

In this Good Practice Note, the authors present how Integrated Crop Management (ICM) has been implemented in chilli cultivation in Suryapet District, Telangana.

CONTEXT

Suryapet district in Telangana is a major chilli-growing belt, with nearly 16,765 acres under cultivation, providing a primary livelihood for small and marginal farmers. However, intensive monocropping, minimal crop rotation, excessive chemical fertiliser use, and repeated pesticide applications have caused severe soil degradation, increased pest and disease incidence, and declining productivity. During the years 2022 to 2024, Key production constraints included damping-off at the nursery stage, western flower thrips, leaf curl disease, Fusarium wilt, and anthracnose, resulting in significant yield losses. Farmers predominantly rely on chemical sprays, which offer short-term relief but threaten soil health, environmental sustainability, and human safety. Conventional practices have proved insufficient to address these persistent challenges. Recognising this, the KVK Gaddipally functioning under Sri Aurobindo Institute of Rural Development (SAIRD) initiated the promotion of Integrated Crop Management (ICM) practices, aiming to enhance chilli productivity, reduce pest and disease pressure, and ensure sustainable farming systems that safeguard both farmer livelihoods and environmental health.

GOOD PRACTICES

Diagnostic Survey

The KVK team conducted a diagnostic survey and engaged with chilli farmers across 10 villages of Suryapet district. The assessment revealed excessive pesticide use (often 20–25 sprays per season), poor nutrient management, and limited awareness of bio-inputs and Economic Threshold Level (ETL)-based pest control. These findings underscored the urgent need for a holistic, science-driven Integrated Crop Management (ICM) approach that integrates Integrated Nutrient Management (INM), Integrated Pest Management (IPM), and good agronomic practices to improve productivity, reduce pest and disease pressure, and ensure sustainable farming.

Training and Demonstrations

The KVK organised a series of eight on-campus and six off-campus training programmes and demonstrations on Integrated Crop Management (ICM) in chilli at its campus during 2022–24. Each year, approximately 25 progressive farmers from 10 villages participated, and over the project period, a total of 75 farmers from 33 villages received hands-on training. The programmes focused on nursery management, soil health improvement, pest and disease identification, Economic Threshold Level (ETL) concepts, and safe use of plant protection chemicals, equipping farmers with practical knowledge and skills for sustainable chilli cultivation.



Training Programme for Chilli Farmers at Gajulamalkapuram Village

Distribution of Critical Inputs

To facilitate the adoption of ICM, the KVK supplied 3.5 lakh seedlings free of cost and provided 3 lakh seedlings (resistant to chilli leaf curl virus and powdery mildew) to participating farmers on a cost-recovery basis. In addition, awareness on scientific crop management was promoted, with an emphasis on reducing chemical dependency.

Frontline Demonstrations

The FLDs were conducted from 2022 to 2024 at 30 locations across the fields of 30 farmers in Suryapet district (viz., Mandals like Mothey, Athamkur, Chinthalapalem, Mellacheruvu, Thungathurthi, etc.). FLDs were supplemented with training programmes, field visits, group discussions, and social media outreach, enabling farmers to adopt sustainable practices effectively and improve productivity while minimising environmental impact. The ICM practices promoted are illustrated in Box 1.

Box 1: ICM Interventions in Chilli

- Soil test–based fertiliser application for balanced nutrient management
- Neem cake application: 200 kg/acre during last ploughing to improve soil health
- Bio-inoculants: Trichoderma viride @ 4 kg/acre and Pseudomonas fluorescens @ 2 kg/acre for soil-borne disease management
- Seedling root dip: Pseudomonas fluorescens @ 5 ml/litre for 10 minutes before transplanting
- Mulching with silver-black plastic (25–30 micron, silver side up) along with drip irrigation to conserve moisture and suppress weeds
- Micronutrient foliar spray: Formula-4 @ 5 g/litre at 30, 50, and 70 DAS
- Biopesticide sprays: Lecanicillium lecanii and Beauveria bassiana @ 5 ml/litre
- Installation of traps at 30 DAS:
- Sticky traps (Blue/Yellow/White) @ 50 per acre
- Pheromone traps @ 4 per acre
- Solar trap @ 1 per acre
- Need-based chemical sprays strictly applied according to ETL



Diagnostic Field Visits to Chilli Farmers' Fields

CHALLENGES

The implementation of ICM in Suryapet faced several obstacles during the initial years. Farmers were initially reluctant to adopt new practices, favouring conventional chemical-intensive methods that gave immediate results. Technical challenges emerged with soil test–based fertilisation, bio-inoculants, and ETL-based pest management, as most farmers had little prior exposure to these practices. Resource constraints, including the availability of quality seedlings, bio-inputs, and training materials, compounded the difficulty. Environmental factors, such as erratic rainfall, pest outbreaks, and fluctuating market conditions, further hindered adoption.

The KVK addressed these issues through hands-on demonstrations, field visits, and training programmes that enabled farmers to see the effectiveness of ICM and gradually build trust. Resource gaps were managed by distributing 6.5 lakh resistant seedlings and efficiently providing bio-inputs. Practices were tailored to local conditions, including optimised mulching, trap installations, and judicious use of chemicals based on ETL. Capacity building for farmers and staff ensured proper implementation of INM, IPM, and other scientific interventions.

Due to excessive pesticide application beyond ETL levels, black trip infestations couldn't be controlled, as pest resistance was observed in farmers' fields. The KVK team pivoted interventions such as practical demonstration sessions, peer learning among farmers through Focus Group Discussions (FGDs) and PRA techniques, and continuous monitoring to reduce the extent of infestation by western black trips and fusarium wilt during 2022-2024. Innovative approaches, such as integrating bio-pesticide sprays with selective chemical use and linking training with Frontline Demonstrations (FLDs),

helped overcome these issues; follow-up and visible yield improvements reinforced farmer confidence, enabling successful adoption despite initial challenges.

BENEFITS AND IMPACT

During 2022-2024, the ICM demonstration plots recorded a 15.7% reduction in wilt incidence and a 14.2% reduction in thrips infestation, resulting in a 23.8 % increase in yield compared to conventional farmers' practices. By adopting ICM, farmers realised additional net returns of around 53% per hectare.

Collectively, the 75 beneficiary farmers earned an extra profit of ₹1.70 crores over the three-year project period at KVK Gaddipally. Furthermore, farmers reduced the number of pesticide sprays by 5–7, saving approximately ₹18,500 per acre while simultaneously improving soil health and crop vigour. These results demonstrate the economic and environmental benefits of shifting from traditional chilli cultivation to a science-based, integrated management approach.

SUSTAINABILITY AND SCALING UP

As farmers achieved higher yields with reduced input costs, they will continue to adopt these cost-effective practices. Evidence of continuation is clear: nearly 412 farmers from 18 villages, covering 964 acres, independently adopted ICM in subsequent seasons. Farmers reported improved crop health, lower pest pressure, reduced input costs, and higher profitability. Moreover, the KVK and the local extension teams of the State Department of Agriculture are always available to provide ongoing guidance and support. The interventions namely use of bio-inoculants, mulching, and ETL-based pest management—is technically effective and environmentally safe, and is contributing to reduced chemical use and improved soil health.

The practices are highly replicable in other chilli-growing regions with similar conditions. Successful replication requires access to quality seedlings, bio-inputs, training, and demonstrations.
The KVK has embedded ICM promotion into its regular training and demonstration programs, ensuring institutional support and ongoing dissemination to support long-term adoption. Policy support and partnerships with cooperatives, input suppliers, and NGOs can further enhance adoption.

LESSONS LEARNED

- Integrated Approaches Work: Combining INM, IPM, and good agronomic practices effectively reduces pest and disease incidence in chilli.
- ETL-Based Pesticide Use: Applying chemicals based on ETL lowers production costs and minimises environmental risks.
- Role of Bio-Inputs: Bio-inoculants and biopesticides are essential for improving soil health and sustaining productivity.
- Capacity Building Matters: Hands-on training, demonstrations, and field interactions accelerate adoption of new technologies among farmers.

CONCLUSION

The introduction of Integrated Crop Management (ICM) in chilli cultivation by the KVK has proven highly effective in enhancing productivity, reducing input costs, and improving farmer livelihoods in Suryapet district. By emphasising sustainable farming practices, ICM has increased yields while contributing to environmental conservation. The success of this initiative provides a replicable model for other regions and crops. For wider adoption, dedicated funding under programs such as the National Mission on Natural Farming (NMNF), the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), and the Mission for Integrated Development of Horticulture (MIDH) can be used to support further promotion of ICM. Additionally, encouraging farmers to adopt drip and sprinkler micro-irrigation systems can strengthen the dissemination and impact of ICM practices across Telangana.

Acknowledgements: The authors sincerely acknowledge ICAR–ATARI, Zone–X, Hyderabad, for financial support and guidance in implementing the ICM intervention in chilli.

Authors



D. Naresh
Senior Scientist and Head (I/c) and Subject Matter Specialist (Agronomy)
KVK Gaddipally
narenjb21@gmail.com



Ch. Naresh
Subject Matter Specialist (Horticulture)
KVK Gaddipally
nareshgoudchamakuri@gmail.com



A. Kiran
Subject Matter Specialist (Soil Science)
KVK Gaddipally
kiranarigela16@gmail.com



D. Adarsh
Subject Matter Specialist (Plant Protection)
KVK Gaddipally
danduadarsh@gmail.com



P. Akshith Sai
Subject Matter Specialist (Agricuture Extension)
KVK Gaddipally
dr.akshithsaipabba136@gmail.com



A. Naresh
Programme Assistant (Computer)
KVK Gaddipally
anaresh776@gmail.com

ICAR-KVK Zaheerabad, Sangareddy, Telangana

Empowering Rural Households through Backyard Poultry in Sangareddy

In this practice note, Pagadala Sai Priyanka, Kailash Madne, C. Vara Prasad and M. Hemalatha present how rural backyard poultry initiatives of the KVK improved nutritional security and income generation.

CONTEXT

Sangareddy district, Telangana, has a predominantly rural population with limited livelihood options, where a significant proportion of households (20.3%) belong to Scheduled Caste (Dalit) communities. Most families depend on dryland farming and casual labour, resulting in low and unstable incomes that limit access to diversified, protein-rich diets. Egg consumption in these households has traditionally been low due to high costs and limited local availability. Although backyard poultry rearing is a familiar practice, local birds are low-producing and cannot reliably meet household nutritional or income needs. Limited dietary diversity and inadequate access to affordable animal-source foods contribute to persistent malnutrition in the district. Children continue to experience high levels of stunting (33%), wasting (25%), and underweight (35%), while anaemia affects 64% of women, highlighting the need for sustainable household-level nutrition interventions.

Conventional livehoods options, such as relying on casual labour or traditional backyard poultry, have proven insufficient. Seasonal employment provides uncertain income, and low-yield local birds fail to address household protein gaps. This creates an urgent need for interventions that are both low-cost

and manageable within the household, particularly for women, who have limited opportunities for livelihood diversification and often rely on daily-wage work.

To address these challenges, the KVK Zaheerabad functioning under the Deccan Devlopment Society (DDS) introduced improved chicken varieties, such as Rainbow Rooster, (in collaboration with ICAR–National Research Centre on Meat (NRCM), Hyderabad), Rajasri, and Sonali, alongside a women-led backyard poultry program under the Scheduled Caste Sub-Plan (SCSP) and KVK technical support. Backyard poultry is well-suited to women's daily schedules, manageable at home, and offers a practical avenue for enhancing household nutrition and generating supplemental income. This intervention leverages an existing



Distribution of Rainbow Rooster Breed of Birds under SC-SP

familiar practice and is effective in strengthening nutritional security and economic empowerment for rural women.

GOOD PRACTICES

Baseline survey and Field visits to identify eligible households

A baseline survey and field visits were conducted in January 2023 among women sanghams promoted by the DDS to identify eligible households. Selection criteria included low-income status, female-headed or women-led households, interest in poultry rearing, availability of adequate backyard space, and willingness to follow scientific poultry practices. Based on these criteria, 175 Scheduled Caste households from several villages were selected.

Distribution of chicks and supporting inputs

The backyard poultry programme was implemented in multiple stages, evolving to ensure sustainability and the continuous availability of chicks.

Pilot 1: In March 2023, fifty beneficiaries from two villages (Bidekanne and Shamsallapur) and, in December 2023, another fifty beneficiaries from two villages (Metalkunta and Huselli) each received 20 Rainbow Rooster chicks along with a feeder, drinker, starter feed, and basic medicines, provided with support from ICAR–NRCM.

Pilot 2: In the second year of April 2024, thirty-five beneficiaries from Potpally village each received 20 Rainbow Rooster chicks, feeder, drinker, starter feed, and basic medicines under the SCSP component.

Pilot 3: In the third year, in July 2025, 40 beneficiaries from Satwar and Jharasangham villages each received 25 Sonali and Rajasri chicks, along with basic medicines, through the KVK's Frontline Demonstration program.



Women-Managed Backyard Poultry Units

Establishment of low-cost hatchery at the KVK Campus

In July 2024, KVK established a low-cost, 100-egg-capacity automated incubator hatchery on campus, worth 15,000 rupees, with power backup, to supply chicks sustainably. Healthy, pure-lined, vaccinated one-month-old Sonali and Rajasri chicks were produced in-house and distributed. This approach reduced dependence on external suppliers, served as a demonstration, and ensured quality-controlled chicks tailored to local conditions. With a unit cost of ₹3,500 per kit, the initiative eventually reached 175 households across the three phases.

Establishment of Large-Capacity Demonstration Poultry and Incubation Facility

A large-capacity poultry unit, valued at 8 lakhs for infrastructure and equipment, was established at the KVK in November, 2025, with support from the Centre for Sustainable Agriculture, Hyderabad. The facility includes a 1,200-egg incubator, capable of hatching 400 chicks per week. The unit was established to:

- Demonstrate scientific backyard poultry rearing practices for rural farmers and trainees.
- Conduct field evaluation of four breeds suited for backyard systems: Rajasri, Sonali, Aseel, and local Desi birds.
- Undertake regular production of high-quality chicks for SCSP and other extension programs.
- Ensure a continuous, year-round supply of chicks for community-level poultry rearing.

This facility has transformed the initiative from a one-time distribution model into a self-sustaining, community-based poultry system, enhancing household nutrition and women's economic participation.



Newly Inaugurated Poultry and Incubator Unit at the KVK

Trainings and Demonstrations

Regular training sessions were conducted both on-campus and at the village level, with three sessions held per village. These sessions focused on low-cost feeding using household kitchen waste and locally available grains, proper housing and brooding practices, vaccination, deworming, and seasonal care. Technical demonstrations emphasised the prevention of morbidity, record-keeping of flock performance, and the simple economics of backyard poultry rearing.



Follow-up Visits to Beneficiaries

Follow-up Visits

The KVK team conducted monthly follow-up visits to monitor the health and performance of the birds, ensure timely vaccination and deworming, record mortality, and provide technical guidance to beneficiaries. During each visit, scientists addressed farmers' queries on feeding, housing, disease management, and general flock management while reinforcing recommended scientific practices. These regular interactions helped improve bird survival, productivity, beneficiary confidence, and the long-term sustainability of the backyard poultry units.

CHALLENGES

Seasonal disease outbreaks put the birds at risk, so regular vaccination was essential. Some farmers were unsure about using the improved dual-purpose breeds and preferred their familiar local birds. During dry seasons, grains for supplementary feeding were not always available. Farmers also faced challenges with proper brooding, maintaining a clean poultry area, and managing diseases. Limited funds made it difficult to purchase inputs, vaccines, and feed, and to expand the program beyond subsidised units. Harsh dry-season conditions further affected bird growth and feed availability.

To address these challenges, the team closely monitored vaccinations, conducted repeated technical demonstrations, and provided hands-on training in the villages. Trust was built through exposure visits, peer learning, and direct engagement with women beneficiaries. Support from ICAR–NRCM, local institutions, and SCSP funds helped provide the necessary inputs, while partnerships with local suppliers ensured a steady supply of feed. Training also strengthened skills in poultry management, record-keeping, and disease prevention.

When some farmers were initially hesitant, repeated demonstrations and one-to-one guidance helped them adopt improved practices. Early problems with dry-season feeding were solved by using low-cost alternative feed options. Consistent training, clear positive results, and ongoing support kept the program moving forward, enabling it to overcome challenges and achieve lasting improvements in nutrition, income, and women's empowerment.

BENEFITS AND IMPACT

Beneficiaries recorded a low average mortality of about two birds per household, reflecting effective management and timely vaccination. Flocks were sustained using household food waste, broken

grains, and small quantities of supplementary feed, with an average additional expenditure of only ₹1,025 per household, making the enterprise affordable for low-income families. The availability of home-produced eggs led to a substantial rise in consumption: before the intervention, many families ate eggs about once a week, whereas after the intervention, household egg consumption increased to nearly every other day. Over the reporting period, each household consumed approximately 1,074 eggs and 15 birds, thereby improving dietary protein and micronutrient intake, with several households reporting measurable weight gains among undernourished children (Table 1).

Table 1: Impact of Backyard poultry interventions

Impact Indicator	Before (January 2023) Intervention	After (December 2025) Intervention	Change / Direction of Impact
Egg consumption frequency	~1 egg per person per week	Eggs consumed every alternate day	↑ Significant improvement in dietary protein intake
Total eggs consumed per household	Very low; <150/year (estimated)	~1,074 eggs/ household/year	↑ 6–7-fold increase in household egg availability
Chicken meat consumption	Once a week; mostly market-purchased	Once a week; partly home-reared (≈15 birds consumed)	↑ Improved quality; ↓ household spending on chicken
Surplus sale: eggs	Negligible	~315 eggs/household/ year	↑ New income avenue created
Surplus sale: birds	Rarely sold	~3 birds/household/ year	↑ Regular small cash inflow for women
Income earned (eggs + birds)	None	~₹6,150/household/ year	↑ New supplementary income
Feed expenditure	Not applicable	Only ~₹1,025 per household/year	↑ Highly economical, low-input
Bird mortality	—	~2 birds/household	↓ Low mortality due to regular vaccination
Women's decision-making	Limited involvement	Full responsibility for flock management & sales	↑ Women's empowerment and financial agency
Community adoption	Limited to traditional desi birds	Neighbouring families started adopting improved birds	↑ Strong ripple effect and peer learning

After meeting household needs, beneficiaries sold surplus eggs and birds, averaging 315 eggs and 3 birds per household (eggs ≈ ₹10 each; birds ≈ ₹1,000 each), generating meaningful supplemental income. Women reported increased confidence in livestock management and greater involvement in household financial decisions.

Visible benefits also prompted neighbouring families to adopt improved backyard poultry practices. Overall, the model emerged as a locally appropriate, low-risk livelihood option that integrates nutrition and income generation while strengthening women's empowerment and community-level engagement.

SUSTAINABILITY AND SCALING UP

The backyard poultry program demonstrates strong potential for sustainability and replication. Financially, the low-cost, low-input model, combined with modest revenue from surplus eggs and birds, makes it affordable and economically viable for low-income households. Institutionally, KVK's technical support, regular training, and partnerships with ICAR–NRCM and local suppliers have built local ownership and strengthened organisational capacity. Technically, improved dual-purpose breeds, simple housing, and vaccination protocols are easy to maintain and well-suited to backyard systems. Socially, women's acceptance, empowerment, and visible nutritional benefits have fostered community buy-in, while environmentally, the model relies on sustainable feeding practices that use household waste and local grains.

The model can be scaled to other dryland regions with similar socio-economic conditions. Partnerships with local institutions, NGOs, and government schemes can support broader adoption. Evidence of continuation is seen in households maintaining independent flocks and in neighbouring families adopting improved practices.

LESSONS LEARNED

- Low-input backyard poultry rearing is viable, economical, and scalable.
- Improved dual-purpose breeds can quickly increase household egg availability and modestly improve meat supply.
- Women can successfully manage backyard poultry units with short, practical training and periodic technical support.
- Low mortality is achievable through proper vaccination, provision of basic medicines, and regular follow-up.
- Even small sales of surplus eggs and birds strengthen household cash flow and enhance women's economic agency.
- Integrating nutrition and income objectives improves acceptance and ensures sustainability.
- Visible local successes create peer learning and encourage neighbouring households to adopt improved practices; demonstration households serve as an effective dissemination route.

CONCLUSION

The DDS–KVK backyard poultry initiative provides a replicable, low-cost model to improve nutritional security and generate supplementary income for rural households. By targeting women beneficiaries, introducing improved dual-purpose breeds with health care support, and combining input provision with practical training and regular follow-up, the program significantly increased egg consumption, enhanced household nutrition, strengthened women's economic participation, and promoted positive community adoption. With modest investment and continued technical support, this model can be successfully scaled to other dryland regions with similar socio-economic conditions.

Acknowledgements: We acknowledge the technical and material support from ICAR-NRC (Meat), the funding and operational support under the Scheduled Caste Sub-Plan (SCSP) and the encouragement and coordination provided by ICAR–ATARI, Hyderabad. Sincere thanks to the participating women farmers across Bidekanne, Metalkunta, Huselli, Shamsallapur, Potpally, Satwar, Jharasangham and neighbouring hamlets for their cooperation and dedication.

Authors



Pagadala Sai Priyanka
Subject Matter Specialist (Agricultural Extension)
KVK Zaheerabad
saipriyanka.ddskvk@ddsindia.org



Madne Kailash
Subject Matter Specialist (Animal Husbandry)
KVK Zaheerabad
KailashMadne.ddskvk@ddsindia.org



C. Vara Prasad
Senior Scientist and Head
KVK Zaheerabad
varaprasad.ddskvk@ddsindia.org



Mandava Hemalatha
Subject Matter Specialist (Home Science)
KVK Zaheerabad
hemalatha.ddskvk@ddsindia.org

ICAR-KVK Anakapalli, Andhra Pradesh

Goat Rearing: A Viable Livelihood Intervention for SC Women

In this Good Practices Note, Ragjni and Sailaja highlight the transformative impact of their interventions in promoting goat rearing, which have enabled continuous income generation and empowered marginalised communities, particularly women.

CONTEXT

The Scheduled Caste (SC) community constitutes 8.54% of Visakhapatnam district's total population, with 48.25% engaged as non-agricultural daily-wage labourers, 43% as agricultural cultivators, and 8.75% as agricultural labourers; among them, more than 50% were women. These communities often face significant challenges, such as small landholdings and low incomes, which limit their livelihood options.

In response to these constraints, goat farming has emerged as a suitable and practical livelihood activity in the district. Goats are well-adapted to the local climate and economic conditions, providing a reliable source of income and stability during rural crises. Their ability to efficiently digest crude fibre allows them to thrive on poor-quality roughage, including leaves, shrubs, and kitchen waste, making them particularly suitable for landless labourers and women, even in areas with limited vegetation. Moreover, their resilience enables them to withstand adverse conditions such as severe droughts.

Recognising this potential, the KVK functioning under the Bhagavatula Charitable Trust (BCT) has promoted goat rearing under the Scheduled Caste Sub Plan (SCSP), aiming to provide sustainable income opportunities and enhance the resilience of SC households.

Since 2000, utilsing the SCSP budget sancationed, the KVK has been promoting sustable livelihoods in district. Over the past five years, targeted interventions have focused on strengthening income generation and resilience among marginalised households. Through proactive and innovative support, approximately 45,000 farmers are empowered annually, resulting in notable improvements in agricultural yields and overall rural livelihoods.

GOOD PRACTICES

Participatory Beneficiary Identification and Livelihood Planning

The intervention began with participatory identification of SC women beneficiaries in Gunupudi village of Nakkapalli mandal, V Kothuru village of Payakaraopeta mandal, and MB Patnam and Mulagapudi villages of Nathavaram mandal, with particular focus on widowed, single, and landless daily-wage labourers. Village-level consultations were conducted in collaboration with community leaders and local groups to assess livelihood vulnerability, household readiness, and women's interest in alternative income-generating activities. Goat rearing was jointly prioritised based on women's labour availability, local feasibility, and cultural acceptability.

Micro-Unit Goat Distribution with Risk Reduction

To reduce entry barriers and perceived financial risk, a total of 25 beneficiaries (5 in 2020, 15 in 2021, and 5 in 2022) were provided with a starter unit of three native goats, comprising two females and one male. The goats were sourced locally based on visible health indicators such as body condition score and coat quality and were thoroughly dewormed before distribution. Units were supplied free of charge under the SCSP, and the small unit size was deliberately chosen to minimise management complexity and financial anxiety among first-time livestock keepers. Through reassurance and risk communication, confidence was gradually built among beneficiaries, enabling them to adopt goat rearing without fear of loss.



Distribution of Goats to Beneficiaries

Hands-on Training and Exposure

Capacity building formed the backbone of the intervention, with continuous training in scientific goat-rearing practices. Eighteen structured training programmes were conducted from 2020- 2023 with 281 beneficiaries across the Nathavaram, Nakkapalli, and Payakaraopeta mandals, covering breeding, feeding, housing, kid management, and disease prevention. Later in December 2023, 30 women were complemented by exposure visits to BCT-KVK and Veterinary College and Research Institute, Namakkal, which enabled them to visualise successful dryland goat production systems and interact with experienced practitioners.

Continuous Technical Handholding and Advisory Support

Recognising that training alone is insufficient, the KVK ensured continuous post-distribution handholding. Scientists conducted more than fifty field visits to provide on-site guidance and problem-solving support. Advisory services were also extended through phone consultations and WhatsApp videos, enabling timely response to emerging issues. Key performance indicators such as kidding rate, mortality, weight gain, and goat sales were regularly monitored. This sustained mentoring, responsiveness, and relationship management helped beneficiaries gain confidence and progressively improve herd performance.

Integrated Animal Health and Low-Cost Technology Support

To strengthen productivity and reduce losses, animal health and nutrition management were integrated into the extension strategy. Ten animal health camps and twelve deworming camps were organised in the KVK operational mandals, namely Nakkapalli, Nathavaram, and Payakaraopeta, during 2020-2023, in close collaboration with veterinarians and para-veterinary staff of the Department of Animal Husbandry, Andhra Pradesh. Low-cost technologies such as mineral salt licks and ethnoveterinary practices have been shown to address common nutritional deficiencies and disease problems. Through coordinated efforts and solution-oriented advisory services, beneficiaries were enabled to maintain healthier herds while keeping management costs low.



Animal Helath Camp

Knowledge Reinforcement through Local Language Materials

To reinforce learning beyond trainings and field visits, the KVK developed and distributed simple, easy-to-understand farm literature in the local language. Out of 500 Telugu booklets printed on profitable goat rearing, 290 were provided to all beneficiaries (25 in number) and to trainees who attended the training programme on goat rearing during 2020-2023, highlighting best management practices, feeding schedules, and vaccination protocols. By simplifying technical knowledge and using locally relevant visuals, the extension team ensured sustained learning and reference support at the household level.

CHALLENGES

Initial resistance to goat rearing stemmed from fear of delayed returns compared to daily-wage labour, a lack of common grazing land, and low confidence in managing livestock. Technical gaps in breeding, feeding, and disease control further discouraged adoption, while financial constraints prevented women from purchasing goats independently or accessing markets.

The KVK addressed these challenges through an integrated and adaptive approach. Demonstrating low-cost practices and providing assured starter units significantly reduced perceived risk. Regular training and exposure visits helped build aspiration and confidence, while continuous field-level handholding ensured timely troubleshooting. Collaboration with veterinarians enabled regular deworming, vaccination, and prompt treatment services.

Some practices required course correction. Extensive grazing without mineral supplementation initially resulted in low productivity and higher kid mortality, which was addressed by promoting mineral salt licks and supplementary feeding. Accidental crossbreeding that diluted the quality of Black Bengal goats led to the adoption of cluster-based distribution and controlled breeding strategies. Persistent engagement and adaptive learning transformed these challenges into opportunities, strengthening both beneficiary confidence and the overall extension model.

BENEFITS AND IMPACT

The goat–rearing–based livelihood intervention generated regular, reliable income for 25 Scheduled Caste (SC) women beneficiaries through the adoption of scientific management practices. On average, each beneficiary maintained a flock of five goats and sold two male goats per season after six months of age at local shandies or slaughterhouses, earning approximately ₹17,850 per beneficiary during 2020–2023. The collective flock strength increased to 139 goats, with an estimated current market value of ₹9.38 lakh, indicating strong adoption, continuity, and asset creatio (Table1). The intervention reduced dependence on daily-wage labour and ensured income during lean agricultural periods. Beneficiaries were capacitated through focused training on scientific housing, feeding, health care, breeding, and market-oriented goat management, resulting in improved technical knowledge and enterprise skills.

Table 1: Economic and livestock outcomes among 25 Scheduled Caste women beneficiaries (2020–2023)

Indicator	Value
Market value (Rs in lakhs)	9.38
Income per beneficiary (Rs in thousands)	17.85
Collective flock strength	139
Goats maintained by beneficia-ries	5
Male goats sold/ season	2

Beyond economic gains, the intervention significantly enhanced women's empowerment, self-confidence, leadership, and social recognition, particularly among single and widowed SC women. Utilisation of goat manure in kitchen gardens improved soil fertility and household nutrition; short-term income gains built confidence and accelerated adoption; and sustained flock growth, livelihood diversification, and resilience ensured

long-term socio-economic security, with positive spillover effects at the household and community levels. Overall, the initiative demonstrated that small-scale goat rearing is a viable, profitable, and sustainable livelihood model for strengthening the economic resilience of SC women in the region.

SUSTAINABILITY AND SCALING UP

Goat rearing activities continue in the community, and the KVK has been conducting systematic follow-up surveys to document improvements in flock size, kid survival rate, marketing behaviour, and beneficiaries' household income. The KVK is providing continuous post-intervention support through regular capacity-building programs, frontline demonstrations on mineral salt licks to eliminate subclinical deficiencies, ethno-veterinary practices to treat basic ailments, timely supply of critical inputs, and veterinary health services to these communities in the KVK's adoptive villages. Scientists undertake periodic field visits and work in close coordination with the State Department of Animal Husbandry to strengthen field-level implementation. This approach ensures that the intervention is not a one-time activity but is consistently reinforced over time.

The program demonstrated effective scalability over successive years. Initiated in 2020 with 10 Scheduled Caste women beneficiaries, each supported with a goat unit, the intervention expanded to 15 beneficiaries in 2021-2023, bringing the total to 25 members across three mandals of Visakhapatnam district. Most first-year beneficiaries have doubled or tripled their flock size through internal breeding. Many have also begun marketing surplus goats during local festivals and shandies, indicating a clear transition from subsistence goat rearing to an income-oriented livestock enterprise.

Since 2023, Farmer Producer Organisations (FPOs) like Tandava Valley Farmer Producer Organisation, Payakaraopeta Mandal and Lambasingi FPO, Chintapalli Mandal, have adopted this model and are extending goat units to 8 of their women members, thereby strengthening collective action and institutional sustainability through KVK with frequent training programmes along with deworming health camps across their operational villages in Payakaraopeta and Chintapalli mandals.

To further enhance scale and household-level multiplication, the KVK has introduced Black Bengal goats, known for high prolificacy and shorter reproductive cycles. The breed's low space and feed requirements make it particularly suitable for landless and economically weaker women.



Demo and Black Bengal Production Units at KVK

To ensure breeder availability and technology demonstration, the KVK maintains a nucleus herd of 50 Black Bengal goats annually.

LESSONS LEARNED

1. Small starter units combined with intensive handholding are more effective than large, one-time asset transfers.
2. Demonstration and role models are critical to overcoming fear and mindset barriers among landless women.
3. Controlled breeding and cluster-based approaches are essential to maintain breed quality.
4. Nutrition and mineral supplementation must be integrated early to avoid productivity losses.
5. Strong linkages with animal health services enhance sustainability.
6. To be successful, focus on confidence building, adapt technologies to micro-scale realities, and ensure post-distribution mentoring for successful replication.

CONCLUSION

By integrating long-term extension support with a low-cost, replicable technology package, the KVK has enabled women farmers from economically weaker sections to adopt goat rearing with confidence and sustainability. Owing to visible economic gains and community-level demand, the model is now being replicated in neighbouring villages, and additional clusters are being planned for the coming years.

Continuous technical support, follow-up surveys, and strong institutional linkages have enabled beneficiaries to increase flock size, improve kid survival, and shift towards income-oriented livestock farming.

Acknowledgements: The authors sincerely thank Mr. B. Sri Ram Murty, Chairman BCT-KVK, Anakapalli for constant encouragement, valuable guidance, and unwavering support in the successful implementation of the program and Dr Shaik N. Meera, Director, ICAR-ATARI, Zone-X, Hyderabad, for facilitating the implementation of livelihood programmes under SCSP funding at BCT-KVK, Anakapalli.

Authors



G. S. Vijaya Ragjni
Subject Matter Specialist (Veterinary Sciences)
KVK Anakapalli
gragjni@gmail.com



Sailaja Kurra
Senior Scientist and Head
KVK Anakapalli
sailaja@bctindia.org

ICAR-KVK Amadalavalasa, Srikakulam, Andhra Pradesh

Promoting Scientific Fish Farming among Tribal Farmers in Srikakulam

In this Good Practice Note, Balakrishna, Roy, and Bhagyalakshmi discuss the efforts of KVK Srikakulam in promoting scientific fish farming practices among tribal farmers.

CONTEXT

Small and marginal tribal farmers in Srikakulam district of Andhra Pradesh have been experiencing chronic livelihood insecurity due to low farm income, small landholdings (0–2 ha), and a gradual decline in forest-based income sources. The district has diverse agro-climatic conditions encompassing coastal, forest, and rainfed farming systems. Agricultural activities in tribal regions are primarily confined to crops such as paddy, turmeric, ginger, and pineapple, which generate seasonal and inadequate returns. Despite the presence of numerous natural and man-made water bodies, these resources remain largely underutilised for aquaculture due to limited technical awareness and absence of scientific management practices. Conventional livelihood options have been insufficient to ensure sustained income and nutritional security for tribal households. The KVK Srikakulam functioning under the Acharya N. G. Ranga Agricultural University (ANGRAU) implemented a successful intervention by introducing scientific fish farming to enhance fish production in underutilised water bodies. The initiative focused on building the skills of tribal farmers in scientific aquaculture practices, leading to improved productivity and their enhanced access to animal protein.



Conducting Group Meetings with Different Stakeholders

GOOD PRACTICES

To enhance fish production and livelihoods of tribal farmers, the KVK implemented a scientific fish farming intervention focusing on composite carp culture, capacity building, and the optimal utilisation of underutilised community water bodies.

Establishment of Fish Seed Nursery at KVK

Limited availability of quality fingerlings was a major constraint to fish production in tribal tanks. To address this, in 2018, the KVK established a fish seed nursery to rear fry to the fingerling stage under controlled conditions, using scientific feed and health management practices. The nursery served both as a reliable source of quality fingerlings and as a demonstration unit under the Integrated Farming System (IFS) model for visiting farmers.

Identification of Suitable Locations

The intervention was initiated in three tribal mandals—Seethampeta, Hiramandalam, and L.N. Peta. Field visits and stakeholder consultations were conducted to identify tanks of one acre or more. Community meetings with village elders and water user groups were organised to assess feasibility. After sustained interactions, 12 villages (four from each mandal) were selected, excluding tanks reserved exclusively for drinking and domestic purposes.

Group Formation and Training

For each selected tank, 6–8 tribal farmers were organised into a management group. From these groups, 12 key members (one per tank) were selected for season-long training on nursery rearing, scientific fish farming, and pond management. Trained members were entrusted with responsibilities including seed selection, stocking, liming, fertilisation, sampling, harvesting, and marketing.

Fish Fingerling and Input Support

KVK provided 6–8 cm-sized fingerlings from its nursery, along with critical inputs such as lime and fish sampling nets. Pre-stocking, Pond management practices, and seed acclimatisation protocols were followed to ensure improved survival and growth. Additional fingerling support was provided through the Integrated Tribal Development Agency (ITDA) Seethampeta, where required.



Supply of Fish Seed to the Tribal Farmers

Optimised Stocking Density and Pond Management

Composite carp culture involving Indian major and exotic carps (catla, rohu, mrigal, silver carp, and common carp) was adopted in the tanks. Species were stocked in optimised ratios (40:20:30:10) based on feeding niches (surface, column, bottom, and marginal feeders). Organic manures were applied to enhance plankton productivity, and farm-made mash feed using rice bran and maize was supplemented.

Skill Development on Improved Aquaculture Practices

Hands-on and on-campus training programs were conducted in October 2024 for farmer groups, neighbouring tribal farmers, and tribal youth. Training focused on pond preparation, water quality management, feed management, health monitoring, liming, and fertilisation, enabling farmers to adopt scientific aquaculture practices independently.



Sample Netting of Fish Seed for Health Check

CHALLENGES

Effective utilisation of community water bodies for fish farming in tribal areas posed several challenges.

Many of the water sources were seasonal or short-duration tanks, limiting the culture period and affecting the achievement of optimum fish production due to uncertainty in water availability. Transportation of critical inputs such as fish seed, feed, lime, and fertilisers to remote tribal villages was difficult because of poor connectivity and logistical constraints. The availability of quality, stock-size fingerlings remained a major bottleneck, particularly for timely stocking in seasonal ponds. Limited awareness among tribal farmers regarding changing pond dynamics, water quality management, and fish health further constrained productivity. In addition, most farmers were highly dependent on institutional support for fish seed supply and technical guidance, thereby restricting independent adoption and scaling of scientific fish farming practices.

To address these challenges, the KVK demonstrated the introduction of a carp polyculture program in water bodies in selected tribal mandals. Selected farmers were trained in scientific management practices, such as liming and fertilisation. Organic manures were used to enrich the water to promote the development of plankton, a natural food source for fish species. In addition, farm-made mash feed prepared with rice bran and maize was used to meet the fish's demand at later stages of fish culture.



Sampling of Fish for Growth and Health Observation

BENEFITS AND IMPACT

The scientific fish farming intervention demonstrated clear improvements in productivity, income, and socio-economic conditions of tribal farmers in Srikakulam district.

Based on input use, production levels, and economic returns, the water bodies were categorised into three performance clusters. Cluster I (3 tanks) recorded lower productivity, with an average yield of 1,061.6 kg ha^{-1}, while Cluster II (5 tanks) showed moderate performance, with 1,615 kg ha^{-1}. In comparison, Cluster III (4 tanks) achieved the highest productivity with an average yield of 2,173.75 kg ha^{-1}.

Higher yields were strongly associated with trained farmers who adopted scientific pond management practices, including timely liming, fertilisation, and supplementary feeding, which enhanced phytoplankton and zooplankton availability.

The intervention significantly improved resource utilisation, with 65% of available water bodies (289 out of 444 tanks above one acre) brought under fish culture. Fish farming emerged as a sustainable livelihood option for nearly 3,200 tribal farmers, helping reduce seasonal migration. Farmers earned an additional annual income of ₹11,000–13,000 per individual through scientific fish farming.

The program also led to notable improvements in skills and knowledge, reflected in better management of ponds, water quality, and fish health. Importantly, partial harvests were performed at regular intervals, and the total fish produced from the demonstrated tanks were sold in the same village, thereby increasing household fish consumption and enhancing nutritional security, particularly by providing high-quality animal protein to children.

SUSTAINABILITY AND SCALING UP

The scientific fish farming intervention here is sustainable due to effective use of local water resources, low-cost inputs, and improved farmer skills. Training and hands-on capacity building enabled tribal farmers to independently manage pond operations, while the KVK-established fish seed nursery ensured timely availability of quality fingerlings. Use of organic manures and farm-made feed further reduced costs and enhanced sustainability.

The model has strong potential for scaling up in other tribal and rainfed areas with underutilised water bodies. Group-based management, institutional convergence with the Department of Fisheries, ITDA, and NGOs, and integration under existing development schemes such as Special Component Assistance-Tribal Subplan Schemes (SCA-TSS), Blue Revolution, Pradhan Mantri Matsya Sampada Yojana (PMMSY), etc. can facilitate replication and wider adoption of scientific fish farming as a sustainable livelihood option.

LESSONS LEARNED

- There is substantial scope to expand scientific fish farming in the tribal areas of Srikakulam district, with more than 600 untapped water bodies still available for aquaculture development.
- Establishment of fish seed nurseries and captive seed rearing units is critical to ensure timely availability of quality fingerlings and to support scaling of fish culture activities.
- Addressing existing knowledge gaps in pond dynamics, water quality, feed management, and fish health is essential for achieving higher productivity and sustainability.
- To fully realise fish farming as a sustainable livelihood option, there is a need for developing infrastructure for water retention, enhancing access to financial support, and strengthening market linkages.

CONCLUSION

The introduction of scientific fish farming in tribal areas of Srikakulam has demonstrated significant potential as a sustainable livelihood option. By utilising underexploited water bodies through composite carp culture, the intervention improved fish productivity, enhanced household income, and strengthened nutritional security among tribal communities. Capacity building, group-based management, and institutional support played a crucial role in achieving positive outcomes. The success of the initiative indicates that with adequate infrastructure, a reliable supply of quality seed, and market linkages, scientific fish farming can be scaled up to benefit more tribal farmers. Overall, this practice provides a viable model for livelihood diversification and socio-economic development in remote tribal regions.

Acknowledgements: The authors sincerely thank Dr. P. V. Satyanarayana, Vice-Chancellor, ANGRAU, Lam, Guntur, and Dr. Shaik N. Meera, Director, ICAR–ATARI, Zone X, Hyderabad, for their constant encouragement, valuable guidance, and unwavering support.

Authors



Balakrishna Chintada
Subject Matter Specialist (Fisheries)
KVK Amadalavalasa
ch.balakrishna@angrau.ac.in, chbalucifefgb32@gmail.com



Sowjanya Roy Goka
Subject Matter Specialist (Agricultural Extension)
KVK Amadalavalasa
g.sowjanyaroy@angrau.ac.in



Bhagyalakshmi K
Senior Scientist & Head
KVK Amadalavalasa
k.bhagyalakshmi@angrau.ac.in, kvk.amadalavalasa@angrau.ac.in.

Skill Development and Employment Promotion

ICAR-KVK Kanyakumari, Tamil Nadu

Promoting Mechanised Coconut Harvesting in Kanyakumari

S. Nazreen Hassan, S. Suresh and K. Kavitha are experts in transforming the livelihoods of rural youth of Kanyakumari district through mechanised approaches in coconut harvesting with enhanced worker safety and cost-effectiveness.

CONTEXT

Small-scale and marginal coconut farmers in Kanyakumari district, Tamil Nadu, depend heavily on coconut cultivation, which covers 24,573 hectares and has an average productivity of about 50 nuts per palm per year. Coconut is deeply embedded in the socio-economic fabric of the district, serving as a primary source of income, employment, nutritional security, and household sustenance for farming families. However, coconut harvesting has traditionally relied on manual tree climbing by trained climbers using ropes or ladders, making it one of the most hazardous agricultural operations. Farmers and climbers faced serious risks of fatal falls, injuries from dropping nuts, and long-term musculoskeletal disorders, leading to health problems, loss of working days, and financial instability for households dependent on climbers.

Conventional harvesting methods were not only unsafe but also highly labour-intensive, time-consuming, and increasingly unsustainable due to the declining availability of skilled climbers and rising labour costs. Seasonal labour shortages further aggravated harvesting delays, affecting timely nut collection and farm profitability. Given the high

dependence on labour, there was an urgent need for an innovative, safer, mechanised harvesting solution that could reduce risk, improve efficiency, and provide livelihood opportunities for rural youth. To address this challenge, the KVK functioning under Tamil Nadu Agricultural University (TNAU) introduced the easy-to-use mechanised coconut harvester for rural youth and farmers to promote safe, efficient, and sustainable coconut harvesting practices.

GOOD PRACTICES

Participatory Problem Diagnosis and Needs Assessment

During 2008 the KVK assessed the extent of drudgery and risk involved in coconut harvesting. though Focus Group Discussions and Key Informant Iinterviews with coconut farmers, traditional climbers, farm women, and local stakeholders across different blocks of the district the KVK assessed real-life injury cases, labour availability, harvesting costs, and climber safety concerns. A retrospective medical study conducted stated that 48% of coconut fall-related injuries occurred among people aged 40–60 years, indicating the need for urgent interventions. These insights were shared and validated in village-level meetings to build collective understanding and ownership of the problem.



Traditional Method of Harvesting Coconut

Technology Demonstration

Simple-to-use harvesters were demonstrated both at KVK campuses and in farmers' fields, allowing users to see the technology in real working conditions. Through seven programmes sponsored by the Coconut Development Baorad (CDB), the trainees were encouraged to operate the equipment themselves under expert supervision, fostering confidence and familiarity. They were also provided with climbers for their livelihood. KVK promoted mechanised coconut harvesters on a larger scale, through practical sessions, hands-on skills and demonstrations.

Micro-scale piloting

Field-level piloting was conducted in two blocks across different coconut-growing clusters to assess performance under varying tree heights, spacing, and orchard conditions. User feedback was collected at the field level from identified trainees and used to refine training methods and operational guidance.

Trainings

Since 2009, KVK has been continuously training coconut climbers and rural youth across multiple locations in the district. A total of 23 training and demonstration programmes (Listed in Annexure I) were organised, benefiting 1038 men and 251 women. Trainings were conducted both on-campus and off-campus, incorporating hands-on practice, field visits, and live harvesting demonstrations.



Coconut Harvesting using Mechanised Harvester

In 2022 and 2024, two six-day "Friends of Coconut Tree (FoCT)" programmes were conducted for 40 youth, with support from the CDB on machine operation, understanding climber components and working mechanisms, safety protocols, seed nut handling, and crown cleaning. Master trainers provided advanced skill training in palm climbing and crown maintenance, while KVK experts



Distribution of Cococnut Harvester Machines

Table 1: Institutional Partnership and Convergence

Date	Title	Sponsor	Nature of Support	Participants
25-28.08.14	Friends of coconut tree (FOCT)	CDB & MSSRF	Training	20
23-28.02.15	FOCT	CDB & MSSRF	Training	37
25.08.2015	Coconut climbing device and root feeding of coconut tonic	CDB & Dept of Agriculture	Training	11
30.05.2015	Coconut seminar and exhibition	Directorate of Cashewnaut and Cocoa Dvelopment (CCD)	Seminar & Exhibition	799
17.01.22 -22.01.22	FOCT	CDB	Skill Training & Climber	20
08.01.24 -13.01.24	FOCT	CDB	Skill Training & Climber	20

integrated sessions on occupational well-being and positive work practices. https://www.coconutboard.in/friends-district.htm

Partnership, Convergence, and Resource Mobilisation

To strengthen outreach and effectiveness, KVK leveraged institutional partnerships and resource convergence (Table !) . Collaborative trainings were conducted with Kanyakumari Coconut Producers Company (FPO) and the Department of Horticulture, ensuring wider reach and institutional support. Resources from the Coconut Development Board, KAU, TNAU, and state departments were effectively dovetailed to provide technical guidance and facilitation, including equipment, to the 40 trained rural youth.

Handholding Support and Technology Adoption Follow-Up

To ensure sustained adoption of mechanised harvesters, continuous post-training handholding support by KVK experts was provided.
All 40 participants in the 2022 and 2024 FoCT programmes received coconut harvesters upon

successful completion of training. Regular follow-up and refresher trainings to address operational challenges and monitoring of User performance, and their success showcased as encouragement for wider acceptance. As a result, approximately 85% of trained participants actively adopted and continued using the mechanised harvesting technology.

Livelihood Promotion and Youth Engagement

KVK positioned mechanised coconut harvesting as a viable rural livelihood opportunity rather than merely a safety intervention. Rural youth were encouraged to adopt mechanised harvesting as a service-based enterprise, helping to address local labour shortages while generating additional income. Exposure visits and interactions with successful service providers helped to build practical understanding and confidence. Discussions on service pricing, scheduling, customer relations, and basic business management; entrepreneurship coaching; motivational guidance; and confidence-building were integral to this approach, demonstrating that technology adoption is more sustainable when linked to income generation and enterprise development.

CHALLENGES

During the initial phase of promoting mechanised coconut harvesters, many traditional coconut climbers and farmers were hesitant to adopt the technology due to concerns about safety and efficiency of this method. This reluctance was gradually overcome through repeated field demonstrations, exposure visits, and showcasing successful local users as role models, which helped build confidence and trust in the technology.

Technical difficulties also emerged with equipment operation, maintenance, and adaptability to varying coconut orchard conditions. Resource constraints posed another challenge, particularly the high cost of equipment and limited financial capacity of small and marginal farmers and rural youth. KVK facilitated sponsored programmes, linked beneficiaries to the CDB and coordinated with the Department of Horticulture and FPOs to ensure convergence of resources and support.
Another initial concern was limited youth participation, which was addressed by positioning mechanised harvesting as a viable livelihood enterprise. Environmental and contextual factors, including seasonal labour fluctuations and market uncertainties, also influenced adoption rates.

The KVK addressed these challenges through regular meetings, proactive networking, and collaborative planning. All these kept the initiative moving forward despite setbacks, ultimately leading to high adoption (≈85%) among trained participants.

BENEFITS AND IMPACT

Promotion of mechanised coconut harvesters generated significant economic, social, and behavioural benefits for rural youth and coconut growers in Kanyakumari district. About 60% of trained participants were young people under 40 years, indicating strong youth engagement and employment generation. Most trainees actively utilised the equipment either for self-use or as a paid service, charging approximately Rs 30 per tree (Rs 50 where palms were fewer), creating assured supplemental income, particularly on Sundays and holidays. Seasonal earnings of around Rs 2,250 per acre (75 trees) were reported, depending on demand and climatic conditions, with better opportunities during the summer season for tender nut harvesting. Field observations and local trader enquiries indicate that nearly 1,500 mechanised harvesters are currently in use across the district, reflecting high adoption and market availability.

The technology significantly reduced drudgery, physical exertion, and occupational risk associated with traditional tree climbing, improving operator safety, comfort, and efficiency. It addressed the acute shortage of skilled climbers, ensuring timely nut harvesting for coconut growers. Increased confidence, positive attitude toward mechanisation, and greater willingness to adopt innovations were observed among rural youth.

In the short term, assured income and employment motivated adoption. In the long run, the intervention strengthened rural livelihoods, improved service availability for coconut growers, and generated spillover adoption beyond direct beneficiaries, contributing to safer and more sustainable coconut farming in the district.

SUSTAINABILITY AND SCALING UP

The promotion of mechanised coconut harvesting byt the KVK has not only sustained adoption among the trainees but has also expanded beyond. The transition from hazardous, labour-intensive traditional climbing to safer, simpler, and more comfortable mechanised methods has ensured long-term acceptability among rural youth and coconut farmers. The increasing ownership of harvesting equipment by youth and farmers, coupled with its commercial availability, reflects continued use of the technology beyond project interventions. Continuous capacity building through hands-on training, refresher courses, and entrepreneurship orientation by KVK Kanyakumari has strengthened local capabilities and ensured a steady supply of skilled coconut climbers.

Economic sustainability is evident through assured income opportunities for trained youth, reduced harvesting costs for farmers, and enhanced efficiency in coconut harvesting operations. The engagement of trained climbers in regular harvesting services—particularly on weekends and during peak seasons—has created a dependable, supplementary income stream.

Understanding the risks associated with this profession, CDB introduced the Kera Suraksha Insurance Scheme to ensure the safety and security of climbers. Kera Suraksha Insurance Scheme is a comprehensive Group Personal Accident Insurance Scheme implemented by the Coconut Development Board in association with Public Insurance companies for coconut climbers, harvesters, coconut hybridisation trainees, and Neera Technicians. This scheme provides comprehensive financial and medical coverage to mitigate the impact of unforeseen accidents during their work. Annual premium is Rs 956/-, shared between the Board and the beneficiary in the ratio of 75:25.

For the trainees undergoing the Board's skill development training, viz. Friends of Coconut Tree (FoCT)/Neera Technician Training Programme, the first-year premium is fully borne by the Board from the date of training commencement. The period of insurance is one year and needs to be renewed every year by paying Rs. 239/- as a contribution from the beneficiary. From an environmental perspective, timely and efficient harvesting minimises crop losses, supports improved orchard management, and contributes to the overall sustainability of coconut production systems.

The presence of nearly 1,500 mechanised coconut harvesters in operation across the district demonstrates strong potential for its scaling to other coconut-growing regions. Expansion of training programmes, engagement of FPOs, and collaboration with the Coconut Development Board, State Horticulture Departments, and agricultural universities—along with establishment of demonstration units and use of trained youth as local resource persons—can accelerate wider adoption.

Vertical scaling can be achieved by integrating mechanised harvesting services with coconut value chains, including collection centres, processing units, and tender coconut marketing. Financial support through bank loans, subsidies, and institutional mechanisms, along with policy measures such as skill certification, insurance coverage, and equipment standardisation, can further institutionalise the practice.

Overall, this model is replicable across coconut-producing districts and can promote safer harvesting, rural youth employment, and a more resilient coconut production system.

LESSONS LEARNED

The experience demonstrated that skill training for rural youth is a critical success factor in enhancing employment, income stability, and livelihood security, while simultaneously addressing the chronic shortage of skilled coconut climbers. The

shift from laborious and risky traditional climbing to a simpler, safer, and more comfortable mechanised approach worked particularly well, as it improved operator confidence, safety, and productivity, and encouraged youth to invest in equipment for sustainable self-employment.

Hands-on, practical training combined with mentoring, leadership, and entrepreneurship inputs proved more effective than one-time training, highlighting the need for continuous handholding and follow-up support. Strong stakeholder linkages with line departments, traders, and local institutions facilitated wider adoption and resource mobilisation.
However, future programmes could improve by ensuring earlier financial linkage support, timely availability of equipment, and broader outreach to women and marginal farmers. Seasonal timing of trainings aligned with peak harvesting periods would further enhance utilisation. For replication, practitioners should prioritise field demonstrations, role-model users, micro-scale piloting, and sustained post-training support, while avoiding purely classroom-based approaches.

CONCLUSION

Overall, mechanised coconut harvesting, supported by systematic skill development of rural youth, has emerged as a sustainable and transformative intervention in the coconut production system. By reducing drudgery and risk associated with traditional climbing, it has enhanced occupational safety, improved harvesting efficiency, and created reliable livelihood opportunities for rural youth. At the same time, it has helped coconut growers overcome the persistent shortage of skilled climbers, ensured timely harvesting, and reduced production bottlenecks. Strengthened capacity building, technological adoption, and institutional support—particularly through training and insurance coverage—can further professionalise this vocation, making it safer, more remunerative, and more attractive, thereby contributing to resilient livelihoods and a more robust coconut value chain.

Acknowledgements: The authors thank Dr P. P. Murugan, the Director of Extension Education, TNAU, Coimbatore, for his support and encouragement, and Dr Shaik N. Meera, the Director of ICAR-ATARI-Zone-X, Hyderabad, for his inspiration and facilitation in enhancing the skills of youth and increasing farm productivity through various activities and funding to KVK Kanyakumari.

Authors



S. Nazreen Hassan
Associate Professor and Subject Matter Specialist (Agricultral Extension)
KVK Kanyakumari
najuhassan@tnau.ac.in.



K. Kavitha
Associate Professor and Subject Matter Specialist (Plant Protection)
KVK Kanyakumari
kavithak@tnau.ac.in



S. Suresh
Senior Scientist and Head
KVK Kanyakumari
surshesam@tnau.ac.in.

ICAR-KVK Ariyalur, Tamil Nadu

Enhancing Employment and Income for Rural Women through Cashew Nut Shelling

In this good practice note, S. Shobana, A. Rajkala, G. Alagukannan and Y. Raja Joslin present their work transforming the lives of SC women through deployment of cashew nut shelling machines.

CONTEXT

Ariyalur district of Tamil Nadu came into existence in 2008 and is considered a backward district in all aspects of development. Most people in Ariyalur district depend on agriculture, and the major crops are Paddy, Groundnut, Sugarcane, Cotton, Maize, cashew nut, and Black Gram. This district has six blocks, of which Thirumanur, T. Palur, and Jayankondam have adequate water resources for agriculture. In comparison, the remaining three blocks, viz., Ariyalur, Andimadam, and Sendurai, depend mainly on rainfall. About 23 per cent of its population belongs to the Scheduled Caste (SC) community, and they are mostly landless and depend mainly on agricultural labour. Though employment generation programmes such as the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and wage labour in farmers' fields exist, they can hardly employ for less than 100 days.

Sendurai block in Ariyalur District has red loamy soil that favours the cultivation of cashew nut as both a rainfed and an irrigated crop. About 40,000 acres in this block are under cashew nut. However, the average productivity is only 440 kg of nuts/ha,

while the state average is 498 kg/ha, because most plantations are rainfed. The KVK, Ariyalur functioning under the Center for Rural Education and Economic Developmnet (CREED) selected the village of Veerakkan in February 2023 to demonstrate improved technologies for cashew nut processing.

GOOD PRACTICES

Assessing the Situation

Veerakkan village belongs to the Sendurai block of Ariyalur district, with a total of 750 households, of which 165 (22%) are Scheduled Castes. Veerakkan was the village adopted by the KVK to demonstrate the doubling of farmers' income (DFI) from 2018 to 2022. At the time, we came to know that the SC households lack land resources and their socio-economic condition is very poor. We have decided to improve their livelihoods and have started surveying the situation through Focus Group Discussions (FGDs), collecting data through personal interviews and obtaining data on employment days provided under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) from the local panchayat. Most of the SC households are deprived of land, and their main occupation is daily-wage work; particularly women are getting wage work in agricultural fields for sowing, weeding, and harvesting groundnut, collecting cashew apples from the trees, and separating the nuts. This could provide hardly 50-55 days of employment and 40-45 days from MGNREGS work. Every year, men in the family go for construction work, as porters in city markets and in textile industries. Their total family income comes to Rs.60,000-70,000 per annum.

As most men work outside the home and come home only once a month, the women in the family are forced to shoulder the entire family's responsibilities. Drug addiction is another social evil that drains money from the men's pockets. They raise poultry for their own consumption and sometimes sell the birds and goats (2-3/family) to cover emergency expenses. Cashew nut cultivation



Dr. V. Nadanasabapathy, Chairman, ICAR-CREED KVK Distributing Cashewnut Shelling Machine under SCSP on 17.2.2023

in the vicinity employs them during May-June through the collection of cashew apples and the separation of nuts from the apples.

As cashew is the predominant crop in Ariyalur District, the KVK sstarted working with one of the women entrepreneurs, Mrs Uma W/o Kumar, who has already been running a medium-scale cashew processing unit "GK Cashews" with a capacity of 60 MT per year. During 2022-23, the KVK provided her a processing unit with 10 cashew shelling machines under the Scheduled Caste Sub-Plan (SCSP) scheme. These machines were placed at M/s. GK Cashews processing unit with the intention to generate employment for SC women.

CAPACITY DEVELOPMENT

As the KVK is actively working in this village, it identified 20 SC women for imparting skill training in cashewnut shelling and other processing aspects such as stream boiling, polishing, grading, and packaging. it adopted the criteria such as low income, single status, women heading the family, and willingness to selet the trainees. As they are new to using the manually operated shelling machine, the selected 20 women were given 3 days of skills training on the safe use of the machine for cashew nut shelling at M/S. GK Cashew Processing Industry itself. The skilled and practising persons from the nearby cashew factory M/s. Shiva Cashew and KVK scientists were engaged as trainers. After attending the hands-on training, the women trainees felt that machine-based cashew shelling is easier and the drudgery is less even after working for six hours.

EXPANDING THE ENTERPRISE

During 2023-24, at the request of these trained women, 10 manual shelling machines were again distributed to M/S GK Cashews processing unitunder the SCSP programme to benefit more SC women. The unit was also facilitated to avail a loan of Rs. 7.5 lakhs under the Pradhan Mantri Formalisation of Micro Food Processing Enterprises scheme (PMFME), which provides a 35% subsidy on the total project cost to expand processing capacity and this enabled her to engage more SC women for shelling.



Skill Training to Selected SC Women at G K Cashew Processing Unit

Introduction of motorised shelling machines

As manual shelling machines were still causing drudgery among women, leading to shoulder pain and thus resulting in moderate shelling efficiency (only 2 kg/hour), two motorised shelling machines were introduced in 2025. The KVK advised the proprietor of the processing unit to buy two motorised shelling machines, as more SC women

wanted to do this work, and to increase shelling efficiency from 2 kg to 4 kg/hour. However, motorised shelling machines require more frequent maintenance and servicing and an uninterrupted power supply.

CHALLENGES

Initially, it was difficult to motivate landless Scheduled Caste (SC) women to adopt a new livelihood activity, as most had no prior experience in cashew processing and were apprehensive about operating the shelling machines. Continuous capacity building, hands-on demonstrations, and confidence-building measures were required to overcome their hesitation. Ensuring year-round availability of raw cashew nuts for processing was another challenge, which was addressed through collaboration with a local entrepreneur who had an established cashew processing unit.

The manual shelling machines, although user-friendly, caused physical strain during prolonged use, leading to the introduction of motorised shelling machines to reduce drudgery and improve productivity. However, the motorised machines required regular maintenance and technical support. Mobilising financial resources for enterprise expansion and linking women to government support schemes also required sustained efforts and coordination with the District Industries Centre, banks, and other stakeholders. Through consistent technical guidance, institutional support, and strong partnership between the KVK, the entrepreneur, and the district administration,thsee challenges were addressed and this ensured the successful implementation and sustainability of the initiative.

BENEFITS AND IMPACT

The cashew nut shelling initiative has significantly enhanced the livelihood security of landless Scheduled Caste (SC) women by creating year-round employment opportunities within their own village. A woman could shell 15 kg of nuts and earn ₹350 per day. From the payment of wages records, we have found that on an average this entreperneur is providing 245 days empolyment to one person to one person. With this, a landless woman got 245 days of employment and earned ₹85,750 per year.

Now, individual households' income increases has increased from ₹60,000- ₹70,000 during 2022 to ₹1,45,000– ₹1,55,000 during 2025. Besides improving economic well-being, the project has enhanced women's self-confidence, decision-making ability, and social recognition. The initiative has also strengthened local entrepreneurship by supporting the expansion of an existing cashew processing enterprise, thereby creating a sustainable value chain for employment generation. The model's success has attracted the attention of government departments, the media, and neighbouring communities, demonstrating its potential as an inclusive rural livelihood intervention.

With increase in income, many households have cleared their debts to the tune of ₹50,000 to ₹80,000 and thus been relieved of local moneylenders. Five women among the forty people modified their homes to include additional facilities such as water tanks and toilets.



Supplement to Dinakaran issue 4-2-2025 Registrar of news papers for India.
Regn No.30424/77 Postal Regn No. TN/CH/(C)/227/24-26

களை அதிகப்படுத்த ஆரம்பித்தோம். இப்போது தரமான பருப்புகளாக உருவாக்கி பல ஊர்களுக்கு விற்பனைக்கு அனுப்புகிறோம்" என தங்களின் முந்திரி பிராசஸிங் ஹிண்டரியோடு ஆரம்பித்த உமா, முந்திரிப்பருப்புகள் எவ்வாறு உருவாகின்றன? என்பதையும் விளக்கினார்.

"முந்திரிக்கொட்டைகளை அவிக்கும் இயந்திரத்தில் வைத்து அவித்து, நீரை வெளியேற்றி, கொட்டைகளை இரண்டாக உடைப்போம். அதில் இருக்கும் முந்திரிப்பருப்புகளை போர்மாபெட்டிகளில் வைத்து 6 மணி நேரம் ஹீட் செய்வோம். இதை இரவு நேரத்தில்தான் செய்வோம். பின்பு விசில் வரும் நேரத்தில் வெளியில் எடுப்போம். அப்போது முந்திரிப் பருப்புகள் மொறுமொறுவென்று கல் போல இருக்கும். அவற்றை எடுத்து ஃபேன் மூலம் குளிர்விப்போம். அப்போது தரையில் தண்ணீர் ஊற்றி வைத்தும், சுவர்களில் ஈர சாக்குகளை கட்டி வைத்து ஈரப்பதம் இருக்குமாறு பார்த்துக்கொள்வோம்.

குளிர்வித்த பிறகு முந்திரிப் பருப்புகளில் இருக்கும் மேல்தோலை உரித்தெடுப்போம். ரப்பர் போல் இருக்கும் இந்தத் தோலைப் பிரித்தெடுக்கவும் மெஷின் வைத்திருக்கிறோம். தோலை உரித்த பிறகு சைஸ் வாரியாக பிரித்து, மீண்டும் ஹீட் செய்வோம். இப்போது பயிர்கள் அனைத்தும் மொறுமொறுவென இருக்கும். இந்த பதத்தில் உள்ள பருப்புகளை அரை கிலோ, ஒரு கிலோ, 5 கிலோ என பேக்கிங் செய்வோம்.

ரகங்களைப் பொருத்து ஒவ்வொன்றுக்கு ஒரு விலை இருக்கிறது. உடையாத பருப்புகளில் 2 ரகம் இருக்கும். அதில் முதல் ரகத்தை ரூ.850 என விற்பனை செய்வோம். இரண்டாவது ரகத்தை ரூ.750 என விற்போம். இரண்டாக உடைந்த பருப்புகளையும் அதுபோல் தரம் பிரித்து ரூ.750, 780 என விற்பனை செய்வோம். எங்களிடம் உள்ளூர் வியாபாரிகளே அதிகளவில் வந்து வாங்கிக் கொள்வார்கள். நாங்கள் கும்பகோணம் உள்ளிட்ட அருகில் உள்ள பகுதிகளுக்கு எடுத்து கடைகளுக்கு நேரடியாக விற்பனை செய்வோம். சென்னை உள்ளிட்ட பகுதிகளுக்கும் அனுப்பி வைக்கிறோம். ஒரு ஏக்கர் நிலத்தில் மானாவாரியாக பயிர் செய்யும்போது 3 மூட்டை கொட்டைகள் மகசூலாக கிடைக்கும். தண்ணீர் பாசனம் இருந்தால் 8 மூட்டை வரை கிடைக்கும். 80 கிலோ எடை கொண்ட இந்த மூட்டைகள் ரூ.12 ஆயிரம் முதல் 13,500 வரை விலை போகிறது. இந்தப் பகுதியில் பெரும்பான்மையாக மானாவாரி விவசாயம் நடப்பதால் அதிகபட்சம் 3 மூட்டை கிடைப்பதே பெரிய விசயம். இதன் மூலம் அதிகபட்சம் ஏக்கருக்கு 40 முதல் 50 ஆயிரம் வரை வருமானம் கிடைக்கும்.

நாங்கள் முந்திரிப்பருப்பாக விற்பதால் அதை விட கூடுதல் லாபம் பார்க்கிறோம்" என பெருமிதத்துடன் பேசி முடித்தார்.

16 4.2.2025

Success Case Published in Vivasayi Tamil Magazine



Different Grades of Processed Cashewnut at GK Cashews, Veerakkan, Ariyalur District

SUSTAINABILITY AND SCALING UP

Cashew nut processing happening at the said unit is year-round, as they are procuring the required nuts during the season and storing them properly. Besides, the sustainability of the initiative is ensured through strong institutional partnerships among ICAR–CREED Krishi Vigyan Kendra, Ariyalur; the local women entrepreneur; the District Industries Centre; and cashew processing industries. The project is economically viable because it is based on the locally abundant availability of raw cashew nuts and a continuous demand for processed kernels. The entrepreneur has expanded her processing capacity with financial support under the PMFME scheme, enabling regular employment for trained women.

The trained beneficiaries are now planning to form a Joint Liability Group (JLG) to establish their own cashew processing enterprise, ensuring long-term ownership and sustainability. Further scaling up is facilitated through linkages with large cashew industries such as M/s. Shiva Cashews, which has agreed to establish a satellite shelling unit in the village to generate additional employment.

The intervention can be readily replicated in other cashew-growing districts by converging SCSP, PMFME, MSME, and other rural livelihood programmes with technical guidance from KVKs. This model demonstrates how the dissemination of technology, entrepreneurship development, and institutional convergence can collectively promote women's economic empowerment and contribute to sustainable rural development.

It is worth noting that, following this model, a cashew nut processing unit was established in 2025 in Kuvagam village with financial support from the Tamil Nadu Tribal Welfare Department and technical guidance from the KVK. About 25 Scheduled Tribe women are regularly engaged in shelling cashew nuts, providing sustained employment and income to the landless.

LESSONS LEARNED

1. Cashew nut processing, specifically cashew nut shelling, can significantly boost SC women's income and livelihood security.
2. Women are building market linkages by participating in exhibitions, expos and expanding marketing and increasing productivity.

Thus, cashew nut processing has sustainable benefits for the socio-economic upliftment of rural SC women.

CONCLUSION

With the consistent support of the KVK and the District Administration, Mrs K. Uma expanded her business and created employment opportunities for SC women. This model promotes women-led entrepreneurship and sustainable utilisation of locally available labour force. This innovative effort by the KVK guaranteed year-round rural employment with good remuneration.

Acknowledgements: The authors thank Dr V. Nadanasabapathy, Chairman, ICAR CREED KVK, Ariyalur, for his support and inspiration, and Dr Shaik N. Meera, Director of ICAR-ATARI-Zone-X, Hyderabad, for facilitating SC livelihood programs through SCSP funding for KVK Ariyalur.

Authors



S. Shobana
Subject Matter Specialist (Home Science)
KVK Ariyalur
hscrm123@gmail.com



A. Rajkala
Subject Matter Specialist (Agriculture Extension)
KVK Ariyalur
rajkala2012@gmail.com



G. Alagukannan
Senior Scientist and Head
KVK Ariyalur
gakannan@rediffmail.com



Y. Raja Joslin
Subject Matter Specialist (Horticulture)
KVK Ariyalur
joselin444@gmail.com

ICAR-KVK Erode, Tmail Nadu

Agro-Ecotourism to Promote Environmental Conservation and Enhance Tribal Livelihoods

In this Good Practice Note, P. Alagesan, A. Premalatha, and K. Karthik discuss the initiatives undertaken by the ICAR–KVK Erode to establish an agro-ecotourism model in the Dhimbam Hills, to promote environmental conservation alongside livelihood enhancement.

CONTEXT

Small-scale tribal communities in the Dhimbam Hills of Talavadi block, Erode district, Tamil Nadu, faced persistent livelihood challenges due to limited employment opportunities, seasonal migration, low adoption of scientific farming, and minimal exposure to biodiversity and conservation practices. The region, part of the Sathyamangalam Tiger Reserve and the NH-948 eco-corridor, is ecologically rich, with tropical dry forests, semi-evergreen patches, and diverse flora and fauna. Still, its potential for nature-based learning and eco-friendly livelihood development remained largely untapped. Conventional approaches that focused solely on agricultural extension and livelihood support were insufficient because they did not integrate ecosystem conservation, tribal culture, and experiential learning.

To address livelihood and conservation challenges in Dhimbam Hills, the KVK Erode functioning under the Mysore Resettlement and Development Agency (MYRADA) in collaboration with the National Bank for Agriculture and Rural Development (NABARD), conceptualised and implemented a community-

owned Agro-Ecotourism Pilot Project in 2022 with funding of Rs 25 lakhs. The initiative provides an integrated platform where visitors learn about ecology, tribal culture, agro-based technologies, and conservation practices, while simultaneously generating sustainable livelihood opportunities for tribal households. It raises awareness on biodiversity conservation, demonstrates eco-friendly farm and forestry practices, promotes sustainable farm- and forest-based enterprises, provides employment for tribal youth, and facilitates market linkages for indigenous products. By linking ecological preservation with socio-economic empowerment, the project ensures long-term sustainability and enhances the overall well-being of Dhimbam's tribal communities.

GOOD PRACTICES

Participatory Planning with Tribal Communities

To identify culturally significant sites, sensitive forest zones, and potential tourism attractions, Soliga and Irula tribal members were actively engaged through PRA tools. Community consultations during September 2021 guided the design of eco-stays, tribal huts, food courts, and walking trails, reflecting local traditions and ecological suitability. Livelihood opportunities such as eco-guiding, value addition in millets and minor forest products, handicraft promotion, and market linkages were jointly identified, ensuring income-generation activities were integrated from the planning stage. This inclusive approach fostered community ownership, cultural sensitivity, and long-term sustainability.

Demonstration of Eco-Friendly Models

- Tribal Hut and Kitchen: The project demonstrated eco-friendly structures, including tribal huts that provide visitors with an authentic hill-tribe living experience. Interiors display traditional materials and accessories used by the Dhimbam Hills tribes. Roofing uses locally available ginger grass (Cymbopogon martini, "kanambul"), providing comfort in both summer and winter. The tribal kitchen and dining hall, managed by a local SHG, were designed with low-impact construction techniques suited to forest landscapes. These models serve as practical learning units on sustainable housing, waste-free living, and green architecture, reinforcing ecological awareness among visitors.
- Interior Design and Furnishing: Furniture in the tribal huts was made from Lantana camara by trained local artisans. The tribal community received skill development training, and NABARD and ICAR KVK, Erode provided construction support.
- Tribal Information Centre: The Tribal Information Centre showcases traditional products, tribal culture, and farming methods to educate visitors and future generations. Twenty-four QR codes were developed to provide detailed information on tribal products. Miniature models of tribal life, flora, fauna, and artwork enhance visitor understanding. To date, 245 students and visitors have learned about tribal culture through the centre.
- Tribal life and culture: Wall paintings depicting tribal traditional life, culture, farming practices, and soil and water conservation activities allow visitors to visually engage with and understand the Dhimbam Hills tribal way of life.

Skill Development for Tribal Communities

The KVK prioritised skill enhancement to empower tribal youth as biodiversity guides, trekking leaders, hospitality assistants, and specialists in minor forest produce and millet value addition. Training included flora and fauna identification, interpretation techniques, communication, visitor management, wildlife safety, and first aid. Hands-on exposure helped youth gain confidence, leadership skills, and new livelihood opportunities within the eco-tourism framework (Box 1)

Box 1: Skill Development for tribal communities

Lantana Camara Product Development Training
To manage the invasive Lantana camara and create livelihoods in the Talavadi hills, 40 participants underwent two 30-day training programs covering raw material preparation, crafting small items, and making larger furniture pieces. The training program led to the production of 22 types of furniture and the formation of two enterprise groups: Hasanur Tribal Lantana Camara Enterprise Group and Kanakarai Lantana Group. The participants received their first order worth ₹1,14,281, and additional vendor orders provided opportunities for full-time craft production. Marketing tie-ups with Poombukar, Erode Royal Residency, Coimbatore, and Chola Trust, Gudalore further expanded the reach and sales of their Lantana-based products.

Skill Development on Herbals Collection and Marketing
A skill training program on "Value-Added Products from Herbal Plants" was conducted for 42 tribal women. Participants learned to produce herbal soaps, shampoos, dress wash liquids, and agarbathis. Their products are showcased and marketed through the My Dhimbam Eco Shop, providing sustainable livelihood opportunities.

Establishment of Demonstration Units

To benefit visitors and tribal communities, the centre has been strengthened with live demonstration units, including a fish-cum-poultry unit, a vermicompost unit, an immune-boosting herbal garden, a vertical garden, honeybee rearing, a watershed, and a nursery. Visitors gain hands-on exposure to these units, understanding their practical adoption, health benefits, and environmental safety.

Promotion of Tribal Food, Forest Produce, and Local Skills

A structured marketing platform, comprising the My Dhimbam Eco Shop outlet and village-level collection points, was created to promote millet-based recipes, forest honey, amla products, and tribal handicrafts. Training on value addition, branding, packaging, and food safety enhanced market readiness, while market linkages through highway outlets and institutional networks enabled tribal households to secure better prices.

Safety and Environmental Measures

Eco-tourism initiatives incorporated safety measures, including elephant-proof trenches, solar lighting, and visitor orientation on responsible behaviour. Waste segregation systems, eco-sanitation units, and compost-based disposal methods were introduced to ensure hygiene, safety, and minimal ecological impact.

Promotion of Tribal Culture

Two traditional music groups, including the Peenachi Tribal Music Group (15 members each), were engaged in 14 events over the past year, supporting livelihood promotion and cultural preservation. Visitors included foreign teams from Africa, the Youth Hostels Association (YHA), NABARD, and MYRADA Kaveri Pradeshika Samsthe (MYKAPS).

Herbal/Kitchen Garden for Eco-Tourism

A new innovative herbal and kitchen garden at Arepalayam allows tourists and local communities to learn fresh vegetable production techniques and their consumption, promoting sustainable agricultural practices.

Online Platform: MyDhimbam Eco-Tourism

The My Dhimbam Eco-Tourism website has been developed to enable online bookings, allowing tourists to participate in eco-tourism programs through institutional networking and direct online access.



Glimpses of Agro-Ecotourism



Glimpses of Agro-Ecotourism

CHALLENGES

The My Dhimbam Eco-Tourism initiative faced social, environmental, technical, and market-related challenges. Community hesitation was initially high, as tribal households feared cultural intrusion and were unsure of economic benefits. For instance, some households were initially reluctant to allow outsiders near sacred sites and family dwellings, fearing disruption of customary practices and loss of privacy. This was addressed through repeated meetings, culturally sensitive dialogues, and exposure visits to successful tribal-led tourism sites. Demonstrations of livelihood gains and revenue-sharing models built trust, encouraging active participation and local ownership.

Environmental and infrastructure constraints included elephant movement, limited transport, and intermittent electricity in the wildlife-sensitive corridor. Adaptive strategies—solar lighting, elephant-proof trenches, and eco-friendly

construction with local materials—ensured visitor safety while maintaining ecological harmony.

Skill gaps among tribal youth in hospitality, guiding, and enterprise management were overcome through hands-on training, mock sessions, and on-site mentoring. Participants gained competencies in guest handling, biodiversity interpretation, catering, micro-enterprise management, record-keeping, product display, and marketing, enabling effective engagement in eco-tourism and value-added product activities.

Market limitations for tribal products—such as weak branding and limited access—were addressed through SHGs, FPOs, and NABARD-supported networks. The My Dhimbam Eco Shop provides a structured outlet for handicrafts, millet-based products, and forest produce, expanding market reach and improving household income.

Waste and hygiene management was strengthened with eco-toilets, waste segregation, composting, and awareness training, ensuring visitor activities complied with conservation standards. Adaptive problem-solving, persistent engagement, and strategic partnerships enabled the initiative to overcome constraints and achieve ecological, social, and economic outcomes, establishing a replicable model for community-led ecotourism.



My Dhimbam Eco Shop

BENEFITS AND IMPACT

The My Dhimbam Agro-Ecotourism Centre has created significant ecological and social benefits. Annually, 400–500 visitors—including students, farmers, and eco-enthusiasts—engage with interactive modules, nature trails, and tribal knowledge demonstrations, gaining understanding of forest ecology, wildlife behaviour, agroforestry, and conservation ethics. This exposure fosters ecological literacy, environmental stewardship, and responsible attitudes toward natural resource management.

Tribal youth and women have gained skills in eco-tourism services, handicrafts, and herbal product production. At the same time, 16 families earn ₹10,000–12,000/month from Lantana camara handicrafts, and the cultural team "Peenachi" earns ₹5,000–10,000/month. In total, 23 tribal members are employed in guiding, hospitality, farm supervision, and market services, reducing migration pressures and strengthening community cohesion.

Eco-tourism has also reinforced cultural preservation and long-term economic diversification. Tribal cuisine, music, art, and games are revitalised, with museum displays fostering pride and inter-generational knowledge transfer. The centre has evolved into a regional hub for agroecology and biodiversity education, supporting farmer groups, academic institutions, and development agencies. This integrated approach has enhanced income generation, promoted sustainable livelihoods, and established Dhimbam as a model for conservation-linked economic development.

SUSTAINABILITY AND SCALING UP

To ensure the long-term sustainability of My Dhimbam Eco Tourism at Arepalayam, Dhimbam Hills, Erode, the following activities are proposed:

- Design training programs to impart knowledge on ecology, biodiversity conservation, and organic/natural farming to local communities and visitors as part of their tour experience.
- Encourage eco-tour programs that involve individuals, families, and officials to stay at the eco-tourism centre, with revenue supporting infrastructure upkeep and project sustainability.
- Engage with schools and academic institutions to raise awareness, build knowledge, and promote livelihood improvements, while providing students hands-on exposure to rural life, culture, agriculture, and local flora and fauna. Institutional network programs will collaborate with like-minded organisations, development institutions, and CSR partners to converge resources, strengthen project management, and ensure continuity.
- Enable village stay programs for agriculture and rural development students to study village demographics, resources, and management, and prepare micro-plans based on field learning.
- Conduct need-based rural camps and campaigns, including health, legal awareness, environmental education, and government scheme programs, year-round, tailored to local community needs and seasonal priorities.
- The model is replicable to KVKs and similar institutions in forested, tribal, coastal, desert, or biodiversity-rich regions. Scaling requires community engagement, raw material availability, and institutional support, with both horizontal and institutional expansion possible. There is also potential to establish similar eco-tourism units directly on tribal farmers' own landholdings, enabling interested farmers to become independent eco-tourism entrepreneurs rather than solely institution-linked service providers. Ongoing eco-tourism activities, camps, village stays, and tribal-led enterprises demonstrate local ownership, effective integration, and long-term sustainability.

LESSONS LEARNED

- Tribal participation ensures authenticity, ownership, and long-term sustainability
- Demonstration units reduce hesitation, improve understanding, and accelerate adoption of new practices.
- Partnerships with the Forest Department, NABARD, and local institutions enhance legitimacy and resource convergence
- Adherence to ecological rules and responsible tourism principles maintains harmony with the forest ecosystem.
- Continuous capacity building strengthens confidence, leadership, and service quality of tribal youth.
- Eco-friendly infrastructure improves visitor experience while minimising ecological impact
- Skill-based training and enterprise promotion foster entrepreneurship and sustainable livelihoods.
- Strong market linkages are essential for the success of tribal products, handicrafts, and value-added enterprises.

CONCLUSION

The My Dhimbam Eco-Tourism initiative demonstrates that community-led, ecologically sensitive tourism can succeed despite social, environmental, and technical challenges. Initial hesitations, skill gaps, infrastructure limitations, and market constraints were effectively addressed through stakeholder engagement, hands-on training, adaptive strategies, and strategic partnerships. As a result, tribal communities gained livelihood opportunities, enhanced skills, and cultural recognition, while visitors developed ecological literacy and environmental awareness. Sustainable infrastructure, waste management, and market linkages ensured long-term viability. The experience underscores the importance of persistent engagement, local ownership, and innovative solutions, providing a replicable model for integrated, conservation-linked rural development and eco-tourism in other forested or tribal regions.

Acknowledgements: The authors thank Shri. Arvind G. Rishbud, Executive Director, MYRADA, Bangalore, and Dr Shaik N. Meera, Director of ICAR ATARI, Zone-X, Hyderabad, and Chief General Manager, NABARD, Chennai, for their support, technical and financial assistance, and guidance.

Authors



P. Alagesan
Senior Scientist & Head
KVK, Erode
myradakvk@gmail.com



A. Premalatha
Subject Matter Specialist (Soil Science)
KVK Erode
myradakvkssac@gmail.com



K. Karthik
Subject Matter Specialist (Animal Science)
KVK Erode
myradakarthik@gmail.com

ICAR-KVK Dindigul, Tamil Nadu

Enhancing Coconut Productivity and Farmer Income through Integrated Management and Mechanised Tree Climbing

In this good practice note, S. Senthil Kumar, M. Thirunavukkarasu, M. Saravanan, and P. P. Saravanan discuss the interventions implemented in coconut cultivation in Dindigul.

CONTEXT

Farmers, farm women, and rural youth in the villages of Anjukulipatty, Mottayagoundanpatty, and Kanniyapuram in Shanarpatti Block, Dindigul district grow coconuts. They depend on well irrigation supported solely by rainfall-recharged aquifers for coconut cultivation.

Coconut productivity remains low due to water stress, limited adoption of Integrated Crop Management (ICM), pest and disease incidence, a shortage of skilled climbers, and unstable market prices. As coconut requires intensive and timely management, up-to-date technical knowledge is vital, and farmers have very limited exposure to integrated coconut management (ICM) practices. Rural youth have remained underemployed due to inadequate skill training. To ensure sustainable coconut production, farmers need to adopt appropriate technologies for drought mitigation and for integrated management of water, weeds, nutrients, pests, and diseases, and they need trained labour for climbing, harvesting, and operations such as root feeding and crown management. To address these issues, KVK Dindigul

functioning under Gandhigram Rural Institue promoted drought-management techniques, machinery-based tree climbing, and integrated crop management practices through technical demonstrations to enhance productivity and improve the socio-economic status of coconut growers.

GOOD PRACTICES

Participatory Need Assessment

The program began with Focused Group Discussions (FGDs) conducted during October 2012, involving farmers, farm women, and underemployed rural youth, along with face-to-face interactions and diagnostic field visits to identify local challenges. This participatory need assessment helped tailor interventions that were practical, acceptable, and relevant to the local agro-climatic and socio-economic conditions.

Village Selection

Villages were selected based on documented climatic and coconut-growing condition data obtained from the Indian Meteorological Department through the Department of Economics and Statistics, Chennai. KVK organised focused group discussions, face-to-face interactions with farmers and extension personnel, and diagnostic field visits to understand the socio-economic status, cropping pattern, and key production issues.

On-farm Demonstrations

On-farm demonstrations were organised to introduce improved coconut cultivation technologies. Drought mitigation practices such as mulching with husk and coir pith, green manure cultivation, removal of senescent leaves, life-saving irrigation during dry months, and promotion of drip irrigation were demonstrated.

Integrated nutrient management interventions included application of NPK (560 g N, 320 g P_2O_5, 1200 g K_2O per plant in two splits), farmyard manure (50 kg/plant), green manure (daincha, 50 g/plant), biofertilizers (Azospirillum, Phosphobacteria, VAM, 50 g each per plant), TNAU micronutrient mixture (1 kg/plant/year), and root feeding of TNAU Coconut Tonic (200 ml/plant every six months) to correct hidden nutrient deficiencies and improve nut size and yield.

Pest and disease management demonstrations included use of azadirachtin, pheromone traps, neem cake, trichoderma, pseudomonas, and bordeaux mixture, helping reduce crop losses and dependence on chemical pesticides.



Integrated Crop Management Practices in Coconut Cultivation

Promoting mechanised tree climbing

To address the shortage of skilled labour, high-wage rates, and lack of timely crop management practices, mechanised tree climbing was promoted, and 200 rural youth, including women, were trained through a six-day residential capacity-building programme on integrated coconut crop management and mechanisation, in partnership with the Coconut Development Board. The training combined theory and hands-on practice in safe tree climbing, crown cleaning, harvesting, pest management, and value addition, enabling many youth to provide harvesting services locally, create livelihood opportunities, and reduce labour bottlenecks. Youth groups were formed to organise services, enhance coordination, and promote group entrepreneurship. Six Friends of coconut tree



Training on use of Climbing Machine

(FoCT) youth groups were facilitated and formed, and conflicts were addressed through regular monthly meetings; selected youth were further developed as master trainers to promote peer learning and farmer-to-farmer extension.

CHALLENGES

During the implementation of the FoCT and integrated coconut management interventions, several challenges were encountered. Farmer resistance and scepticism were the foremost constraint, particularly regarding the adoption of mechanised tree climbers and new crop management practices. Many farmers were unfamiliar with integrated crop management (ICM), including Integrated Nutrient management (INM), Integrated Pest management (IPM), micronutrient application, and disease diagnosis, leading to low participation. Technical difficulties included properly identifying pests and disease damage, as well as safely handling climbing machines.

However, through repeated village-level meetings, on-farm demonstrations, exposure visits, and use of live specimens to illustrate pest damage, disease symptoms, and nutrient deficiencies, many of these issues were addressed. Stakeholder engagement was enhanced by forming six youth groups, promoting peer learning, and building trust through visible field results.

The Coconut Development Board granted 100% financial assistance for resource mobilisation, including the free provision of climbing machines and training under FoCT scheme. Partnerships with extension personnel from the Department of Agriculture and Horticulture, FPOs, NGOs, Agricultural Technology Management Agency (ATMA), and the Coconut Development Board facilitated technical guidance and youth participation.

Persistent engagement, continuous monitoring, and demonstration of tangible benefits ultimately led to increased adoption of ICM practices and mechanised climbing, enhancing coconut productivity and livelihood opportunities.



Demonstration on Handling of Coconut Climbing Machine

SUSTAINABILITY AND SCALING UP

The efforts of the KVK will be sustained in the years ahead, as the promoted practices such as mulching, green manuring, INM, and Integrated Pest and Disease Management (IPDM) are low-cost. Mechanised tree climbing has addressed the labour shortage and is currently employing trained rural youth. KVK is supporting farmers and youth through advisory services and routine soil testing. There is an ongoing demand on the KVK to organise more training. The programme has high potential for scaling, as practices can be adapted to other drought-prone coconut belts.

LESSONS LEARNED

- It is essential first to identify local needs through participatory assessment and field-level consultations.
- Technologies should be demonstrated initially on farmers' fields to build confidence and encourage wider adoption.
- The use of live specimens for pest and disease identification enhances practical learning and clarity among farmers.
- Formation of youth groups is important for collective action and service delivery, along with providing them training in both technical and soft skills.
- Ensuring the availability of critical inputs at local centres facilitates timely adoption of practices.
- Regular follow-up meetings and field visits are necessary to sustain adoption and address emerging challenges effectively.

CONCLUSIONS

The intervention demonstrated that hands-on demonstrations, continuous capacity building, and farmer-to-farmer learning are highly effective for scaling drought-resilient coconut management. Practical training through the FoCT programme proved particularly successful, improving labour availability, increasing adoption of mechanised tree-climbing technology, and strengthening youth livelihoods. On-farm demonstrations of mulching, green manuring, and integrated nutrient and pest management enhanced soil moisture, reduced pest incidence, and improved yields, fostering strong farmer confidence.

Acknowledgements: The authors gratefully acknowledge the Coconut Development Board, Government of India, for sponsoring the FoCT program, and ICAR-ATARI Zone X, Hyderabad, and ICAR-ATARI Zone XI, Bengaluru, for providing financial support for enhancing coconut productivity through on-farm demonstrations.

Authors



S. Senthil Kumar
Senior Scientist & Head
KVK Dindigul
ssenthilhort75@gmail.com.



M. Thirunavukkarasu
Subject Matter Specialist (Soil Science)
KVK Dindigul
thirusac@gmail.com



M. Saravanan
Subject Matter Specialist (Agronomy)
KVK Dindigul
mahathendral@gmail.com



P. P. Saravanan
Subject Matter Specialist (Forestry)
KVK Dindigul
ppsfor@gmail.com

Promoting Value Addition

ICAR-KVK Undi, West Godavari, Andhra Pradesh

Promoting Honeybee Keeping in West Godavari

In this good practice note, N. Mallikharjuna Rao, A. Srinivasa Rao, A. Rajesh, and P. Vinaya Lakshmi discuss their work on promoting honeybee keeping in the West Godavari District of Andhra Pradesh.

CONTEXT

Many farmers and landless labourers in the West Godavari District of Andhra Pradesh lack sustainable livelihood options and are adversely affected by fluctuating crop yields and market prices. Conventional agricultural practices alone are insufficient to ensure year-round income and resilience against climate variability. In this scenario, beekeeping emerged as a promising rural enterprise as it requires minimal land, provides additional income, and can be practised even through migratory beekeeping, where bee boxes are shifted from nectar-exhausted areas to nectar-rich locations according to seasonal availability. Besides honey, beekeeping supports crop productivity through enhanced pollination and generates several commercially valuable byproducts, including pollen, royal jelly, beeswax, and bee venom. However, low awareness of scientific beekeeping and limited access to training hinder its adoption. The area also has abundant forage and a natural habitat conducive to bee rearing. To diversify livelihoods and strengthen the rural economy, the KVK, Undi functioning under Acharya N. G. Ranga Agricultural University (ANGRAU) established an apiary unit in 2018 she began promoting scientific and beekeeping among small, marginal, and landless farmers to improve income security and agricultural sustainability.

GOOD PRACTICES

Awareness Programmes

The KVK organised nine one-day awareness programmes at the KVK on occasions such as World Bee Day, with participation of 246 members (165 males and 81 females). These programmes highlighted the importance of honeybees, their role in crop pollination, and the commercial value of bee products.

Training Programmes

The KVK organised skill development training programmes to promote scientific beekeeping among small, marginal, and landless farmers. The first 25-day "Beekeeper" training was conducted in 2018–19 with 20 participants. From 2018–19 to 2023–24, the KVK, Undi conducted seven training programmes with 129 participants (88 males and 41 females). Various agencies supported the training programmes:

- Agricultural Skill Council of India (ASCI) – Skill Development Training on "Beekeeper"
- Acharya N. G. Ranga Agricultural University (ANGRAU) – Beekeeping Online Distance Learning Course (ODLC)
- Agricultural Technology Management Agency (ATMA) – Skill Training for Rural Youth (STRY) on Beekeeping
- National Bee Board (NBB) project – Training program on beekeeping
- KVK, Undi – Two programmes on scientific beekeeping

Out of these trainees, 48 members adopted honeybee keeping as an enterprise, post-training.

Provision of inputs

To encourage small and marginal beekeepers, the KVK provided support to four farmers under the Schedule Castes Sub Plan (SCSP), supplying bee boxes, honey bee colonies, honey extractors, and other essential inputs.

Exposure Visits and Diagnostic Support

Exposure visits were arranged for trainees to successful beekeeping units. The KVK facilitated coordination between budding entrepreneurs and established beekeepers, helping them acquire bee boxes and colonies and simplifying hive management at individual levels. KVK also conducted diagnostic visits to identify and resolve problems encountered by beekeepers. During these visits, beetle attacks on bee colonies were detected and successfully managed. The support extended beyond West Godavari district, reaching beekeepers from across Andhra Pradesh and Telangana.



Practical Experience to Participants during Beekeeping Training at KVK Undi

Promotion of Stingless Bee Keeping

The KVK maintains a stingless bee colony for demonstration and training. The KVK is actively promoting stingless beekeeping in terrace and kitchen gardens as an additional source of income. Awareness was created about the medicinal value of stingless bee honey and its importance in urban farming.

CHALLENGES

During the implementation of beekeeping practices, several challenges were encountered despite the benefits of the enterprise:



Bee Enterprenures Sri MS Raju and Sri K Satyanarayana

Bee colonies are vulnerable to pests, diseases, and predators. Mites such as Varroa destructor, wax moths, and birds can weaken hives, particularly when colonies are small or poorly managed. Adulterated honey is widely available in the market at low prices. As consumers struggle to distinguish pure honey from adulterated products, genuine honey producers are unable to command premium prices. This discourages small farmers from scaling up production and achieving sustainability. Many farmers perceive beekeeping only as a source of honey production. It is challenging to make them understand the broader role of bees in pollination and ecosystem stabilisation, which limits the adoption of beekeeping as an integrated farming practice.

The problems of beekeeping are being addressed through awareness programmes, training programmes, mobile advisory services, field visits, and WhatsApp groups by KVK.



Training on Scientific Beekeeping

BENEFITS AND IMPACT

For example, with support from KVK under the SC Sub Plan, Mr K. Ambedkar and Mr K. Nagaraju from Andaluru, West Godavari district, established 28 bee boxes in a citrus orchard. They produced 200 kg of honey and sold it at ₹500 per kg under the brand "GODAVARI Honey", demonstrating the enterprise's income potential and commercial viability. During 2023-24, out of 65 trainees who attended training at KVK, 28 (43.07%) members started beekeeping, indicating successful adoption and income diversification.

Among those trained, six beekeepers have initiated brand-based marketing of honey under their own labels, namely Deccan Bees, Vijaya Organics, Vasista, Kona Seema Honey, Rudra, and SIPCOV. In addition, honey is being marketed online under the SIPCOV brand through the parent company, Dheera Foodco, Velpur, West Godavari, thereby expanding market reach and enabling better price realisation for the producers.



P.Satyanaryana -A Bee Entrepreneur

The initiative has promoted entrepreneurship by encouraging farmers to adopt beekeeping as a profitable enterprise, thereby strengthening livelihood security. The adoption of beekeeping has also created a sustainable source of income, particularly for small and marginal farmers, by effectively utilising locally available resources and emerging market opportunities.

SUSTAINABILITY AND SCALING UP

The KVK played a pivotal role in ensuring the sustainability and scaling of the beekeeping initiative by effectively linking budding entrepreneurs with well-established beekeepers. This networking facilitated group marketing, development of individual brand identities, and reduction in investment costs through shared resources and collective procurement. By coordinating interactions between new and experienced entrepreneurs, the KVK enabled easier access to bee boxes, bee colonies, and technical know-how, which simplified hive management at the individual level and reduced operational risks.



Sri PSV Subrahmanyam Raju- A Bee Keeper

The integration of entrepreneurs also created opportunities for value addition and enterprise diversification. Women entrepreneurs, in particular, are being engaged to prepare value-added products, such as beeswax candles and lip balms, in collaboration with other entrepreneurs. This collective approach not only enhances income opportunities but also strengthens long-term sustainability and scalability of the beekeeping enterprise by promoting entrepreneurship, value addition, and market-driven expansion.

Identification of suitable areas for beekeeping with natural flora and the flowering seasons of various crops, raising awareness about the commercial benefits of beekeeping, and providing support through subsidies & incentives to farmers and rural youth are to be carried out to promote beekeeping as a rural enterprise.

LESSONS LEARNED

- Beekeeping should be promoted not only for honey production but also for its role

in improving crop yields and strengthening biodiversity through effective pollination.

- Pollination services themselves can become an income source by leasing bee colonies to farmers for crop pollination.
- Migratory beekeeping offers farmers a reliable and continuous stream of additional income by following seasonal nectar flows.
- Honey produced in chemical-free environments can fetch premium prices, especially when organically certified, due to growing demand from health-conscious consumers and export markets.
- Apiary byproducts such as beeswax, propolis, bee venom, and royal jelly have high commercial value and offer lucrative opportunities for enterprise diversification.

CONCLUSION

Beekeeping is a simple, lucrative, and reliable income-generating activity that can be adopted at small, marginal, or large enterprise levels. It requires a one-time initial investment and minimal, regular maintenance that requires basic technical know-how. The KVK has played a significant role in promoting beekeeping, including stingless beekeeping, as an additional source of income for rural and urban youth and women, while also integrating it as a viable component of terrace and kitchen gardens.

Acknowledgements: The authors sincerely acknowledge ANGRAU, and ICAR–ATARI, Zone–X, Hyderabad, for their support and guidance in implementing the beekeeping activities at KVK Undi.

Authors



N. Mallikharjuna Rao
Programme Coordinator (Entomology)
KVK Undi
n.mallikharjunrao@angrau.ac.in



A Srinivasa Rao
Principal Scientist & Subject Matter Specialist (Fishery Science)
KVK Undi
srinivasfish@angrau.ac.in



A. Rajesh
Subject Matter Specialist (Plant Protection)
KVK Undi
a.rajesh@angrau.ac.in



P. VinayaLakshmi
Subject Matter Specialist (Crop Production)
KVK Undi
Vinaya.podapati126@gmail.com

ICAR-KVK Rudrur, Nizamabad, Telangana

From Production to Prosperity: Strengthening Producer Groups in the Turmeric Sector

In this Good Practice Note, Bandaru Venkata Rajkumar, Swetha, Anjaiah, and Vijay Kumar discuss their efforts in strengthening a Farmer Producer Company in the turmeric sector.

CONTEXT

Telangana is the leading producer of turmeric in India, with cultivation concentrated in the erstwhile districts of Nizamabad, Karimnagar, Warangal, and Adilabad. Among these, Nizamabad is a key turmeric hub, where the crop is mainly grown by small and marginal farmers under irrigated and semi-irrigated systems. Small-scale turmeric farmers in Nizamabad district faced significant challenges, including unstable incomes and limited market access, resulting in reduced profitability despite cultivating a high-value crop. Despite its commercial importance, turmeric growers in the district face multiple challenges that result in low and uncertain incomes. Fluctuating market prices create income instability, while the lack of scientific storage facilities forces farmers to sell at a loss immediately after harvest. The dominance of middlemen in the supply chain further reduces farmers' share in consumer prices. Additionally, the crop is vulnerable to pests and diseases, leading to yield and quality losses.

Given turmeric's economic importance in the region and farmers' heavy dependence on this crop, addressing these issues became urgent. KVK Rudrur functioning under Professor Jayashankar Telangana Agricultural University (PJTAU) took the initiative to strengthen Farmer Producer Organisations (FPOs)and Farmer Producer Companys (FPCs) in the turmeric sector.

GOOD PRACTICES

Facilitating the formation of FPC

After adopting the village under the village adoption programme, the KVK motivated farmers to form a collective to establish an FPO. Sensitisation workshops were conducted in coordination with Spice Board, Nizamabad, and the National Bank for Agriculture and Rural Development (NABARD) to raise awareness of the Central Government's initiative to establish 10000 FPOs. Connecting buyers and sellers through a start-up, 'transity', was piloted as part of the PJTAU AgHub initiative. The KVK facilitated the formation of Morthad Fed FPCL in 2023, with support from National Agricultural Cooperative Marketing Federation of India (NAFED), mobilising 306 farmers into an organised enterprise. The FPO initiated input supply services, improving access and generating a turnover of ₹80 lakhs with a profit of ₹6 lakhs.

Training and Demonstrations

The KVK organised training and demonstrations for 240 farmers of the Morthad Fed FPCL during during 2023-24 and 2024-25. The topics covered all key stages of turmeric cultivation, including seed selection and seed treatment; land preparation and planting methods (raised bed with 4-row planter and 2-row planter) for better crop establishment and resource use; nutrient management with emphasis on balanced fertilization and soil health; integrated pest and disease management to reduce chemical use and enhance sustainability; improved harvesting practices to maximize yield and quality; and seed-to-seed mechanization in turmeric.

Involving multiple stakeholders

In addition to knowledge transfer by KVK scientific staff, the initiative was implemented with support from a number of stakeholders.

Sl No	Stakeholders	Contributions to the initiative
1	Turmeric Research Station, Kammarpally	Technical expertise
2	Spices Board, Nizamabad	Certification and market linkages
3	Agricultural Market Committee	Market facilitation
4	National Commodity & Derivatives Exchange (NCDEX)	Commodity trading and price risk management
5	NABARD	Facilitated in organising meetups of FPOs and FPCLs with different stakeholders
6	NAFED	Sponsoring agency helped in establishing and registering Morthad Fed FPC

This integrated approach strengthened farmers' knowledge, improved institutional linkages, enhanced scientific cultivation practices, and increased resilience to market fluctuations, leading to better-quality turmeric with higher market value from Nizamabad.

Management Training for FPO Executives

50+ FPO Board Members and Chairman participated in district-level training and capacity-building programmes facilitated by KVKs and organised by NABARD, involving multiple stakeholders. These programmes focused on strengthening managerial competencies, enhancing both backwards and forward linkages in the turmeric value chain, and building the capacities of CEOs and Board Members of FPOs.

In addition, leadership and team-building workshops were organised to further enhance the decision-making, coordination, and overall management skills of FPO executives, enabling them to effectively manage Farmer Producer Organisations and improve business performance.

Distribution of Inputs

Fifty progressive farmers were selected based on their active engagement in turmeric cultivation to ensure effective adoption and field-level monitoring. Essential micronutrients, IISR Turmeric Special from the ICAR-Indian Institute of Spices Research (IISR), and a microbial consortium developed by PJTAU were distributed to enhance nutrient availability, rhizome quality, and productivity. Vermicompost and neem cake were also provided as organic amendments to improve soil fertility, support



Input Distribution to Turmeric Farmers

sustainable crop growth, and enhance yield and quality. For post-harvest management, gunny bags and hermetic storage bags were supplied to enable safe, pest-free storage of turmeric rhizomes and reduce losses.

Literature and Documentation

Comprehensive training materials were developed on turmeric (Curcuma longa) cultivation, emphasising Good Agricultural Practices (GAP), value addition, and marketing to enhance farmers' technical capacity in varietal selection, soil fertility management, integrated pest and disease management, irrigation, harvesting, post-harvest handling, grading, and preparation of value-added products. Simultaneously, best practices and farmer success stories were systematically documented in PJTAU's monthly magazine, capturing innovative approaches and evidence-based outcomes. The literature was disseminated among farmers to promote the adoption of improved practices in turmeric cultivation.

Support to development of marketing and branding strategy

A comprehensive marketing and branding strategy was developed for FPO turmeric products to ensure compliance with the Food Safety and Standards Authority of India (FSSAI) licensing norms. The framework was formulated through participatory discussions involving KVK scientists, Spices Board officials, and FPO members, integrating technical expertise with local insights. Product branding (Induru) and packaging solutions were designed using stand-up pouches to enhance product appeal, shelf life, and market competitiveness, aligned with contemporary marketing practices.

Additionally, structured capacity-building programmes on marketing were conducted in collaboration with National Commodity & Derivatives Exchange (NCDEX), focusing on market positioning, consumer behaviour, and regulatory compliance, thereby strengthening the market readiness of FPO members.



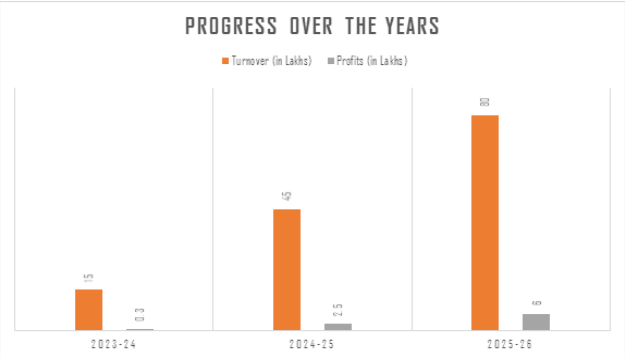
Market linkages of Turmeric

CHALLENGES

Initially, the FPOs have been facing several challenges, including limited working capital, weak governance, and low managerial capacity (within FPOs), which affected their operational efficiency and growth. In addition, inadequate awareness

of quality standards and compliance requirements restricted their access to premium markets. Infrastructure gaps, such as the absence of proper facilities for processing, drying, grading, and storage, further constrained value addition and reduced market competitiveness, while limited access to institutional credit and support systems posed an additional barrier.

To address these issues, the KVK trained farmers on Good Agricultural Practices (GAP) and strengthened the financial and operational management skills of FPO leaders. Strategic linkages were established with NABARD for credit facilitation and Spices Board for infrastructure and technical support. Infrastructure gaps were mitigated by mobilising resources for boiling, drying, and grading units, while digital tools introduced by the Spice Board enhanced quality control, traceability, and market access.



BENEFITS AND IMPACT

KVK's efforts in enhancing the capacities of turmeric farmers associated with the Morthad Fed FPCL in GAP, post-harvest management, value addition, and marketing, along with the adoption of mechanisation and scientific practices, helped improve productivity, reduce cultivation costs, and enhance yield and quality. IndiGAP certification, supported by the Spices Board India, further strengthened compliance and market access.

The initiative enhanced collective action, bargaining power, and market participation by strengthening the FPO structure. Institutional convergence among KVK, NAFED, and the Spices Board improved technical support, infrastructure, and service delivery. Farmers showed increased awareness of quality standards, traceability, and sustainable practices, leading to behavioural shifts toward scientific cultivation.

Branding initiatives such as "Induru Turmeric Powder" and "Induru Golden Latte" improved product identity, visibility, and farmer confidence in value addition.



In the short term, improved input access, skills, and market linkages created momentum for collective business operations. Over the long term, a functional FPO, IndiGAP certification, and infrastructure development led to improvements in sustainable livelihoods, higher-quality production, and enhanced competitiveness. Spillover effects included wider adoption by neighbouring farmers and a shift from individual to organised, market-oriented farming systems.

SUSTAINABILITY AND SCALING UP

The turmeric-based FPO promoted by the KVK is still in an early stage and may not sustain in the short term without external support. Financial stability depends on improving income through value addition and better market linkages, while strong management and governance are also needed. Interventions such as IndiGAP certification and compliance with the Food Safety and Standards Authority of India (FSSAI) have provided a solid foundation, but continued support is required to maintain quality and smooth operations.

Overall, long-term sustainability depends on strengthening three key areas—capital, skills, and market linkages—while farmer acceptance and environmentally friendly practices are already in place.

The FPO has started continuing its activities through input supply and branding efforts, but it still needs

support to become fully independent. Ongoing support from KVK, along with NAFED and Spices Board India, is helping in its growth. Regular guidance, training, and strong market linkages are needed to make the FPO self-reliant and sustainable in the long run.

The model can be easily replicated in other turmeric-growing areas if farmer groups are well organised and supported with training and market linkages. Scaling can be achieved by expanding into additional areas and strengthening activities such as infrastructure development, branding, and value addition (e.g., turmeric powder, curcumin, and retail packs). Support from institutions such as NABARD and the Small Farmers Agribusiness Consortium, (SFAC) as well as private buyers, is important for successful expansion.

LESSONS LEARNED

- Institutional capacity building is critical—strong governance, transparent financial systems, and trained leadership are essential for FPO success. FPOs require 5–7 years of continuous handholding to achieve financial stability, governance maturity, and strong market integration.
- Value addition is a game changer—processing turmeric into powder and branded products significantly improves price realisation over raw sales.
- Certification and compliance (e.g., quality standards and open access to premium markets) require continuous technical and financial support, not one-time training.
- Market linkages and buyer contracts are essential for stability, reducing risks from price fluctuations.
- Partnerships amplify impact—collaboration with institutions like NAFED and Spices Board India helps address resource and knowledge gaps.

CONCLUSION

The turmeric-based FPO in Nizamabad (Rudrur) have strong potential to evolve into value-driven enterprises. Priority should be given to developing processing facilities (powder, curcumin, oleoresins), strengthening branding, and expanding market access through one district on product (ODOP) outlets with support from NABARD and Spices Board India. Building linkages with buyers, processors, and exporters will ensure better price realisation and reduce dependence on local markets.

Simultaneously, capacity building in governance, financial management, and leadership, along with improved access to credit, is essential for strengthening FPO operations. Upgrading post-harvest infrastructure will help maintain quality and reduce losses. With continued support from the KVK and convergence with partners such as NAFED, the FPOs can transition from aggregation to value addition and branding, ensuring sustainability, resilience, and enhanced farmer incomes.

Acknowledgements: The authors thank Prof. Aldas Janaiah, Vice-Chancellor, Professor Jayashankar Telangana Agricultural University (PJTAU), Hyderabad, for his support and inspiration, Dr. Shaik N Meera, Director, ICAR-ATARI-Zone-X Hyderabad, for facilitating this project on impactful intervention in Turmeric and Dr. J. V. Prasad, Principal Scientist, ICAR-ATARI-Zone-X Hyderabad for his continuous support in executing the project.

Authors



Bandaru Venkata Rajkumar
Scientist (Horticulture),
Telangana Rythu Vignana Kendra (TRVK), Warangal
Email: bvrajkumar87@pjtau.edu.in



M. Swetha
Assistant Professor(Agricultural Extension)
BJR Agricultural College, Sircilla (PJTAU)
Email: mswetha.muddam@gmail.com



T. Anjaiah
Principal Scientist (Soil Science and Agricultural Chemistry,
WTC, PJTAU, Hyderabad
Email: anjaiahtheerthala@pjtau.edu.in



P. Vijay Kumar
Scientist (Entomology)
KVK Rudrur
Email: vijaypulluri68@gmail.com

ICAR-KVK Erode, Tamil Nadu

Exploring Banana Enterprises in Erode District

In this Good Practice note, P. Alagesan, S. Saravanakumar, P. Pachiappan, and M. Siva discuss their end-to-end interventions in banana cultivation and value addition, and highlight how these interventions have enhanced productivity and promoted entrepreneurship in Erode District.

CONTEXT

Most banana-growing farmers in Erode district of Tamil Nadu were facing stagnating productivity and limited value realisation from their crop, adversely affecting their income and sustainability. The district has favourable agro-climatic conditions that support the cultivation of diverse crops, including banana, a major fruit crop grown on more than 15,000 ha at an average productivity of about 38 MT/ha (District Statistical Handbook, 2024). However, farmers had limited awareness of recent scientific crop management practices, resulting in suboptimal yields and inefficient use of resources. Additionally, harvested banana plants and pseudo-stems were largely underutilised or improperly disposed of, despite their potential as a source of eco-friendly natural fibre. Conventional production-focused approaches failed to address productivity gaps, biomass utilisation, and market-oriented value addition.

Given the potential to increase productivity up to 60 MT/ha and the growing global demand for banana-based food and fibre products, there was an urgent need for innovative extension interventions. In this context, the KVK, functioning under the Mysore Resettlement and Development Agency (MYRADA) has undertaken systematic, technology-led and

enterprise-oriented interventions over the years to enhance banana productivity and promote natural fibre extraction, utilisation, and value addition through capacity-building and field-based activities.

GOOD PRACTICES

Promotion of New Varieties

The widespread cultivation of traditional banana varieties such as Ney Poovan and Karpuravalli had made the crop highly vulnerable to Panama wilt disease, leading to yield losses. To address this challenge, KVK introduced and promoted three improved varieties—Udhayam, CO-2, and CO-3—in 10 farmers' fields from 2013 onwards. This initiative helped reduce pest and disease incidence while enhancing productivity. To ensure the availability of quality planting material in Erode district, five farmers were trained in sucker and mother plant production and distribution. As a result, these varieties are currently cultivated across 118 hectares in 240 farmers' fields.

Promotion of Micronutrients

During 2015-16, the KVK conducted an on-farm trial in five farmers' fields to assess the effectiveness of IIHR Arka Banana Special, a micronutrient formulation developed by ICAR–IIHR, Bengaluru. Since this was a new ICAR technology, timely access to the product was a challenge for farmers. To address this, KVK Erode made an MoU with IIHR and initiated in-house production of IIHR Arka Banana Special at KVK to ensure continuous availability. On average, 1.5 tons of Banana Special were produced and supplied to farmers at Rs. 200/kg.

Establishment of Bio-control Units

During 2015–16, on-farm trials were conducted in 10 farmers' fields to evaluate the efficacy of various bio-control agents against leaf spot, wilt, Erwinia rot, and nematode infestations in banana. To ensure year-round availability of bio-control agents, KVK established decentralised bio-control units at both KVK and village levels. These units produced 75 quintals of high-quality bio-fungicides per year, enabling local farmers to avail themselves of them at Rs. 130.00/kg to manage pests and diseases effectively and improve yields sustainably.

Skill Building Programme

To promote waste-to-wealth initiatives, harvested banana plants were utilised to develop banana fibre-based products. KVK organised 15 skill development training programmes for rural youth on banana fibre extraction and product preparation during the period 2015 – 2020, each lasting 10 days. Trained youth were later organised into Self Help Groups (SHGs) and engaged in producing various banana fibre-based products. Since KVK lacked product standardisation facilities, linkages were established with the National Research Centre for Banana (NRCB), Trichy, and the Technology Business Incubator (TBI), TNAU, Coimbatore, for quality assurance and product refinement during the year 2019.

Formation of Various Groups

Two youth groups (each with 20 members) were formed in the Gobi and Bhavani clusters, focusing on banana fibre extraction, processing, rope-making, and handicraft production. These groups also produced and marketed by-products for the textile, defence, and sanitary industries. Additionally, three trained SHGs in Sathya Mangalam were involved in manufacturing handicrafts such as baskets, toys, and yoga mats using banana fibre and bark.

Promotion of Entrepreneurship

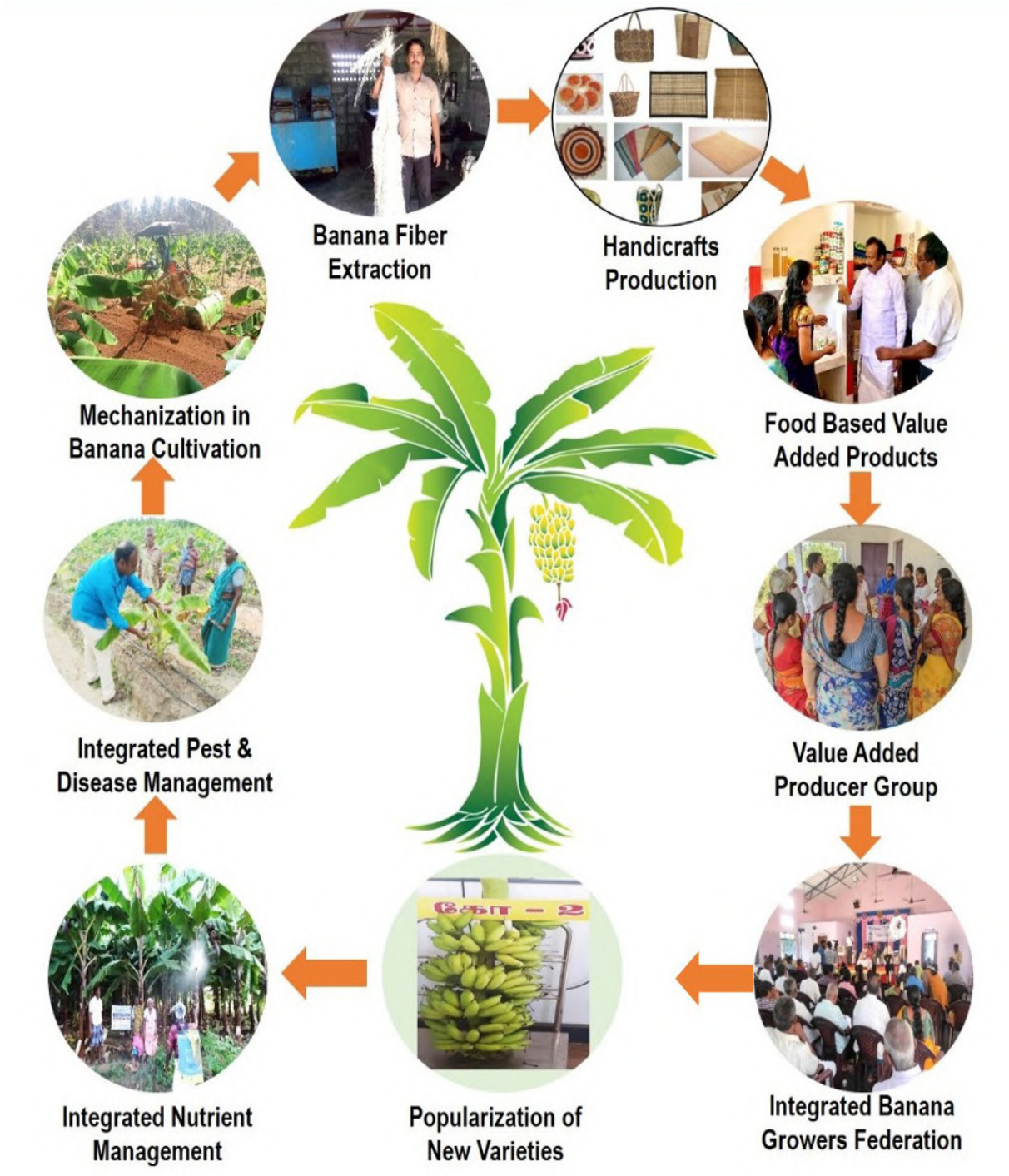
KVK-trained entrepreneurs initiated entrepreneurship activities in two clusters through training and hand-holding support to produce banana-based value-added food products. Entrepreneurs were exposed to national-level institutions involved in product development and standardisation, including:

- ICAR-National Research Centre for Banana (NRCB), Trichy
- National Institute of Food Technology Entrepreneurship and Management (NIFTEM)
- CIR-Central Food Technological Research Institute (CFTRI)
- Tamil Nadu Agricultural University (TNAU), Coimbatore

These linkages helped entrepreneurs improve product quality, packaging, and market readiness.

Table 1: Techological nterventions

Sl No	Intervention	Technology popularized
1	Introduction of new varieties	CO-2, CO-3, Udhayam
2	Weevil management	Pseudostem trap
3	Leafspot management and Erwinia Management	Bio fungicide
4	Nematode management	Bio nematicide
5	Nutrient management	IIHR Arka Banana special – Micronutrient mixture





Various uses of Banana and its Product

CHALLENGES

Initially, farmers were sceptical about adopting new varieties (Udhayam, CO-2, CO-3) and modern crop management practices due to reliance on traditional methods and uncertainty about profitability. KVK overcame this through on-farm demonstrations, field trials, and training progressive farmers as master growers, creating local role models and building confidence among peers.

Initially, critical inputs such as IIHR Arka Banana Special micronutrients and other bio-inputs were not easily available at the right time. To address this, KVK established decentralised bio-input production units at KVK and village levels and partnered with IIHR to ensure continuous supply. Resource limitations, including funding and workforce for large-scale training and enterprise development, were managed by prioritising capacity-building programs and leveraging partnerships with NRCB, TNAU, and other institutions.



Banana Fiber Extraction

Networking youth and SHGs under a common platform was another challenge. KVK addressed this by establishing the Agri Entrepreneurs Service Centre (AESC) at the KVK and promoting the Sustainable Banana Growers Federation (SBGF) to coordinate training, collective production, branding, and marketing of banana fibre and value-added products.

Through iterative learning, KVK refined demonstrations, strengthened input supply chains, and mentored master growers to scale adoption despite initial scepticism and logistical constraints; persistent engagement, capacity building, and strategic collaborations enabled successful technology deployment, entrepreneurship development, and sustainable biomass utilisation, significantly enhancing productivity and livelihoods in the district.

BENEFITS AND IMPACT

The extension interventions in banana enterprises in Erode district have led to significant adoption, capacity building, and enterprise development.

Improved banana varieties (Udhayam, CO-2, and CO-3) were adopted on 118 ha by 240 farmers. At the same time, KVK produced 57.62 tonnes of IIHR Arka Banana Special micronutrient, reaching 4,610 ha, and supplied 75 quintals of decentralised bio-inputs across 3,750 ha, improving crop health and pest management.

Over five years, 73 skill development training programs benefited 2,450 farmers, rural youth, and women, while 350 youth and SHG members were trained in banana fibre value addition, resulting in 174 entrepreneurs who developed over 50 fibre products and 20 food products, which were marketed through digital platforms. Two youth groups, three SHGs, and the 272-member Sustainable Banana Growers Federation (SBGF) collectively produced and marketed banana fibre and value-added food products, with active participation of 174 youths and 56 women, enhancing livelihoods, entrepreneurship, and sustainable biomass utilisation.

The extension interventions led to notable improvements in farmers' knowledge, productivity, and income, with about 70% of farmers enhancing their skills in scientific banana cultivation, resulting in a 9.8% increase in yield and higher profitability. Farmers adopting integrated crop management practices realised an incremental income of ₹80,000 per hectare. Additionally, group members and entrepreneurs collectively produced around 40 tonnes of banana fibre and 15,000 litres of sap water-based value-added products annually. Strengthened market linkages with international buyers in Japan, Sri Lanka, and other countries further expanded marketing opportunities for banana-based products, promoting sustainable livelihoods and enterprise development in the district.

SUSTAINABILITY AND SCALING UP

The banana enterprise interventions by KVK, Erode, are designed for long-term sustainability and scaling. Institutional mechanisms such as the Agri-Entrepreneurs Service Centre (AESC), Community Managed Resource Centre (CMRC), and Farmer Producer Organisations (FPOs) ensure a continuous supply of micronutrients and biopesticides. At the same time, decentralised production units and technical support enable local ownership and



Banana Fibre Value-added Products Exhibition

maintenance. The Integrated Banana Growers Federation (IBGF) connects entrepreneurs producing value-added banana products under the common brand "B Fruit," providing financial sustainability and market access. SHG members trained in banana fibre extraction and handicrafts benefit socially and economically, while biomass utilisation promotes environmental sustainability.

The practices have strong scaling potential and can be replicated in other high-banana-cultivation districts in Tamil Nadu and Kerala, given access to inputs, training, and markets. Horizontal scaling can be achieved through farmer networks and SHG clusters. In contrast, vertical scaling requires institutional embedding and partnerships with research institutions, government programs, and markets to ensure long-term productivity, enterprise development, and regional impact.

LESSONS LEARNED

- Leverage local strengths: Build initiatives around region-specific resources and crop potential.
- Diversify and add value: Promote value addition in crops and by-products to increase income.
- Promote entrepreneurship: Utilise underused plant parts and farm waste to create new business opportunities.
- Adopt a market-oriented approach: Align production with demand for food and fibre-based products.
- Capacity building: Provide skill training, exposure visits, and technical support at all stages.
- Foster linkages and collaborations: Engage farmers, entrepreneurs, and industry experts to share expertise and resources.
- Replicability: Lessons can guide similar initiatives for sustainable livelihoods and rural development in other regions.

These experiences can guide replication of similar initiatives, fostering entrepreneurship, value addition, and rural development in other regions.

CONCLUSION

The integrated interventions by KVK, Erode, in banana cultivation and enterprise have demonstrated that technology-led, market-oriented, and enterprise-focused approaches can significantly enhance productivity, income, and livelihoods. Adoption of improved varieties, micronutrient and bio-input technologies, skill development, and promotion of value-added food and fibre products have empowered farmers, rural youth,

and women, while ensuring sustainable biomass utilisation and environmental benefits. Strong institutional mechanisms, including decentralised input units, federations, and partnerships with research institutions, have enabled long-term sustainability and the potential for replication.

These practices offer a model for other regions to foster entrepreneurship, diversify income sources, and strengthen rural development, illustrating how integrated extension, capacity building, and market linkages can transform agricultural systems while promoting economic and social resilience.

Acknowledgements: The authors thank Shri. Arvind G. Rishbud, Executive Director, MYRADA, Bangalore; Dr Shaik N. Meera, Director of ICAR ATARI, Zone-X, Hyderabad; and Chief General Manager, NABARD, Chennai, for their support, technical and financial assistance, and guidance.

Authors



P. Alagesan,
Senior Scientist & Head
KVK Erode
dralagesanmykvk@gmail.com



S. Saravanakumar
Subject Matter Specialist (Agronomy)
KVK Erode
myradakvkagri@gmail.com



P. Pachiappan
Subject Matter Specialist (Horticulture)
KVK Erode
myradakvkhorti@gmail.com



M. Siva
Subject Matter Specialist (Home Science)
KVK Erode
myradakvkhs@gmail.com

ICAR-KVK Zaheerabad, Sangareddy, Telangana

Empowering SC Women Through Millet Processing and Value Addition

In this Good Practice Note, Mandava Hemalatha, N. Snehalatha, Pagadala Sai Priyanka, and C. Vara Prasad discuss the efforts of the DDS-Krishi Vigyan Kendra (KVK) to empower SC Women in the Sangareddy district of Telangana through millet processing and value addition.

CONTEXT

Sangareddy district of Telangana is predominantly agrarian, with around 2.6 lakh hectares mainly under rainfed cultivation, dominated by small and marginal farmers, nearly 18% of these farmers belong to Scheduled Caste (SC) households relying on subsistence farming and agricultural labour, resulting in low and uncertain incomes. Traditionally, the district cultivated millets such as jowar, ragi, and foxtail millet, well-suited to its semi-arid climate and low-input farming systems. However, millet cultivation has declined due to changing food habits, limited processing facilities, poor market access, and inadequate value addition, leaving these nutritious crops underutilised and providing low returns. The district also faces serious nutrition challenges, particularly anaemia among women and children. According to the District Nutrition Profile (based on NFHS-5), 48% of non-pregnant women, 64% of pregnant women (15-49 years), and 67% of children are affected by anaemia.

To address these livelihood and nutrition gaps, the KVK which is functioning under the Deccan Development Society (DDS) with support from the National Bank for Agriculture and Rural Development

(NABARD), launched a Livelihood Entrepreneurship Development Programme, training 30 women from the villages of Algole, Pottupalli, and Pastapur in millet production, processing, packaging, and marketing. Subsequently, five SC women from Algole established a millet processing unit with KVK support, securing equipment and market linkages, resulting in increased incomes, enhanced skills, higher millet consumption, and strengthened livelihoods.

GOOD PRACTICES

Training Programme on Organic Millet Cultivation and Value Addition

As part of the training programme, the DDS KVK organised a comprehensive capacity development programme in three batches, each of 30 members, from September, 2023 to January, 2024 on organic millet cultivation and millet-based value addition. The programme focused on improving farmers' knowledge through practical learning and field exposure. The training began with sessions on organic practices in millet cultivation. Aspects related to soil health, crop growth stages, and pest balance in the field were explained to the participants. Special emphasis was given to the role of plant growth promoters and botanical preparations in maintaining healthy crop growth and reducing pest incidence.

Farmers were trained to use low-cost, locally available inputs through demonstrations of Panchagavya, Jeevamrutam, Ghana Jeevamrutam, Dashaparni Kashayam, Neemastram, and sour buttermilk, thereby reducing chemical use and cultivation costs. Soil health management was reinforced through visits to KVK vermicompost and vermiwash units, where participants learned about the preparation, application, and benefits of improving soil fertility through farm waste recycling.



Training Programme under LEDP

Skill-Based Learning in Millet Food Preparation

The programme focused on hands-on, skill-based learning, in which participants prepared traditional and innovative millet products such as Jonna Garjalu, Jonna Cake, Jonna Murukulu, Korra Kichadi, and Jonna Nachos, thereby enhancing their understanding of millet nutrition and cooking skills. Training also covered value addition for income generation, including ready-to-eat and ready-to-cook products, instant mixes, and baked items, with an emphasis on hygiene, quality control, packaging, and labelling to improve marketability.

Exposure visits to millet processing units

Exposure visits to the DDS millet processing unit familiarised participants with primary processing activities - destoning, dehulling, extrusion, and milling - along with machine operation, setup costs, and processing efficiency.



Home Science Expert Demonstrating the Preparation of Ready-to-Eat and Ready-to-Cook Millet-based Products.

Field visits to mixed millet-pulse-oilseed cropping systems and the DDS community seed bank enhanced awareness of millet diversity, cropping systems, and seed conservation.

Enterprise Establishment

Following the training, five women from Algole village planned a millet-based enterprise, with KVK providing 5-6 hand-holding sessions to finalise action plans, equipment, and branding strategies. In January 2024, with ₹2.5 Lakh financial support from NABARD, these women established the Mahila Swayam Krushi – Millet Processing Unit (MSK-MPU). The unit began preparing various ready-to-cook products, including multi-millet idli mix, dosa mix, upma mix, soup mix, and poha mix, as well as ready-to-eat products such as jowar coconut cookies, bajra chocolate cookies, muffins, groundnut chikki, sesame chikki, millet carrot muruku, millet beetroot muruku, jowar muruku, and ginger burfi. The unit also started producing value-added flour products including various types of sprouted millet flours and millet vermicelli. To promote these products they participated in district and state-level exhibitions such as Numaish Exhibition at Nampally, Hyderabad; Biodiversity Festivals organised by DDS across different mandals; exhibitions conducted by various schools in Hyderabad and several programmes organised at KVK, Zaheerabad, such as Rythu Mela, PPV&FRA awareness programmes, International Women's Day celebrations and Children's Day celebrations supported by Pragathi Hospital. They also participated in exhibitions and awareness programmes conducted in schools around Zaheerabad, including Sanghamitra School, to enhance the visibility of their products, which helped achieve a 30% increase in sales and develop a strong customer base.



Discussion with Women on the Establishment of a Millet Processing Unit by DDS KVK & NABARD Staff

CHALLENGES

In the initial year, the enterprise faced multiple challenges related to competition from established brands in the market, maintaining uniform quality, adhering to food safety standards, and low consumer awareness of the nutritional benefits of millets, which limited initial market demand. Ensuring consistent profitability and business viability required systematic planning and monitoring.

To address these challenges, the KVK supported the enterprise in organising regular consultations on business planning, sales monitoring, and the exploration of new market opportunities. This helped the enterprise focus on differentiating its product by emphasising local, traditional, and organic attributes to stand out in competitive markets. Quality issues were addressed through strict quality control measures and efforts by KVK experts to standardise and improve processing practices. The enterprise participated in exhibitions, local promotional events, and product demonstrations, which helped enhance awareness, build demand, and increase visibility.

Through improved packaging, better quality control, and targeted marketing strategies, product acceptance gradually improved. Continuous outreach and consumer education strengthened demand over time. The success of the initiative was driven by persistence, adaptive learning, and continuous improvement, enabling the enterprise to achieve better market presence and sustainability.

BENEFITS AND IMPACT

The intervention generated significant economic benefits, with a group of women successfully managing a millet-processing unit that produced diverse value-added products. As of December 2025, with a minimum weekly order of ₹5,500, the enterprise earns income of about ₹22,000 per month, ensuring steady income and sustainability. Each member earns at least ₹1,000 per week, improving household income and financial independence. The programme also strengthened capacity, with women gaining skills in processing, quality control, and marketing.

The initiative had strong social and behavioural impacts, inspiring other young women to join similar training programmes and thereby promoting local entrepreneurship and peer learning. Increased awareness led to higher household consumption of millet products, improving nutrition and reinforcing traditional food habits. Women actively engaged in both millet cultivation and value addition, contributing to healthier family diets.

In the short term, the programme enhanced participants' income, skills, and confidence. In the long term, it will promote women's empowerment, sustainable livelihoods, and nutritional security, with spillover effects that could be witnessed in increased community participation and demand for millet-based products.



Establishment of the Mahila Swayam Krushi Millet Processing Unit at Algole Village/ Participants Displaying the Millet-based Products

SUSTAINABILITY AND SCALING UP

Currently, the enterprise is functioning sustainably with increasing demand and independent operations by the women. Continued support from NABARD and KVKs, along with partnerships and policy support, can further strengthen and expand this women-centric millet enterprise model.

The MSK-MPU currently demonstrates strong financial and social sustainability, as it generates regular income through cost-effective processing and growing market demand. The ownership of the enterprise by women SHGs and continuous technical support provided by the KVK is ensuring institutional sustainability.

The model is highly scalable and can be replicated in other villages by promoting SC women-led SHGs, cluster-based processing units, and collective branding strategies. Successful replication requires access to credit, training, basic processing infrastructure, and market linkages.

LESSONS LEARNED

- Integrated approach works best: Combining production, processing, and marketing creates stronger and sustainable livelihood outcomes.
- Hands-on training is crucial: Practical, skill-based learning improves adoption and confidence among farmers and women beneficiaries.
- Continuous handholding ensures success: Regular follow-up and mentoring are essential for converting training into enterprise.
- Institutional support accelerates growth: Support from organisations like NABARD helps in accessing finance, infrastructure, and market linkages.
- Women-led enterprises are effective: Women SHGs can successfully manage processing units and contribute significantly to household income.
- Local resource-based technologies are sustainable: Use of low-cost, locally available inputs reduces dependency on external inputs and lowers costs.
- Value addition enhances income: Processing and diversification of products significantly increase profitability compared to raw produce sale.
- Market exposure is key: Participation in exhibitions and local marketing builds customer base and product visibility.
- Peer learning creates ripple effects: Success of one group motivates others in the community to adopt similar enterprises.
- Nutrition awareness drives demand: Increased understanding of millet nutrition leads to higher household consumption and local market demand.

CONCLUSION

The initiative clearly demonstrates how integrated capacity building—combining organic cultivation, value addition, and enterprise development—can transform rural livelihoods, particularly for women. The success of the Mahila Swayam Krushi Millet Processing Unit (MSK-MPU) highlights the critical role of continuous handholding, institutional support, and market linkages in transforming small-scale efforts into sustainable, scalable agribusiness models.

Through targeted training, financial assistance, and mentorship from DDS KVK and NABARD, the enterprise has not only generated steady income but also strengthened women's skills, confidence, and entrepreneurial spirit. Beyond its direct beneficiaries, the initiative has created a ripple effect, with other trained women adopting millet-based value-added products at the household level, thereby enhancing nutritional awareness and healthy food choices. Overall, the model offers a replicable pathway to promote women-led enterprises, strengthen rural economies, and advance sustainable agriculture and nutrition security in similar regions.

Acknowledgements: We acknowledge the encouragement and coordination provided by ICAR–ATARI, Hyderabad.

Authors



Mandava Hemalatha
Subject Matter Specialist (Home Science)
DDS KVK Sanga Reddy
hemalatha.ddskvk@ddsindia.org



N. Snehalatha
Subject Matter Specialist (Plant Protection)
DDS KVK Sanga Reddy
snehalatha.ddskvk@ddsindia.org



Pagadala Sai Priyanka
Subject Matter Specialist (Agricultural Extension)
DDS KVK Sanga Reddy
saipriyanka.ddskvk@ddsindia.org



C. Vara Prasad
Senior Scientist and Head
DDS KVK Sanga Reddy
varaprasad.ddskvk@ddsindia.org

ICAR-KVK Wanaparthy, Mahabubnagar-1, Telangana

Leveraging FPOs for Quality-Assured Sorghum Production and Enhanced Farmer Income

In this good practice note, G. Bhavani, V. Rajendrakumar, and R. Anitha discuss their efforts to promote INDGAP certification among sorghum farmers in Wanaparthy, in collaboration with a Farmer Producer Company.

CONTEXT

Agriculture in Wanaparthy district is predominantly rainfed, with the kharif season (June–September) being the primary cropping period. Kashimnagar village cluster of Wanaparthy mandal is a major millet-growing area, covering about 200 acres, and represents a key production cluster in the district. The area is primarily known for its extensive sorghum cultivation, which contributes nearly 26% of the Wanaparthy district's total sorghum output. The farming community largely comprises tribal farmers who traditionally cultivate a local sorghum variety known as the "Yellow type". However, this local yellow jowar is characterised by low yield potential, high susceptibility to pests and diseases, and low grain protein content.

Farmers are growing sorghum either as a sole crop or intercropped with pulses, particularly red gram. Most of them follow traditional agronomic practices with minimal external inputs. Although millets such as sorghum were historically important in the region, the area under millets declined over the years due to changing dietary habits and consumer preferences. In recent years, however, demand for millets has

resurged due to increased health awareness, particularly following the COVID-19 pandemic. To revive millet cultivation in Wanaparthy district, the KVK functioning under Youth for Action (YFA) initiated a pilot project in 2022 in collaboration with the Kashimnagar Farmer Producer Organisation (FPO). The intervention promoted the collective cultivation of the improved sorghum variety CSV 15 under GAP-based practices across 17.13 hectares, addressing low productivity and pest incidence. The FPO successfully facilitated INDGAP certification for 32 farmers, leading to higher price realisation and renewed farmer confidence in improved millet cultivation.

GOOD PRACTICES

Problem Analysis

During April–May 2022, the YFA–KVK team, in collaboration with the Kashimnagar FPO directors, conducted four focused group discussions (FGDs) with male and female farmers, including tribal households, across the Kashimnagar village cluster to identify production and marketing constraints. Farmers reported heavy dependence on the local sorghum variety ("Yellow type"), which was prone to pest incidence, low yields, and poor grain quality. They also highlighted limited awareness of improved varieties and scientific cultivation practices. The exercise identified key needs, including access to improved seed, technical guidance, and assured market linkages.

Provision of Improved Seed

In June 2022, the KVK facilitated the introduction of the improved sorghum variety CSV 15, sourced from ICAR–Indian Institute of Millets Research (IIMR), Hyderabad, which is suitable for Wanaparthy's agro-climatic conditions and has high grain iron and zinc density. The variety selection was discussed and finalized with FPO members through village-level group meetings. As part of the pilot programme, 120 kg of sorghum seed (3 kg/person/acre), procured from IIMR, was distributed to 40 interested farmers for demonstration and evaluation.

Technical Assistance for Adoption of Good Agricultural Practices (GAP)

The KVK provided continuous, process-oriented technical support to promote the adoption of Good Agricultural Practices (GAP) and compliance with INDGAP requirements. India Good Agriculture Practices (IndGAP) is a national certification scheme created by the India Good Agriculture Practices program to improve food safety, farm quality, and worker safety. Farmers were trained on soil and nutrient management, quality seed selection, balanced fertiliser use, safe pesticide application, water management, integrated pest and disease management, post-harvest handling, farmer health and safety, and digital record-keeping. Regular field visits and timely advisories ensured effective implementation of GAP and preparedness for INDGAP group certification.
Training programmes were conducted at critical stages of the crop, both on- and off-campus, at the KVK and FPO office. Special training for 23 tribal women focused on millet processing, value addition, and household-level enterprise development.

Demonstrations and Field Monitoring

40 demonstrations were conducted in Megya Thanda, Nagamma Thada, Yerragattu Thanda and Kashimnagar to promote recommended production practices. Regular field visits were conducted to monitor crop growth, identify pest and disease incidence, and provide timely advisories. Farmers were also trained in recording digital crop data on mobile phones to support traceability and INDGAP compliance.

Support for INDGAP Group Certification and Market Linkage

The KVK, in partnership with eFresh Agribusiness Solutions Pvt. Ltd., supported the FPO in INDGAP group certification and marketing process.
The KVK provided quality seed and technical guidance, while eFresh oriented the FPO on INDGAP protocols, coordinated certification



KVK Scientists Interacting with Farmers during Field Visit

audits, and facilitated market access. This collaboration enabled smooth certification, better price realisation, and encouraged tribal farmers to adopt improved sorghum varieties and INDGAP-compliant production practices.

Digital Interventions (Partnership with Carbon Mint)

As a pioneer in introducing the INDGAP scheme through FPOs in the district, the KVK prioritised digital data capture and traceability. To strengthen this, the programme partnered with CarbonMint IT Solutions. Young farmers were trained in digital data recording and compliance requirements. Crop information from sowing to packing was digitally recorded, creating a comprehensive database of field operations and farmer details. This improved traceability, facilitated certification audits, and strengthened farm record management.

Awareness Generation on Nutritional Value of Millets

Millets have traditionally been an important component of local diets and are known for their nutritional benefits. However, their consumption has declined, particularly among younger generations. To address this gap and strengthen the millet value chain, the KVK conducted a couple of nutrition awareness programmes in tribal villages under the FPO.

As a follow-up to the production and certification phase, a millet-based recipe contest was organised during July 2023 at Nagamma Thanda, a major millet-growing village. The event promoted the nutritional benefits, value addition, and household consumption of millets, with enthusiastic participation from village women who showcased a variety of millet-based recipes.

Training on Millet Processing and Value Addition

Beyond awareness generation, the KVK conducted skill-oriented training programmes for interested tribal women farmers of the FPO during June 2022, focusing on millet processing, value addition, and enterprise development. The training covered primary processing, preparation of value-added millet products, market opportunities, and

government support schemes for establishing small-scale processing units, with the aim of promoting entrepreneurship and improving household income.

Partnership with other agencies

The initiative was implemented through a collaborative partnership involving the KVK, the Kashimnagar Farmer Producer Organisation, and public and private stakeholders. The KVK facilitated farmer mobilisation, planning, seed distribution, capacity building, field monitoring, and technical guidance, while the FPO coordinated farmers and collaborated with partner agencies for certification, digital documentation, and market linkage (Table 1). The specific roles of each partner are presented below.

Table 1: The KVK's partnership with other stakeholders

Organisation	Nature of support
National Bank for Agriculture and Rural Development (NABARD)	Financial support to Kashimnagar FPO
Agricultural and Processed Food Products Export Development Authority (APEDA)	Export development authority to export the Sorghum produce
ICAR-Indian Institute for Millet Research (IIMR)	Provision of seeds of improved sorghum variety (CSV-15) and provision of technical support whenever needed
e-Fresh Agribusiness solutions private Ltd.	Assisted in certifying the FPO for meeting INDGAP standards and Market linkage
CarbonMint	Digitalization support for marketing of produce in premium markets.



Awareness Generation on Nutritional Value of Millets through Millet-based Receipe Contest at NagammaThanda



Farmers Participating in a Group Discussion on APEDA Registration and Marketing Strategies.



Field View of Sorghum (CSV 15) Cultivated at Ranipet Thanda, Wanaparthy.



Technical Field Inspection by KVK Experts



Sorghum Crop Harvest



Sorghum Produce Obtained under the Certification Programme.



TQ Cert Inspection Team Meeting with Registered Farmers and FPO Directors



Filed Data Recording by Farmer in his Phone via Carbon Mint Application (Block Chain Technology)

CHALLENGES

Farmers were initially reluctant to replace the traditional local yellow sorghum variety, which had long been preferred for household consumption. Through a series of awareness programmes, exposure visits, and group discussions highlighting the higher yield potential and enhanced nutritional value (rich in iron and zinc) of the improved variety (CSV 15), farmers agreed to experiment with the new variety, which subsequently gained acceptance based on its performance.

Farmers initially perceived INDGAP practices, particularly safe chemical handling, scientific spraying, farmer health and safety, and IPM, as complex and time-consuming. Through field demonstrations, hands-on training, and field guidance, their confidence gradually built, and adoption was encouraged.

A significant proportion of fields faced crop damage from wild boar and bird attacks, particularly during critical crop stages. To mitigate this, bio-acoustic deterrent methods were introduced, which showed partial effectiveness. In addition, farmers adopted traditional deterrent measures such as fixing coloured sarees, ribbons, noise-making devices, and cloth flags on sticks around fields. The combined use of modern and traditional methods helped reduce damage to a considerable extent.

BENEFITS AND IMPACT

A total of 32 sorghum farmers, covering 17.13 hectares, successfully obtained INDGAP certification by complying with all certification requirements, including pesticide residue analysis in accordance with FSSAI standards. In addition, the Kashimnagar FPO was registered with APEDA, enabling access to premium and potential export markets.

Adoption of GAP-based practices resulted in an average sorghum yield of 4.5 quintals per acre, compared to 1.0–1.5 quintals per acre under the traditional local variety and conventional practices. The use of high-quality improved seed (CSV 15) and adherence to INDGAP protocols, based on technical recommendations from ICAR–IIMR, Hyderabad and facilitated by the KVK, were key contributors to this yield enhancement. Timely technical support enabled farmers to effectively implement scientific crop management practices.

The combined effect of higher yields and improved market access led to a nearly 200% increase in productivity over previous practices. About 70% of the farmers were able to sell their produce at remunerative market prices, while

retaining a portion for household consumption. Driven by increased demand for millets and supportive government initiatives, farmers realised prices of ₹70–80 per kg, nearly double the earlier rates. This intervention significantly improved income security and food self-sufficiency, particularly for small and marginal tribal farmers.

SUSTAINABILITY AND SCALING UP

Leveraging FPOs as implementation platforms can strengthen the collective adoption of GAP, quality certification, digital traceability, and market linkages, ensuring long-term sustainability. In this initiative, INDGAP-certified farmers, APEDA registration, processing initiatives, and digital monitoring institutionalised the approach. The model can be replicated across crops and regions through FPO-based implementation, supported by digital literacy, market access, institutional capacity, policy support, and strong public–private partnerships

LESSONS LEARNT

- Leveraging FPOs as implementation platforms strengthens quality certification and market access: The FPO played a pivotal role in mobilising farmers, facilitating collective adoption of GAP, coordinating INDGAP certification, and strengthening market linkages. Collaboration among the KVK, NABARD, APEDA, ICAR–IIMR, eFresh, CarbonMint, and the FPO demonstrated that integrated value chain development requires coordinated efforts from multiple stakeholders.
- Trust-building is essential for farmer mobilisation and technology adoption: Initial resistance to adoption of improved varieties, GAP protocols, and documentation highlighted the importance of sustained engagement, peer learning, transparency, and field demonstrations. Farmer participation improved when they were actively involved in decision-making.
- Capacity Building is Key to Sustained Adoption: One-time trainings were insufficient. Regular field visits, follow-ups, refresher trainings, and digital advisories were critical for sustaining GAP and INDGAP adoption.
- Certification requires dedicated resources: INDGAP certification strengthened market credibility but demanded systematic planning, trained manpower, digital systems, and financial support for documentation, audits, and renewal.
- Market linkage planning should start early: Market access takes time due to price negotiations, volume commitments, and quality consistency requirements. Early buyer identification, volume planning, and formal arrangements are essential for smooth value chain operations

CONCLUSION

The pilot initiative in the Kashimnagar village cluster demonstrated that leveraging the Farmer Producer Organisation (FPO) as the implementation platform, combined with good agricultural practices through INDGAP certification, can significantly enhance productivity, market access, and farmer income. Through multi-stakeholder collaboration, regular capacity building, and digital interventions, the project addressed key challenges of low productivity, pest incidence, and limited market linkages.

Farmers achieved a threefold increase in yield, higher price realisation, and greater awareness of quality certification, value addition, and digital record-keeping. Women farmers also strengthened their livelihoods through training in millet processing and enterprise development.

The experience demonstrates that FPOs can serve as effective institutional platforms for scaling quality-assured production, certification, and market linkages. With appropriate technical support, partnerships, and policy backing, this model can be replicated across crops and regions to improve the livelihoods of smallholder and tribal farmers.

Acknowledgements: The authors thank the Honourable Chairman of YFA-KVK, Mahabubnagar-I and Honourable Director of ICAR-ATARI-Zone-X, Hyderabad for their constant guidance and support in undertaking this initiative on strengthening FPOs through Good Agricultural Practices (GAP). The cooperation of the Kashimnagar FPO director, members, and field stakeholders is gratefully acknowledged.

Authors



G. Bhavani
Subject Matter Specialist (Agricultural Extension)
YFA-KVK Wanaparthy
bhavanig0712@gmail.com



V. Rajendra Kumar
Sr. Scientist and Head(i/c).
YFA-KVK Wanaparthy
vrajendra69@gmail.com



R.Anitha
Subject Matter Specialist (Home Science)
YFA-KVK Wanaparthy
rondlaanitha@gmail.com

ICAR-KVK Lam, Guntur, Andhra Pradesh

Enhancing Preschool Nutrition with Millets: A Community-Based Intervention

In this Good Practice Note, M Deepa and M. Yugandhar Kumar share their experience of promoting the nutrition status of preschool children in Guntur.

CONTEXT

Malnutrition among preschool children remained a significant public health concern in Guntur District of Andhra Pradesh, particularly in rural farming communities where small and marginal farm families depended on seasonal agricultural income. The primary beneficiaries were preschool children (3–6 years), their mothers and caregivers attending Anganwadi Centres under the Integrated Child Development Services (ICDS). Growth monitoring records indicated persistent mild and moderate undernutrition due to poor dietary diversity, limited nutrition awareness among caregivers and inadequate consumption of nutrient-rich foods. Although supplementary nutrition was available through ICDS, millet-based foods were rarely prepared at the household level because mothers lacked the knowledge, skills and confidence to develop child-friendly millet recipes. Conventional classroom-based nutrition education and routine health advisories had limited impact on sustained dietary behaviour change.

Considering the increasing burden of childhood malnutrition and the local availability of nutritious millets, the KVK,functioning under Sri Venkateswara Veterinary University initiated a participatory extension

intervention in 2021, involving ICDS, Anganwadi workers, health personnel and mothers to promote sustainable household adoption of millet-based nutrition practices.

GOOD PRACTICES

Participatory Situation Analysis and Nutritional Diagnosis

KVK conducted a participatory baseline assessment during June 2021 to identify the nutritional status of preschool children and understand the underlying causes of malnutrition. Growth monitoring records from Anganwadi Centres were reviewed in collaboration with ICDS staff. Household visits, 24-hour dietary recall surveys, focus group discussions with mothers and consultations with Anganwadi workers and medical personnel were conducted to identify dietary gaps, feeding practices and locally available food resources. The findings were jointly analysed to prioritise children requiring intervention and to design need-based extension strategies.

Behaviour Change Nutrition Education

Interactive nutrition education programmes were organised to improve mothers' knowledge of child nutrition, balanced diets and the nutritional benefits of millets. it was planned every fortnight for a period of six months begining from July 2021 to December 2021.

Training sessions were conducted at Anganwadi Centres using flip charts, locally available food samples and interactive discussions. Mothers were encouraged to share their feeding practices, discuss barriers to healthy diets and identify affordable solutions using locally available foods. The emphasis was on dialogue, practical learning and behaviour change rather than one-way information delivery.

Mother-led Millet Recipe Development and Cooking Demonstrations

Hands-on cooking demonstrations were organised during September 2021 in which mothers prepared millet-based recipes suitable for preschool children.

Using locally available ingredients, KVK scientists demonstrated the preparation of ragi and jowar laddus, explaining ingredient proportions, hygiene practices and nutrient retention. Mothers prepared the recipes themselves in small groups, followed by tasting sessions and discussions on improving taste, texture and acceptability. Recipe leaflets were distributed, and follow-up visits encouraged regular household preparation.



Identifying the Gaps – Interaction of Programme Coordinator with Women

Institutional Convergence with ICDS and Health Functionaries

KVK established institutional collaboration with ICDS, Anganwadi Centres and local health personnel to ensure coordinated implementation and monitoring during the interventation period 2021.

Roles and responsibilities were jointly defined for beneficiary identification, nutrition education, growth monitoring, recipe demonstrations and follow-up. Regular review meetings, field visits and information sharing among partner institutions ensured timely support, improved coordination and strengthened community participation throughout the intervention.

Continuous Handholding, Follow-up and Motivation

Continuous follow-up and personalised support were provided to sustain millet-based feeding practices among participating families. KVK scientists conducted regular home visits, counselling sessions and interactions with mothers and Anganwadi workers to monitor adoption, resolve practical difficulties and reinforce recommended feeding practices. Child growth records were periodically reviewed, and positive outcomes and success stories were shared during community meetings to motivate other families.

CHALLENGES

The intervention encountered several implementation challenges during its initial phase. Many mothers were hesitant to introduce millet-based foods due to limited awareness of their nutritional benefits and concerns about children's acceptance. Preschool children were unfamiliar with the taste and texture of millet preparations, resulting in initial reluctance to consume them. Limited household knowledge on preparing child-friendly millet recipes further constrained adoption. Coordinating activities among ICDS functionaries, Anganwadi workers, health personnel and beneficiary families also required continuous effort.

To address these challenges, KVK adopted a flexible and participatory approach. Repeated nutrition education sessions, hands-on cooking demonstrations, tasting sessions and personalised counselling helped mothers understand the nutritional importance of millets and develop confidence in preparing acceptable recipes. Community leaders, Anganwadi workers, and medical personnel actively encouraged beneficiary participation, thereby strengthening community trust and improving programme ownership. Regular home visits, growth monitoring and feedback meetings enabled the team to identify household-specific constraints and modify extension strategies accordingly. The shift from one-way awareness campaigns to continuous



Interaction with Mothers

mentoring and experiential learning significantly improved adoption, demonstrating that sustained handholding is essential for long-term behavioural change.

BENEFITS AND IMPACT

The intervention directly benefited 30 preschool children from four Anganwadi Centres in Guntur District in 21 and the same was replicated in another village during 2024-2025 benefitting 30 children. Growth monitoring indicated an approximately 15% improvement in the nutritional status of participating children, while about 85% of the children accepted millet laddus as a supplementary food. Mothers acquired practical knowledge and skills to prepare nutritious millet-based recipes using locally available ingredients, thereby improving household dietary diversity and feeding practices.

The intervention also enhanced Anganwadi workers' capacity to deliver participatory nutrition education and to monitor child growth more effectively. Collaboration among KVK, ICDS and health personnel strengthened institutional convergence, improved service delivery and promoted community participation. Beyond the immediate nutritional gains, the programme brought about positive behavioural changes among caregivers, increased awareness of the nutritional value of millets and encouraged regular inclusion of millet-based foods in family diets. The experience demonstrated that participatory extension approaches can generate sustainable improvements in child nutrition and strengthen community ownership of nutrition interventions.

SUSTAINABILITY AND SCALING UP

The intervention has strong potential for long-term sustainability because it is based on locally available millets, low-cost food preparation techniques and active community participation. Mothers have acquired practical skills and confidence to continue preparing millet-based foods independently, reducing dependence on external support. Institutional collaboration among KVK, ICDS, Anganwadi Centres and health personnel has strengthened local capacity to sustain nutrition education and growth monitoring as part of routine activities.

The approach is highly replicable in other Anganwadi Centres and rural communities with similar nutritional challenges. Successful scaling requires capacity building for frontline workers, standardised training materials, continuous mentoring, and regular monitoring of children's growth. Integrating millet promotion into ICDS and other community nutrition programmes, supported by convergence among the agriculture, health, and women and child development departments, can further enhance outreach, sustainability, and long-term nutritional impact.



Promoting Millets Recipes

LESSONS LEARNED

The intervention demonstrated that participatory extension is more effective than conventional awareness campaigns in achieving sustainable behavioural change. Active involvement of mothers in problem identification, recipe preparation, tasting sessions and follow-up significantly improved confidence, ownership and adoption of recommended nutrition practices. Continuous hand-holding, regular counselling, and strong institutional convergence among KVK, ICDS, and health personnel were critical factors contributing to the programme's success.

Future interventions should strengthen baseline documentation, organis periodic nutritional assessments, engage community champions and experienced mothers as peer educators, and use digital communication tools to reinforce key nutrition messages. The experience highlights that locally available millets can serve as an effective and sustainable solution for improving child nutrition when scientific knowledge is combined with participatory extension methods, continuous mentoring and community ownership.

Acknowledgements: The authors sincerely acknowledge Dr. J. V. Ramana, Vice-Chancellor, Sri Venkateswara Veterinary University (SVVU), for his constant encouragement and institutional support. The authors also express their gratitude to Dr. Shaik N. Meera, Director, ICAR–ATARI, and all the staff of ICAR–ATARI, Hyderabad, for their valuable guidance and facilitation. The authors gratefully acknowledge the cooperation and support extended by all concerned field staff.

Authors



M. Deepa
Subject Matter Specialist (Home Science)
KVK Guntur
deepanarayanam@gmail.com



M. Yugandhar Kumar
Programme Coordinator
KVK Guntur
kvkguntur@yahoo.com

ICAR-KVK Thoothukudi, Tamil Nadu

Empowering a Farmer Producer Company for Sustainable Growth

In this good practice note, V. Palanichamy, S. Sumathi, and T. Masanaselvam discuss how the KVK Thoothukudi facilitated the formation and strengthening of an FPC which is currently promoting sustainable growth in the district.

CONTEXT

Small-scale banana farmers in Thoothukudi District have been facing persistent challenges in achieving higher production, productivity, and income, especially among small and marginal farmers. Although banana-based farming systems are prevalent, value addition remains in its nascent stage, limiting opportunities to enhance income. Farmers also lack strong institutional support and adequate technical guidance for improving production and marketing practices. In addition, water scarcity during non-monsoon seasons poses a major constraint, adversely affecting yield and quality. Farmers had limited awareness and adoption of modern irrigation methods, particularly drip irrigation, resulting in lower yields and inefficient use of scarce water resources. Most farmers depended on intermediaries for marketing, leading to lower prices for their produce. Additionally, there was limited awareness of value-addition opportunities, particularly the use of banana pseudostem for fibre extraction and handicraft production. Traditional approaches, largely based on individual efforts, have been insufficient due to limited access to credit, weak market linkages, and the absence of collective enterprise development.

The KVK Thoothukudi, functioning under Social Change and Development (SCAD), organised farmers by facilitating the formation of the Perunthalaivar Vazhai Farmer Producer Company Limited (PVFPCL) in February 2017, with financial support from National Bank for Agriculture and Rural Development (NABARD). Though it created a strong foundation, continuous capacity building, technical support, and business guidance remain essential. The KVK worked towards strengthening the FPC, promoting value addition, and diversifying its product portfolio beyond banana by processing millets.

GOOD PRACTICES

Facilitating the formation of FPC

The KVK played a catalytic role in facilitating the formation of PVFPCL by mobilising small and marginal banana farmers into organised groups and building their awareness on the benefits of collective action. The KVK conducted a series of sensitisation meetings, exposure visits and stakeholder consultations to promote the concept of a Farmer Producer Company (FPC) and to build trust among farmers. It provided continuous hand-holding support for legal registration, documentation, and compliance processes, with financial assistance from NABARD. Further, the KVK strengthened the institutional framework by developing leadership among members, establishing governance structures, and providing training in business planning and financial management. This systematic facilitation enabled the transition from fragmented individual farming to a structured collective enterprise, laying a strong foundation for improved access to inputs, stronger market linkages, and enhanced income opportunities for banana farmers in Thoothukudi District.

Promotion of Micro Irrigation System

In 2017, the KVK initiated efforts to promote adoption of drip irrigation among banana farmers to ensure year-round water availability for banana cultivation. It facilitated the installation and guided the FPC in signing an MoU with Jain Irrigation Systems, accessing subsidies from the Department of Horticulture, and installing drip irrigation systems in farmers' fields. The initiative began with 15 acres under drip irrigation and, through sustained efforts and continuous farmer engagement, expanded to 822 hectares by 2024.



Promoting Drip Irrigation System in Field

Further, PVFPCL members were encouraged to take up the supply, repair, and maintenance of drip irrigation components through regular field visits, thereby creating an additional revenue stream of about ₹1.5 lakh per month for the company and strengthening both farm productivity and enterprise sustainability.

Skill development on value addition in banana fibre

Rising unemployment in rural areas, particularly among women, has created an urgent need to generate local livelihood opportunities and additional income sources. In this context, banana fibre emerged as a promising resource for integrated rural development, offering scope for value addition and enterprise creation. Recognising the vast potential of banana cultivation spread across nearly 9,300 hectares in Thoothukudi District, the KVK initiated skill development interventions with financial support from NABARD.

As part of this effort, 25 women members were trained during 2017–2018 to produce value-added handicraft items using banana fibre. The training was conducted by Banana Green Craft, a specialised banana fibre craft enterprise based in Madurai. The trained women have continued these activities, transforming an underutilised agricultural by-product into a sustainable source of income and livelihood.



Banana Fibre Making Unit of PVFPCL

Skill development training for PVFPCL Members

In 2017, KVK initiated the process by organising vocational and skill-based training lasting 3 to 15 days to build the capacities of PVFPCL members. Subsequently, financial support of ₹8 lakhs was mobilised through Tamil Nadu Rural Transformation Project (TNRTP) to enable the FPC to procure the necessary machinery for banana fibre extraction. With the infrastructure in place, members were supported in sourcing banana pseudostem at pre-determined prices from local farmers, ensuring a consistent supply of raw material.

Facilitating market linkages

To strengthen market linkages, the products were connected with Ramesh Flowers, a leading exporter of dry flowers and handicrafts based in Thoothukudi District. In addition, the banana fibre handicrafts were promoted through participation in exhibitions at local, district, regional, and national levels. Throughout the intervention, KVK provided continuous monitoring and evaluation to ensure the sustainability and growth of these entrepreneurial activities.

Product Diversification to Millets

The KVK organised skill and vocational training programmes on the preparation of millet-based nutrimix, enabling members of PVFPCL to develop value-added products from minor millets. With financial support from ICAR–ATARI Hyderabad, the group launched the brand Surabi Nutrimix and obtained the required FSSAI license for marketing. Through strategic partnerships with Women Self-Help Groups (WSHGs) and Farmer Producer Organisations (FPOs), SCAD KVK successfully promoted and facilitated the expansion of the product's production, distribution and marketing network across Thoothukudi District and neighbouring areas, thereby enhancing its reach and adoption among consumers.

Building on its earlier success, PVFPCL launched the millet-based nutrimix brand KING MAKER in 2023 with support from the Tamil Nadu Rural Transformation Project (TNRTP). Currently, the organisation has the capacity to produce up to 1,000 kg of millet nutrimix per month. SCAD KVK continues to provide technical guidance, product development support, and market advisory services to strengthen the enterprise, promote product diversification, and ensure its long-term sustainability.

CHALLENGES

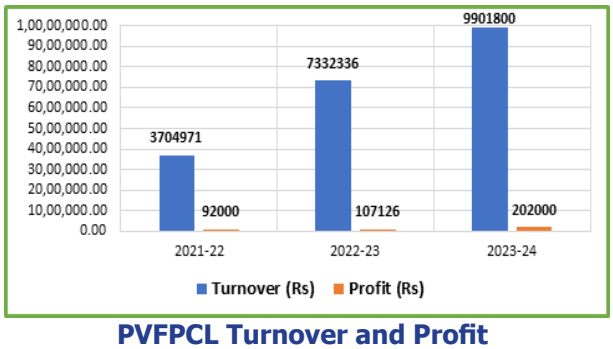
The implementation of interventions in PVFPCL faced several challenges during initial years. Farmers were hesitant to adopt new practices such as drip irrigation and value addition due to limited awareness and risk perception. Technical difficulties in installation, maintenance, and processing activities, along with resource constraints such as limited funding and delays in accessing financial support, further slowed progress. Institutional barriers, including complex registration procedures and documentation requirements, compounded the difficulties, while environmental factors, such as water scarcity in Thoothukudi District, affected productivity.

The KVK addressed these challenges through phased implementation, continuous technical support and intensive capacity building. Farmer resistance gradually decreased through building trust and providing practical exposure. Resource constraints were managed by mobilising funds and leveraging support from NABARD and Tamil Nadu Rural Transformation Project (TNRTP). Market-related challenges were overcome through partnerships with Ramesh Flowers, improving market access and price realisation. Initial attempts at rapid scaling were unsuccessful, prompting a course correction through gradual expansion and continuous hand-holding. In addition to promoting banana fibre-based enterprises, the KVK facilitated several service-oriented livelihood activities, including drip irrigation installation and maintenance, custom hiring of farm machinery, input supply, post-harvest handling, and fibre extraction. These interventions generated additional income opportunities for FPO members while strengthening the enterprise's overall sustainability and resilience.

BENEFITS AND IMPACT

Under the guidance and continuous support of the KVK, the PVFPCL has achieved significant economic and social impact. Membership has grown to 1,072 farmers, reflecting strong adoption and institutional strengthening. The promotion of drip irrigation in Thoothukudi District has resulted in 50% savings in irrigation water and a 20–25% increase in yield and income. A total of 2,005 farmers have adopted drip irrigation across 822 hectares, demonstrating large-scale technology adoption and improved resource use efficiency. Economic benefits were further enhanced through value addition and enterprise development, including ₹8 lakhs mobilised through the Tamil Nadu Rural Transformation Project for banana fibre extraction units and strengthened market linkages with Ramesh Flowers.

Additionally, PVFPCL members are now producing up to 1,000 kg of millet-based nutrimix per month, supporting livelihood diversification and income generation. Socially, the initiative has empowered farmers—especially women—through skill development, enhanced confidence, and active participation in enterprise activities. Environmentally, improved water use efficiency has contributed to sustainability. While short-term gains include higher productivity and income, long-term impacts are evident in stronger farmer institutions, sustainable enterprises, and improved resilience. The benefits have also extended beyond direct members, encouraging wider adoption and contributing to overall agricultural development in the region.



PVFPCL Turnover and Profit

SUSTAINABILITY AND SCALING UP

To ensure the long-term sustainability of the PVFPCL, the KVK provides continuous technical guidance through regular field visits, advisory services and capacity-building programmes. Members are encouraged to strengthen and expand their enterprises through skill development, the promotion of entrepreneurship, and regular mentoring.

Financial sustainability has been enhanced through diversified income-generating activities such as banana fibre products, nutrimix production, fibre extraction services, drip irrigation installation and maintenance, custom hiring of farm machinery, input supply and post-harvest handling services. These enterprises are supported through institutional and financial linkages with the NABARD and the TNRTP.

The model has strong potential for replication in other regions due to its farmer-led approach, active participation of women, enterprise diversification and established market linkages. Continued adoption of technologies and business models by members, along with integration of these activities into regular KVK programmes, ensures institutional support, wider outreach and long-term sustainability.



PVFPCL Receiving Green Award from State Family Welfare Minister

LESSONS LEARNED

1. Strong market linkages through Public–Private Partnership (PPP) models can improve business prospects.
2. Structured advertising and promotional activities are essential for improving market access, increasing product visibility, and expanding sales opportunities for farmer-owned enterprises.
3. Distribution of value-added products through bank branches and post offices can increase product reach and visibility.
4. Stronger branding and early market positioning are critical for the success of an enterprise. At the same time, market intelligence and demand analysis are also required.
5. Improved coordination among stakeholders and institutional convergence can offer diverse support to entrepreneurs
6. Farmers need capacities on value chain development and marketing, and this highlights the importance of market-oriented extension approaches.

CONCLUSION

The KVK has played a pivotal role in the successful organisation and promotion of PVFPCL by leveraging their extensive field-level experience, deep understanding of local farming systems, and strong, trust-based relationships with farmers. Their ability to coordinate multiple agencies on a common platform has facilitated collective action and the effective implementation of initiatives. At the same time, proactive and collaborative support from various stakeholders, combined with the KVK's mature leadership, has been critical in advancing the enterprise for the economic and social upliftment of farmer producers. Today, members of PVFPCL actively support and motivate their Board of Directors to explore new business avenues and are eagerly anticipating the day when they can market value-added banana products under their own brand, reflecting growing ownership, confidence, and aspiration within the group.

Acknowledgements: The authors express their sincere gratitude to Dr S. Cletus Babu, Chairman, KVK Thoothukudi, for his continuous guidance, encouragement, and institutional support. The authors also acknowledge Dr Shaik N. Meera, Director, ICAR–ATARI, Zone-X, Hyderabad, for extending financial assistance under the Impactful Interventions programme towards promoting agri-entrepreneurship and rural enterprises for sustainable livelihoods.

Authors



V. Palanichamy
Senior Scientist and Head
KVK Thoothukudi
pcscadkvk@gmail.com



S. Sumathi
Subject Matter Specialist (Home Science)
KVK Thoothukudi
sumathikvk2025@gmail.com



T. Masanaselvam
Subject Matter Specialist (Agricultural Extension)
KVK Thoothukudi
dr.t.masanaselvam@gmail.com

ICAR-KVK Utukur, YSR Kadapa, Andhra Pradesh

Crafting Value, Building Careers: KVK Utukur's Entrepreneurship Blueprint for YSR Kadapa District

In this good practice note, S. Prasanthi, K. Ankaiah Kumar, A. Veeraiah, and Genikala Sivanarayana discuss their efforts to transform the lives of SHG women through entrepreneurship development in YSR Kadapa District.

CONTEXT

In Kadapa district, smallholder farmers, self-help groups, unemployed youth, and emerging entrepreneurs are progressively adopting millet cultivation and value addition due to growing consumer demand, government incentives, favourable red and lateritic soils, and reduced input costs. The millet area expanded rapidly from 12,000 acres in 2023 to 23,227 acres in early 2024, highlighting strong growth potential in this drought-prone Rayalaseema region, where millets thrive under limited and erratic rainfall. However, millet value addition remains constrained by technical, processing, and market challenges. Existing de-hulling machines have low grain recovery (70–80%), reducing profitability, while developing 100% millet products with acceptable taste and texture remains difficult due to the absence of gluten. Market access is limited by multiple intermediaries, resulting in low price realisation and higher retail prices, which restrict affordability for low-income consumers. Hence, since 2010, KVK Utukur functioning under Acharya N. G. Ranga Agricultural University (ANGRAU) has introduced vocational training and entrepreneurship development programs to build skills, establish processing units, and strengthen the millet value chain.

GOOD PRACTICES

Leveraging SHGs

The KVK leveraged the strong network of women Self Help Groups (SHGs) in the district to integrate entrepreneurship into their livelihood activities. Though women have been contributing substantially to agriculture, they had limited access to economic opportunities. Focus Group Discussions FGDs were conducted with the SHG members to assess their livelihood status and skill requirements.

Skill Development in the processing units

To bridge skill and infrastructure gaps, the KVK established primary and secondary millet processing units in 2010 with support from the Rastriya Krishi Vikas Yojana (RKVY) and the Power Grid Corporation Ltd (PGCL). The KVK organised 180 skill development programmes and trained 6050 SHG members, combining technical training with practical exposure to ensure readiness for enterprise establishment.

Financial support for these capacity-building training programmes was provided by National Bank for Agriculture and Rural Development (NABARD), Sakshar Bharat, PGCL, and Mission for Elimination of Poverty in Municipal Areas (MEPMA). These trainings enabled participants to acquire hands-on skills in millet value addition and enterprise management. Close coordination with the Municipal administration, Urban and Rural Development departments ensured the effective mobilisation of SHG women.

End-to-End Handholding for Enterprise Establishment

The KVK provided comprehensive handholding from training to enterprise establishment. Support included assistance in FSSAI licensing, equipment procurement, and unit setup. Market access was strengthened through collaboration with the district administration to establish sales outlets at Rythu Bazaars, the Collectorate, and RIMS Hospital, Kadapa. Continuous mentoring, participation in exhibitions and Kisan melas, and distribution of practical literature ensured sustained technical and business support, enhancing enterprise viability.

Support for Product Diversification

KVK supported product diversification by developing and standardising 44 value-added products from millets and allied commodities. Technical guidance on processing, quality control, packaging, and product diversification enabled entrepreneurs to respond to market demand and improve profitability. This practice encouraged innovation, reduced market risk, and expanded income opportunities for women and youth.

Demonstration of Scalable Agripreneurship Models

Successful women-led processing units established in Kadapa and Proddatur, along with bakery units and retail stalls, enabled 50 women to achieve financial independence. Farmer-turned-entrepreneurs supported by the KVK demonstrated scalable enterprise models, inspiring wider adoption. These role models strengthened confidence among prospective entrepreneurs and accelerated the spread of agripreneurship in the district.



Dhall Machine Installed at FPC Velluru/ Dhal Processing

CHALLENGES

As the initial value-addition training was largely targeted towards women, many male farmers and farmer groups perceived these enterprises as domestic or non-farm activities meant exclusively for women. This social stigma led to low participation among marginal and small farmers, despite the visible success of enterprises such as Ample Foods and Kothas Agro Foods. Changing this deeply ingrained mindset became critical for scaling agri-preneurship in the district.

Another challenge was farmers' reluctance to invest in value addition due to uncertainty about profitability and fear of financial risk. Limited exposure to processing technologies, lack of confidence in market viability, and dependence on intermediaries further discouraged farmers from adopting enterprise-oriented approaches. In addition, the lack of affordable processing facilities limited experimentation and learning, making it difficult for farmers to see value addition as a feasible extension of farming.

The KVK adopted several measures to address these challenges. For instance, training sessions were redesigned to encourage gender-neutral participation and to actively mobilise male farmers, rural youth, and members of Farmer Producer Organisations. The curriculum was reframed from a food-preparation focus to a farmer-centric enterprise model, and its duration was extended from two to six days. New modules included mechanised processing, branding, packaging, labelling, cost calculation, risk management, market strategies, and preparation of detailed project reports, which helped reposition value addition as a business opportunity rather than a household activity.

To address risk aversion, KVK operationalised an incubation approach by allowing farmers to use existing processing machinery at nominal cost. This hands-on exposure enabled farmers to process their own produce, analyse profit–loss outcomes, and realise additional benefits such as retaining by-products for fodder and soil enrichment. Further, start-up support in the form of machinery and equipment was provided through convergence with the Attracting and Retaining Youth in Agriculture (ARYA), Schedule Cast sub-plan, and Biotech Kisan Hub schemes.

These course corrections gradually shifted farmer perceptions. Early adopters emerged as local role models, building confidence among peers. What began as resistance evolved into farmer-led participation, thereby strengthening the sustainability and scalability of value-addition initiatives in the district.



Hands on Traning for Women SHG Members

BENEFITS AND IMPACT

The value addition and agripreneurship interventions led to significant economic, social, and institutional benefits for farmers and rural communities in Kadapa district (Box 1). More than 5,000 farmers, SHG members, rural youth, and start-up entrepreneurs enhanced their technical and entrepreneurial skills through structured training and incubation support. Establishment of women-led and farmer-led processing units resulted in diversified income streams, with participating entrepreneurs reporting two- to three-fold increases in net income compared to primary production alone. Over 50 women achieved financial independence through millet processing units and market outlets at Rythu Bazaars and public institutions.

Box 1: 3 Successful cases

Sri Bhagavan Foods: Led by the late Mrs Bandi Hymavathi, scaled millet snack production to ₹5,00,000 in monthly turnover. The business provided a vital financial safety net for the family following the owner's passing, proving the long-term resilience of the business model.

Valluru FPC: led by CEO Mrs M. Gangeswari, utilised equipment support under ARYA and Biotech Kisan Hub projects. Their key achievement was reaching a production volume of 12,000 kg per year, securing annual net returns of ₹2,04,000. This case highlights how targeted equipment provision can rapidly boost an FPO's profitability.

Millet Snacks: Mr Mahesh, an IT professional who entered the agricultural value chain during the COVID-19 pandemic. His venture "Millet Snacks" successfully tapped into the market demand for healthy alternatives to fried snacks. He now earns a steady monthly income of ₹40,000–₹60,000, demonstrating that food processing is a viable career option for educated youth.



Dal and Millet Processing Units for Agripreneurship

Qualitatively, the initiative strengthened community organisation, improved confidence among marginal farmers, and reduced gender-based stigma around food enterprises through inclusive participation. Environmentally, promotion of millets supported climate-resilient farming in drought-prone areas and encouraged sustainable resource use. Institutionally, linkages among KVK, SHGs, FPOs, the district administration, and funding agencies were strengthened, thereby improving service delivery and market access.

In the short term, incubation support enabled rapid enterprise start-up. In contrast, in the long term, farmer-led replication and functioning FPCs indicate sustainable adoption and spillover effects across the district.

SUSTAINABILITY AND SCALING UP

The agripreneurship and value addition initiatives supported by the KVK demonstrate strong potential

for long-term sustainability and scalability. Financial sustainability is ensured through viable revenue models based on value-added product sales, low-cost incubation support, and convergence with schemes such as ARYA, SCSP, and Biotech Kisan Hub, reducing dependence on external funding. Institutional sustainability is strengthened through local ownership with SHGs, FPOs, and individual entrepreneurs independently managing processing units and market linkages, while KVK continues as a technical backstopping agency. Social acceptance has increased due to gender-inclusive participation and visible role models, reinforcing community confidence. The model is highly replicable in other millet-growing regions, provided that basic processing infrastructure, skill training, and market access are in place.

LESSONS LEARNED

- To promote rural enterprises, one-time training is insufficient—sustained handholding and continuous technical backstopping can only lead to meaningful adoption.
- Practical exposure and enterprise-oriented learning are more effective than theory-based interventions.
- Long-term extension support is key to building confidence, entrepreneurship, and sustainable rural development.

CONCLUSION

The program successfully demonstrated that structured extension support, combined with capacity building, incubation, and market linkages, can effectively transform traditional farmers into confident agripreneurs. By promoting millet-based value addition and inclusive participation of women, youth, and marginal farmers, the initiative enhanced income, employment, and resilience in a drought-prone region. Beyond economic gains, the program fostered mindset change, strengthened local institutions, and encouraged climate-resilient agriculture. The experience highlights the potential of Krishi Vigyan Kendras as catalysts for rural entrepreneurship. It demonstrates a scalable, sustainable pathway for livelihood diversification and agrarian transformation in similar agro-ecological contexts.

Acknowledgements: The authors gratefully acknowledge Acharya N.G. Ranga Agricultural University, Guntur, and KVK Utukur, for institutional support. They sincerely thank the Hon'ble Vice-Chancellor Dr Prof. S. Sarda Devi for guidance and administrative support, and acknowledge Dr Sumathi, Associate Director of Research (ADR), RARS Tirupati, for her encouragement. Special thanks are extended to Mrs Swarnalatha, Research Associate (Home Science), for her dedication to field implementation and training activities.

Authors



S. Prasanthi
Subject Matter Specialist (Home Science)
KVK Utukur
s.prasanthi@angrau.ac.in



K. Anakaiah Kumar
Programme Coordinator
KVK Utukur
k.ankaiahkumar@angrau.ac.in



A. Veeraiah
Professor
Department of Extension, Agricultural College, Mahanadi
a.veeraiah@angrau.ac.in



Genikala Sivanarayana
Director of Extension (i/c)
Acharya N.G. Ranga Agricultural University
g.sivanarayana@angrau.ac.in

ICAR-KVK Anakapalli, Andhra Pradesh

Turning Abundance into Advantage: A Livelihood-Centric Approach to Jackfruit Value Addition in Visakhapatnam

In this good practice note, Ragjni, Sailaja, and Divya Sudha discuss the interventions by the KVK, to promote value addition of jackfruit as a sustainable income-generation activity for the tribal women of Alluri Sita Ramaraju district.

CONTEXT

Small-scale tribal women farmers in the Visakha agency area of South India were facing low income and high post-harvest losses due to the underutilization of jackfruit, a locally abundant forest fruit. Although jackfruit production in the Chintapalli region is estimated at 20,000–22,000 metric tons annually, only 15–20% of the produce reaches urban markets, with the remainder wasted or consumed locally without any value addition.

The farmers mainly relied on traditional selling of raw jackfruit in nearby markets and shandies. Traders purchased the fruit from farmers at a low price of Rs 10–15 per fruit and sold it in urban markets for Rs 50–100, resulting in low-income realisation for the primary producers. The absence of processing units, poor storage facilities, limited market linkages, and lack of technical knowledge prevented farmers, especially tribal women, from converting jackfruit into value-added products.

Traditional extension approaches that focus only on demonstrations and training in cultivation aspects are

inadequate, as they do not address post-harvest losses, product diversification, skill development, and entrepreneurship. The challenge required innovative extension interventions to empower tribal women through value addition, enhance income, and improve livelihood resilience. Therefore,the KVK funcationing under Bhagavatula Charitable Trust (BCT) decided to promote jackfruit value addition among tribal women, SHGs, and Farmer Producer Organisations in the Visakhapatnam district to support value addition in jackfruit.

GOOD PRACTICES

Pre-intervention assessment through group discussions

In May 2016, the KVK conducted a series of group discussions across the Chintapalli, G.K. Veedhi, G. Madugula, and Paderu mandals to assess jackfruit availability, seasonality, traditional uses, and awareness of value addition. The exercise helped identify production gaps, post-harvest losses, and community readiness. Based on the findings, villages such as Lambasingi, Tajangi, and Paderu were prioritised for their high jackfruit availability, market access, and tourism potential, ensuring a location-specific and demand-driven approach.

Training of Tribal Youth

In 2017, with support from Microsoft, the KVK implemented a structured training programme to build local capacity in jackfruit value addition. About 200 tribal youth were trained in processing techniques, hygiene, packaging, and basic business skills. The programme emphasised entrepreneurship and local employment generation, enabling efficient utilisation of surplus jackfruit and promoting livelihood diversification among tribal communities.



Training on Jackfruit Value Addition

Establishment of a Demonstration Unit at KVK

In 2017, with the financial support of ₹10 lakhs from Microsoft, a jackfruit processing unit, equipped with cutters, chip cutters, electric and solar dryers, and sealing machines, was established at the KVK campus to provide hands-on training in processing and value addition of Jackfruit. Hands-on training was provided in preparing jackfruit-based products such as chips, pickles, leather, and seed powder, as well as exposure to processing equipment, quality control, enterprise establishment, and market opportunities.

Establishment of & Decentralised Processing Units

In March 2018, Microsoft also supported the SHGs of Paderu in setting up 10 mini processing units, each equipped with cutters, utensils, and gas stoves, to strengthen community-level processing.

These decentralised units reduced transportation costs, enhanced local ownership, and facilitated the sustainable adoption of jackfruit value products such as Jackfruit pickle (200 kg), Chips (100 kg), and Leather (75 kg).

NGO Collaboration & Institutional Linkages

The SHGs have started earning a net income of Rs 25,000 during the jackfruit season (May-July) through value addition and processing, which has encouraged NGOs working with tribal communities to collaborate with the KVK (Table 1). These partnerships helped the KVK to expand outreach, mobilise resources, and strengthen its technical and organisational support. NGO involvement also facilitated community mobilisation and the scaling up of jackfruit value-addition activities across the region.

Table 1: Organisations that supported the KVK in this initiative

S. No.	Organization	Financial support (Rs)	Activity undertaken in Collaboration	No. of Participants
1.	GCC	2,00,000	5 Awareness programs 6 Skill trainings & Demonstrations	386
2.	Laya NGO	1,00,000	4 Skill trainings	129
3.	TechnoServe	75,000	3 Awareness programs & 2 skill trainings	172
4.	Girijana vikas	75,000	3 Awareness programs & 2 Skill trainings	189
5.	Lambasingi FPO	40,000	2 Awareness programs & 2 Skill trainings	146

Awareness on Nutrition & Livelihood Opportunities

KVK conducted 23 awareness programmes to sensitise communities on the nutritional importance of jackfruit and its income-generation potential. Programmes targeted men, women, and youth, promoting jackfruit as a nutrition-rich and livelihood-supporting resource. The use of the local language and participatory communication helped build acceptance and interest.

CHALLENGES

Initially, significant resistance and scepticism were observed among farmers and tribal women due to their limited knowledge of jackfruit value addition and fear of financial risk. Jackfruit was largely perceived as a seasonal subsistence food rather than a marketable commodity. This challenge was addressed through structured awareness programs, exposure visits, hands-on demonstrations, and sharing of success stories from progressive farmers and SHGs, which gradually reshaped mindsets and built confidence.

Technical and environmental challenges arose from the seasonal and highly perishable nature of jackfruit, which is available mainly from April to July. During the initial phase of the intervention by KVK's attempts focussed only on freshly harvested jackfruit, without preserving surplus produce. Consequently, production ceased at the end of the harvesting season, rendering the enterprise economically unviable. Course correction was made by introducing preservation technologies such as brining, dehydration, vacuum sealing, and freezer storage to extend the usability of raw materials beyond the harvest season. Cluster-based procurement and peak-season aggregation were promoted to ensure year-round continuity for processing units.

Logistical difficulties were prominent due to the remote, high-altitude tribal locations of jackfruit orchards, which were characterised by poor connectivity and high transportation costs. Centralised processing models faced limitations. This led to the establishment of decentralised mini-processing units and the strengthening of FPO-led aggregation systems, which reduced the transport burden and improved farm-to-market movement.



Providing Technical Guidance to the FPO

Additionally, low consumer awareness limited market demand. Strategic branding by Lambasingi FPO, improved packaging, digital marketing, and participation in exhibitions and food festivals were adopted to enhance visibility. Persistent engagement, partnerships, and adaptive learning transformed these challenges into opportunities, strengthening the sustainability and scalability of the jackfruit value-chain intervention.

BENEFITS AND IMPACT

Through 12 demonstrations and 12 skill development training sessions on jackfruit value addition, the KVK significantly enhanced incomes and livelihood opportunities in the Visakha agency area. Beneficiaries earned an additional ₹10,000–15,000 per season through collection, processing, and sale of jackfruit fruits and seeds. Nearly 45% of participants showed measurable improvement in knowledge, skills, and adoption levels. At the same time, 56 members adopted household-level preparation of value-added products and post-harvest storage techniques such as brining and freezing (BCT-KVK Baseline survey 2020). The initiative directly contributed to the development of one Farmer Producer Organisation (FPO), namely Lambasingi Tribal Products FPO-2021, one women entrepreneur (Desagiri Bangaramma), and several SHGs, all of which generate income through jackfruit processing.

Qualitatively, the intervention strengthened women's confidence, entrepreneurship, and collective action, thereby improving social cohesion and institutional capacity. The Lambasingi tribal products Farmer Producer Organisation, supported by the National Bank for Agriculture and Rural Development (NABARD), the Indian Council of Agricultural Research (ICAR) and the Indian Institute of Millets Research (IIMR), established a food processing unit and now produces jackfruit pickle, jam, chips, squash, and leather. Off-season sales to tourists using stored raw material ensured sustained income, demonstrating long-term livelihood resilience and spillover benefits in the region.

During April–June 2024, Lambasingi FPO processed 12,500 kg of jackfruit into pickle, jam, squash, chips, and leather, generating profits of ₹3,500–₹40,000 per product. The BCR ranged from 1.3 to 2.0, with jackfruit chips recording the highest profitability (BCR 2.0), confirming the economic viability of jackfruit value addition.

SUSTAINABILITY AND SCALING UP

The jackfruit value-addition interventions promoted by the KVK demonstrate strong potential for long-term sustainability and scalability. Financial sustainability is ensured through low-cost, locally available raw materials, diversified product portfolios, and assured seasonal markets,

particularly by leveraging demand generated by tourism, especially in the winter months. Institutional sustainability is strengthened by local ownership through SHGs, FPOs, and women entrepreneurs, with KVK gradually shifting from a lead role to a facilitative role. The technologies promoted are simple and affordable, requiring minimal maintenance, which supports technical and social sustainability. Environmentally, utilisation of surplus and underutilised jackfruit reduces wastage and enhances resource efficiency.

Post-project continuation is evident, with farmer-led enterprises independently operating and jackfruit value addition integrated into regular KVK training and NGO-supported livelihood programs.

The model is highly replicable in other tribal and jackfruit-growing regions, provided that prerequisites such as raw material mapping, access to basic processing infrastructure, credit linkages, and market support are in place.

Financial constraints among small and tribal farmers can be addressed by facilitating access to institutional credit and government subsidy schemes for purchasing processing equipment and covering operational expenses. Promoting collective investment models through SHGs, FPOs, and cooperatives can further enhance affordability, encourage enterprise development, and ensure the sustainability of jackfruit value-addition initiatives.

LESSONS LEARNED

1. Jackfruit is highly underutilised in the state, with value addition largely limited to small-scale household preparation of pickles and chips and negligible commercial processing.
2. Despite strong demand in urban and mainland markets, large quantities of jackfruit go to waste due to transportation challenges, poor handling, lack of awareness, and absence of organised value-addition facilities. Low availability of processed jackfruit products in local markets is driven more by limited producer interest and entrepreneurial support than by raw material scarcity.
3. Traditional household-level processing exists mainly for self-consumption, with minimal linkage to organised markets.
4. Weak supply chain management—covering storage, packaging, handling, transportation, and marketing—remains a major constraint and requires adoption of best practices.
5. Skill training alone is insufficient; sustained pre- and post-enterprise handholding is essential for successful transition from trainee to entrepreneur.
6. Promoting farmer-managed micro-processing units and nurturing local entrepreneurs are crictial to ensure that farmers realise the full benefits of jackfruit value addition.

For those who are keen to promote such enterprises, our advice is to start with participatory planning, adapt technologies to local scale, invest in post-establishment mentoring, and promote strong institutional partnerships for long-term success.

CONCLUSION

The jackfruit value-addition program successfully converted an underutilised local resource into a sustainable livelihood option for tribal communities. Through targeted training, continuous hand-holding, and institutional support, farmers—especially tribal women—adopted value-addition enterprises, reduced post-harvest losses, and improved incomes. The development of women-led enterprises, SHGs, and FPOs strengthened local value chains and built confidence in agri-entrepreneurship. The initiative offers a scalable and replicable model for promoting value addition of perishable crops in remote tribal areas through coordinated extension, market linkage, and institutional collaboration.

Acknowledgements: The authors sincerely thank Mr. B. Sri Ram Murty, Chairman BCT-KVK, Anakapalli for constant encouragement, valuable guidance, and unwavering support in the successful implementation of the program and Dr Shaik N. Meera, Director, ICAR-ATARI, Zone-X, Hyderabad, for facilitating the livelihood program under TSP funding at BCT-KVK, Anakapalli. They also express gratitude to Microsoft for supporting the Tribal Women Entrepreneur Development Programme through CSR initiatives, and to the Chairman, BCT-KVK.

Authors



G. S. Vijaya Ragjni
Subject Matter Specialist (Veterinary Science)
BCT-KVK Anakapalli
gragjni@gmail.com



Sailaja Kurra
Senior Scientist and Head
BCT-KVK Anakapalli
sailaja@bctindia.org



B. Divya Sudha
Programme Assistant (Home Science)
BCT-KVK Anakapalli
divyasudhaburada@gmail.com

ICAR-KVK Theni, Tamil Nadu

Promoting Agripreneurship for Value Addition in Theni

In this good practice note, P. Maheswaran and M. Ramyasivaselvi discuss interventions implemented to promote agri-entrepreneurship and rural enterprises in Theni.

CONTEXT

The Cumbum Valley in Theni District, Tamil Nadu, known as the "Grapes City of South India," is renowned for its GI-tagged Panneer Thiratchai (Muscat Hamburg) grape variety, cultivated over approximately 1,890 ha. Banana, the district's One District One Product (ODOP) crop, is cultivated on around 6,000 ha. Many small and marginal farmers, farm women, and Farmer Interest Groups (FIGs) depend on these crops for their income. However, during peak harvest season, both grapes and bananas face a steep decline in market price due to their high perishability, forcing farmers to sell their produce at distress prices (₹10–15/kg for grapes and ₹5–10/kg for bananas). Approximately 23% of grapes and 31% of bananas are wasted during peak harvest periods due to low market prices and inadequate post-harvest handling. Interactions with farmers revealed limited awareness of post-harvest management, value addition, processing, branding, and market linkages. As a result, farmers remain heavily dependent on intermediaries, which reduces profitability. To address these challenges, the KVK -Theni functioning under the Centre for Development and Communication Trust (CENDECT) implemented a value chain management strategy during 2023–24

and 2024–25, focusing on skill enhancement, enterprise development, and market diversification. This initiative empowered farmers and farm women as entrepreneurs, thereby enhancing their income, reducing post-harvest losses, and promoting sustainable livelihoods.

GOOD PRACTICES

Selection of Villages and Beneficiaries

The intervention targeted Appipatti (Chinnamanur Block) for grape value addition and Gullapuram (Periyakulam Block) for banana-based products, focusing on villages where high post-harvest losses occurred during the peak harvest season. Beneficiaries, including farm women and Farmer Interest Groups (FIGs), were identified with the support of Gram Panchayat presidents to ensure smooth mobilisation and sustained participation. A baseline survey and structured interviews, conducted during 2021-2022, were used to assess existing practices, skill gaps, and entrepreneurial potential. To sensitise participants on value chain practices and opportunities. Six village-level group meetings and two Farmer–Scientist interactions were conducted.

Training on Micro and Livelihood Enterprise Development Programme (MEDP & LEDP)

To promote rural enterprise, the KVK organised a three-day MEDP on Value Chain Management in Grapes for 25 farm women and rural youth, focusing on product diversification and zero-waste utilisation. In addition, a six-day LEDP on Banana for 30 farm women, FIG members and youth was conducted during February 2024. The training emphasised 80% practical and 20% theory, with hands-on demonstrations and experiential learning. Participants were exposed to industrial and institutional visits to ICAR-National Research Centre for Grapes (NRC Grapes) Pune, Sahyadri Farms (Nashik), ICAR-National Research Centre for Banana (NRC Banana) Trichy, NIFTEM–T (Thanjavur), and successful startups to understand value chain dynamics, quality production, branding, and commercial operations.

Guidance on Certification

To enhance market readiness of value-added grape and banana products, beneficiaries were guided on standardization and certification, including Food Safety and Standard Authority of India (FSSAI) licensing, Micro Small Medium Enterprises (MSME) Udyam registration, and trademark and patent filing from Tamil Nadu State Council for Science and Technology (TNSCST), Chennai, enabling farmers and farm women entrepreneurs to formalize enterprises, meet safety standards, and protect product identity. Hands-on demonstrations and meetings were conducted with line departments such as the Department of Agriculture, Horticulture, Agricultural Marketing, and Agri Business, helping participants understand documentation, application procedures, compliance norms, and the benefits of certification.

To connect entrepreneurs to other support agencies, linkages were established with the District Industries Centre (DIC), the Khadi and Village Industries Commission (KVIC), the Regional Office (Madurai), the Tamil Nadu Adi Dravidar Housing & Development Corporation (TAHDCO), the Agricultural Engineering Department, and nationalised banks to facilitate financial assistance and subsidies. Beneficiaries were also guided in preparing Detailed Project Reports (DPRs) Continuous facilitation, mentoring, and follow-up support ensured timely submission of documents, coordination with departments, and confidence-building among entrepreneurs.

Market Linkage

In December 2024, a district-level sales outlet named "Lavoisier" was set up at Aranmanaipudur, Theni Block, to market value-added products under Lavoisier Collective Farming Farmers Producer Company Limited, Theni District, Tamil Nadu. The KVK organised monthly meetings on the 5th of every month to provide hand-holding support to KVK-promoted entrepreneurs and ensure continuous facilitation and monitoring. Entrepreneurs were supported with advice on GST and trademark applications, promoting their products through social media, participating in fairs, and using other promotional materials to increase brand visibility and expand market reach.

CHALLENGES

Farmers were initially hesitant due to risk aversion, low willingness to invest, social discouragement, and limited experience in running a business. They



Promotion of Agri-Entrepreneurship and Rural Enterprises

also faced technical problems because they lacked proper methods for making and standardising high-value products. Lack of resources, such as the absence of a processing facility at KVK, limited hands-on training opportunities, and insufficient skilled staff, made it harder. Poor coordination between departments and little market information made it difficult to get branding, certification, and market access. On top of this, most entrepreneurs paid little attention to marketing and promotion, and women faced social challenges that affected their business growth and sustainability.

Initially, mobilising farmers and identifying potential beneficiaries for the interventions was challenging for the KVK. To address this, fortnightly group meetings and one-to-one sessions were conducted to identify interested participants and understand their problems, and to provide tailored solutions and opportunities for entrepreneurship development.

Over three years (2023-2025), the KVK supported entrepreneurs at every stage, from selecting raw materials to marketing. It also organised a monthly district-level Entrepreneurs Meet at the KVK Premises to provide technical knowledge, share solutions, and build trust. KVK also organised visits to successful entrepreneurs to help build farmers' confidence. Access to finances was addressed by linking participants to banks and other government schemes, such as the PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme) and the Prime Minister's Employment Generation Programme (PMEGP). Skill gaps were filled through hands-on training and exposure visits.

Partnerships with Indian Council of Agriculture Research (ICAR) institutions like National Research Centre for Banana (NRCB), Trichy, National Research Centre for Grapes (NRCG), Pune, Indian Institute of Horticultural Research, Bengaluru and State Agricultural.

Universities in Tamil Nadu, Kerala, and Punjab provided technical guidance, while DIC, KVIC, TAHDCO, banks for financial assistances, Food Safety and MSME departments for certification, auditors, and e-marketing platforms like Amazon supported for marketing.

BENEFITS AND IMPACT

The interventions led to measurable quantitative benefits by enabling the effective utilisation of 7% of grape waste and 16% of banana waste in the district for producing value-added products such as dry grapes, jams, pickles, ready-to-serve (RTS) beverages, banana malt, and bakery items, thereby reducing waste while creating marketable products.

Farmers and farm women experienced significant income enhancement ranging from ₹5,000 to ₹1,25,000 per month. Of the 195 trained participants, 86 trainees from FIGs and SHGs actively adopted the promoted practices, reflecting a 44% adoption rate and indicating successful uptake of value-addition technologies and entrepreneurial progression.

The initiative also promoted and nurtured Lavoisier Collective Farmers Producer Company Limited in Theni District, with an average utilisation of around 100 tonnes of grapes for high-value-added products during peak harvest and rainy seasons. Overall, 195 farmers and farm women were capacitated through hands-on training in processing, packaging, branding, quality control, value chains, regulatory compliance, and financial schemes, with continuous mentoring strengthening their ability to manage and sustain agri-based enterprises.

The interventions generated significant qualitative and sustained impacts by empowering women through enhanced confidence, financial independence, and leadership capabilities, while strengthening Farmer Interest Groups (FIGs) to promote social cohesion, collective problem-solving, and peer learning. The adoption of zero-waste processing and effective utilisation of grape and banana by-products reduced post-harvest losses and promoted sustainable resource conservation.

The initiative also generated strong spillover effects by inspiring approximately 710 neighbouring farmers and rural youth to adopt value-addition practices through various extension programmes. At the same time, at the system level, it advanced the "waste-to-wealth" approach by empowering women through entrepreneurship development, nurturing 86 entrepreneurs from FIGs and SHGs, facilitating the processing of 100 tonnes of grape and banana waste, and generating total sales of ₹6.25 million over the years.

SUSTAINABILITY AND SCALING UP

The initiative is sustainable because it has strong financial, institutional, technical, social, and environmental support. Entrepreneurs earn a steady income of ₹5,000–₹1,25,000 per month by using low-cost raw materials, reducing waste, and using KVK facilities, with additional credit support from DIC, KVIC, and banks. Food processing incubation centres at KVK premises supported by TNSCST, Chennai and Corporate Social Responsibility (CSR) fund for conducting training at KVK premises and village level promoted by KVK under Impactful Interventions and Community Science College & Research Institute, TNAU, Madurai, Tamil Nadu under All India Coordinated Research Projects (AICRP), ICAR CIWA, Bhubaneswar have helped strengthen farmer groups and community networks and made processes easier to repeat. Simple, need-based technologies, practical training, demonstrations, and solar dryers have improved skills in processing, quality control, and packaging. The community has embraced the initiative, and farmer groups work together and learn from one another. Environment-friendly practices, reduced post-harvest losses, and better use of by-products have made the enterprises more resilient and successful in the long run.

There is clear evidence that the initiative is continuing, as entrepreneurs are running and growing their businesses and earning a minimum monthly income of ₹5,000 during the initial period to a maximum of ₹1,25,000 over the three years. Farmers mainly drive adoption, and entrepreneurs are independently selling their products through

both B2B and B2C markets. KVK's Food Processing Incubation Centre and Agri-Business Incubation Centre for SC/ST provide regular training, mentoring, market support through Lavoisier outlet and e-marketing, scientist visits, and monthly meetings, which help sustain businesses, support community-led enterprises, and strengthen grape and banana value addition.

The initiative can be easily expanded to other blocks and districts where raw materials are available by starting on a small scale and slowly growing based on learning and experience. It can be scaled up by spreading the work to nearby villages, setting up processing centres at block level, and linking with government schemes and policies. Support from district-level mentoring committees, regular grievance meetings, local marketing outlets, and buyer–seller meetings will help in expansion, while partnerships with Arts and Science colleges, ICAR, universities, research institutes, government departments, and private companies can provide technical help, funds, certification, and better market access

LESSONS LEARNED

- Continuous mentoring, technical backstopping, and regular follow-up significantly enhance adoption and enterprise performance in rural value-addition initiatives.
- Establishing district-level marketing outlets, facilitating buyer–seller interactions, and integrating digital marketing are essential for business sustainability.
- Adoption of "Zero Waste" and "Waste to Wealth" models improves resource efficiency, environmental sustainability, and income generation through the Food Processing Incubation Centre, KVK Premises.
- Functional Farmer Interest Groups (FIGs) and Entrepreneurs Associations of Theni (EAT) (such as EAT) promote peer learning, collaboration, and collective bargaining power.
- Incubation support accelerates enterprise development: KVK-based Food Processing and Agri-Business Incubation Centres play a pivotal role in capacity building, product development, and market linkage.
- As grapes and bananas are available throughout the year in the region, it ensures uninterrupted supply of quality raw materials for processing and sustainable rural enterprises.
- Capacity building must extend beyond production to include quality assurance, branding, packaging, financial management, record keeping, and digital marketing.
- Institutional convergence enhances impact: Strategic collaboration with ICAR, SAUs, district line departments, financial institutions, and private partners strengthens technical, financial, and market support systems.
- Robust business systems with clear planning, SOPs, proper records, product diversification, and financial discipline are essential for long-term enterprise success.

CONCLUSION

The interventions clearly demonstrate that a holistic, participatory, and market-oriented value-addition model can effectively convert agricultural waste into economic opportunity while advancing social, environmental, and institutional outcomes. By combining skill development, technological adoption, collective action through FIGs and SHGs, and strong institutional support mechanisms such as incubation centres and KVKs, the initiative acts as a "One Stop Service Centre," successfully enhancing productivity, entrepreneurship, and income security for farmers and farm women. Overall, the initiative serves as a replicable and sustainable framework for inclusive rural development, resilient agri-based livelihoods, and climate-smart value chain transformation in similar agro-ecological contexts.

Acknowledgements: The authors thank Dr P. Patchaimal, Chairman, KVK Theni, for his support and inspiration, and Dr Shaik N. Meera, Director of ICAR-ATARI-Zone-X, Hyderabad, for providing financial assistance for the Promotion of Agri-Entrepreneurship and Rural Enterprises for Sustainable Livelihood under Impactful Interventions to KVK Theni.

Authors



P. Maheswaran
Programme Coordinator (i/c) and Subject Matter Specalist (Agronomy)
KVK Theni
danushmahes@gmail.com



M. Ramyasivaselvi
Subject Matter Specalist (Home Science)
KVK Theni
manorani87@gmail.com

Promoting Quality Production Inputs

ICAR-KVK Yagantipalle, Nandyal, Andhra Pradesh

A Participatory Seed Production Model in Nandyal for Strengthening Local Seed Systems

In this Good Practice Note, M. Sudhakar, G. Dhanalakshmi, and E. Ravi Goud describe how the KVK Yagantipalle adopted a Participatory Seed Production Model for Strengthening Local Seed Systems.

CONTEXT

Small and marginal farmers in the Nandyal district of Andhra Pradesh, predominantly dependent on cereals (paddy and maize), pulses (red gram, bengal gram, green gram, and black gram), and oilseeds (groundnut and soybean), were facing persistently low crop productivity and unstable yields. A major underlying constraint was the unavailability of quality seed of public-sector varieties at the local level, leading to low seed replacement rates and poor crop performance. Conventional seed supply mechanisms were inadequate, as commercial seed companies showed limited interest in producing seeds of low-value, high-volume crops, particularly pulses and millets. Farmers were often forced to reuse farm-saved seed or procure inferior-quality seed from informal sources, further exacerbating yield gaps.

Given the importance of pulses and oilseeds for nutritional security and farm income, the situation demanded urgent intervention. The KVK Yagantipalle, functioning under theShri Hanumantharaya Eductional & Charitable Society, implemented the Pulses Seed Hub programme and Cluster Front Line Demonstrations to strengthen local seed systems through participatory seed production, ensuring timely access to quality seed and sustainably improving productivity.

GOOD PRACTICES

Participatory Problem Diagnosis and Seed Planning

The KVK initiated the intervention in June 2015 through participatory interactions with farmers to identify constraints related to the low productivity of major crops in Nandyal district. Group discussions and field consultations revealed a scarcity of high-quality seeds for major crops and a mismatch in varieties. This exercise also helped in assessing crop-wise seed demand, varietal preferences, irrigation availability, and gaps in the existing seed supply system.

Cluster Front Line Demonstrations

Since 2015-16, Cluster Front Line Demonstrations (CFLDs) have been implemented to showcase improved production technologies, including participatory seed production of pulses and oilseeds, under a cluster approach. A total of 1,360 ha of CFLDs have been conducted, benefiting 1,246 farmers, with about 170 ha covered annually. The cluster-based approach facilitated synchronised sowing, strengthened peer learning, and enabled effective technical monitoring, with simplified supervision and impact assessment.

Selection and Clustering of Seed Producing Farmers

Progressive farmers with assured irrigation facilities, interest in seed production, and willingness to follow certification norms were selected and organised into clusters. Priority was given to farmers associated with Cluster Front Line Demonstrations to strengthen convergence with ongoing programmes.

Distribution of quality seeds of improved varieties

KVK procured Breeder and Foundation seeds of improved varieties of cereals, millets, pulses, and oilseeds from Acharya N. G. Ranga Agricultural University (ANGRAU), and other authorised seed-producing agencies, including millets from ICAR-Indian Institute of Millets Research (IIMR), Hyderabad, Red gram variety PRG-176 from Regional Agricultural Research Station (RARS), Palem, PJTAU, Chickpea varieties from RARS, Nandyal (ANGRAU), and Black gram variety VBN-8 from NPRC-National Pulses Research Centre, Vamban, Tamil Nadu. These quality seeds were distributed to identified seed-producing farmers to establish seed production plots under the participatory seed production programme. During the initial years, these quality seeds were supplied free of cost under demonstrations to promote improved varieties. In subsequent years, Breeder and Foundation seeds were distributed to identified seed producers at cost, as per rates fixed by ANGRAU. At the same time, CFLD farmers received seeds at a nominal cost for producing Foundation or Certified seed in their fields. This ensured the availability of high-quality seed stock and strengthened the decentralised seed production system in the district.

Training

Farmers were trained through a combination of on- and off-campus programs in scientific seed production, Good Agricultural Practices, certification procedures, roguing, isolation distances, and geo-tagging. Every year, the KVK organised two one-day on-campus training programmes (one each during Kharif: June-July and Rabi: September-October) and four one-day off-campus programmes (two each during Kharif and Rabi), with about 60 farmers participating in each training session, covering identified seed-producing farmers and CFLD beneficiaries. The pre-season on-campus programmes focused on scientific seed production, varietal selection, GAP, and seed certification procedures. In contrast, the off-campus programmes, conducted at critical crop growth stages, provided hands-on training in roguing, isolation distances, field inspection, geo-tagging, pest and disease management, harvesting, and post-harvest seed handling. Emphasis was placed on hands-on learning through demonstrations and crop-stage-specific field exercises, making the training practical and farmer-friendly.

Continuous Handholding and Joint Field Inspections

Continuous technical support was provided through joint field inspections by KVK scientists and Andhra Pradesh State Seed Certification Agency (APSSCA) officials at vegetative, flowering, and maturity stages. These visits functioned as interactive learning platforms for pest and disease management, off-type removal, and compliance with certification standards.



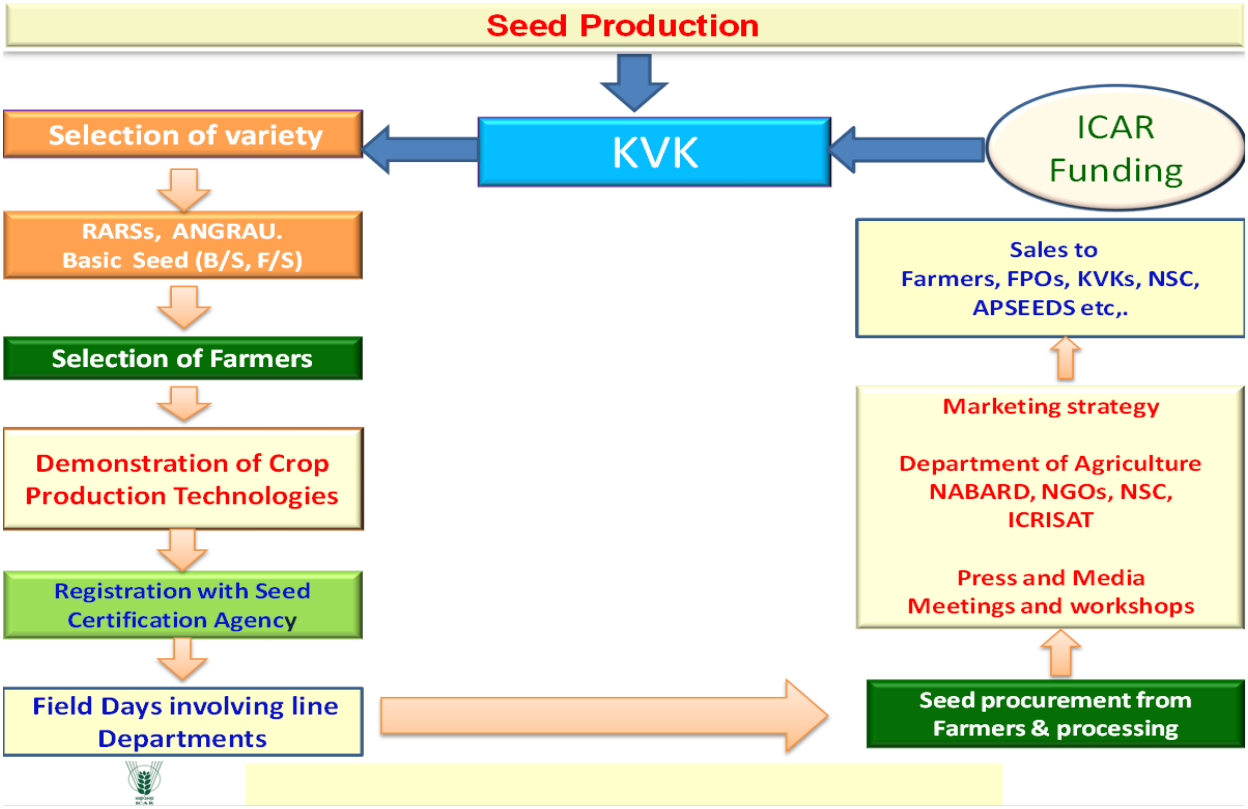
Sesame Field Inpection at Flowering Stage

Institutional Linkages and Buy-Back Assurance Mechanism

KVK established a buy-back mechanism through Memoranda of Understanding to ensure assured procurement of quality seed at 15-20 per cent above market price. Farmers committed to follow recommended seed production practices, reducing market risk and improving compliance.

Seed Processing, Packaging, and Decentralised Distribution

Procured seeds of Paddy, Bengal gram, Red gram, Black gram, Green gram, Groundnut, Soybean, and Millets were processed and certified at the KVK seed processing unit, established in 2016 under the Pulses Seed hub project, ensuring safe moisture levels, impurity removal, and uniform



Flow Chart of Seed Production Process

quality. The processed seeds were packed in eco-friendly, labelled bags and distributed through the KVK sales counter and KVK Sub-centres established in the Rudravaram, Dhone, Nandikotkur, Velugodu, and Gadivemula Mandals. The decentralised distribution system ensured the timely availability of quality seed to farmers while reducing the distance they had to travel to the KVK, thereby improving farmers' access to quality seed across all agricultural divisions of the district. Coordination, quality control supervision, and basic marketing facilitation were key skills applied. Establishing processing and storage infrastructure is critical before scaling up.



Seed Production Plots

CHALLENGES

One of the initial constraints we faced was the limited availability of breeder and foundation seed needed for multiplication, which delayed the initiation of seed production. This challenge was addressed through timely placement of indents with State Agricultural Universities and ICAR institutes such as ICAR-IIMR, Indian Institute of Oilseeds Research (ICAR-IIOR), Hyderabad, close coordination with the State Seed Certification Agencies, and collaboration with the Pulses Seed Hub project implemented by ICAR-Indian Institute of Pulses Research (ICAR-IIPR), Kanpur to access released varieties. These institutional linkages ensured uninterrupted availability of basic seed in subsequent seasons.

Labour scarcity, particularly for rouging operations during peak crop stages, emerged as another major challenge, increasing production costs and affecting timely field operations. To overcome this, village-level labour groups were mobilised and trained specifically in rouging practices, thereby reducing dependence on external labour and improving efficiency. Despite training, some farmers initially had difficulty adhering to standard seed production protocols. This was addressed through repeated field demonstrations, season-long hand-holding, and continuous advisory support via digital platforms such as WhatsApp, gradually improving farmers' confidence and technical compliance.

Weather variability posed significant challenges, including delayed sowing due to erratic monsoon onset and unexpected rainfall during harvest, affecting seed quality. Adaptive strategies such as staggered sowing, promotion of early-maturing and drought-tolerant varieties, improved field drainage, and issuance of weather-based advisories helped minimise losses and maintain seed standards.

Market linkage and seed distribution were initially weak, limiting farmer motivation. An entry-point strategy was adopted wherein KVK supplied seed at nominal cost to Farmer Producer Organizations Such as Beathamcherla Abhyudaya Farmers Producer Company, Bethamcherla Mandal; Veldurthi Farmer Producer Company Ltd., Veldthurthi Mandal; Peddavaduguru Mahila Rythu Samakya, Gooty; Jupadu Bunglow Agriculture & Allied producer mutually aided Co-operative Society Ltd., Jupadu Bunglow mandal; the Kothapalli Agriculture & Allied producer mutually aided Co-operative Society Ltd, Kothapalli Mandal; and around 69 individual farmers of different crops, supported by the Department of Agriculture. Visibility was enhanced by disseminating seed information via posters at all Rythu Bharosa



Seed Stock Verification and Inspection by Official

Kendras and through the Kisan Sarathi portal, reaching a large base of farmers. These challenges, though significant, became learning opportunities that strengthened coordination, adaptability, and sustainability of the participatory seed production model.

BENEFITS AND IMPACT

The participatory seed production initiative delivered significant economic, technical, and institutional benefits to farmers and the KVK. Farmers received an assured buyback of seed at 15–20% above prevailing market prices, resulting in higher net income than from normal grain cultivation. Seed production generated local employment for 148 rural youth, 119 farm workers, and 212 farm women, while skill-oriented practices improved farmers' technical capacity without incurring additional labour or input costs. Self-pollinated pulse crops further reduced production risk and cultivation costs.

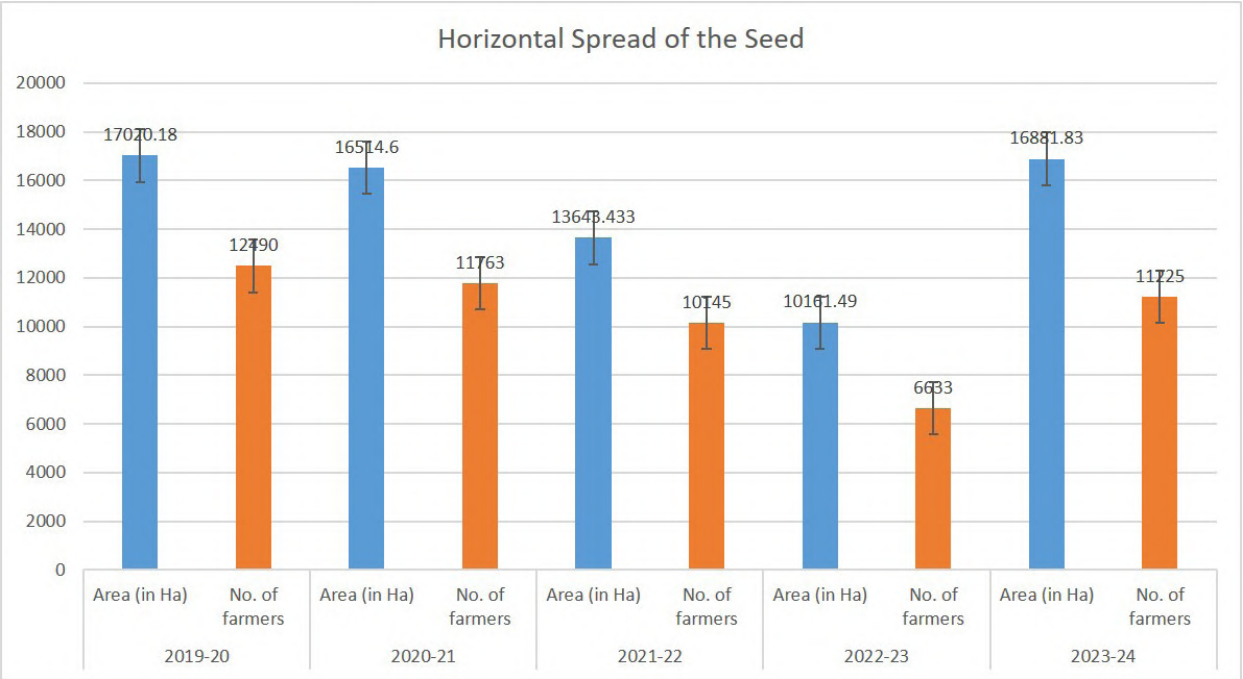
Between 2019 and 2023, KVK produced 5,716.52 quintals of pulse seed, 888 quintals of oilseeds, 5,681 quintals of cereals, and 1,626 quintals of millets, generating a gross revenue of ₹9.86 crore. Quality seed supplied covered 74,221.53 ha, accounting for nearly 21% of the cropped area in Nandyal district. Adoption of improved varieties and integrated crop management practices resulted in yields of 7–8 quintals per acre at reduced cost. In the long term, the initiative strengthened local seed systems, enhanced farmer confidence, and created a sustainable, decentralised seed supply mechanism with spillover benefits across the district.

Seeds were also sold to various organisations such as ICRISAT, Hyderabad; T.S, ICARDA, Odisha, Seed Corprations in different states, FPOs from Tamil Nadu, Karnataka, and Madhya Pradesh; KVKs of Andhra Pradesh, Telangana, and Tamil Nadu; Private seed production companies HIL, V care etc.

SUSTAINABILITY AND SCALING UP

The participatory seed production model is financially sustainable through the buy-back policy and seed sales revenue, as evidenced by a gross income of ₹9.86 crore generated during 2019–2023 (Fig 1), which is reinvested in seed hub infrastructure and workforce enhancement. Institutional sustainability is ensured through strong KVK leadership, trained farmer clusters, and established linkages with SAUs, ICAR institutes, and seed certification agencies. Technically, the practice is viable due to the use of locally adapted varieties, standard seed production protocols, and continued on-field advisory support via WhatsApp and Kisan Sarathi. The model has gained community acceptance by creating employment opportunities for youth and women and improving farmers' incomes and confidence.

The model is highly scalable to other districts with similar cropping systems, provided that basic seed supply, processing infrastructure, and institutional convergence are in place. Horizontal scaling through KVK networks and vertical scaling through DoA and FPO partnerships can sustain and expand the impact.



Horizontal Spread of the Seed

LESSONS LEARNED

- Farmer ownership and institutional convergence are key: Participatory planning and strong linkages with SAUs, ICAR institutes, and certification agencies ensured smooth seed availability and quality control.
- Continuous handholding matters: Training alone was not sufficient; repeated field demonstrations, season-long support, and digital advisories (WhatsApp/Kisan Sarathi) helped farmers adopt protocols effectively.
- Buy-back mechanism boosts motivation: Assured procurement at 15–20% higher price reduced market risk and improved compliance with seed standards.
- Cluster approach improves efficiency: Grouping farmers enabled synchronised operations, peer learning, and easier monitoring.
- Labour and weather remain critical constraints: Pre-formed labour groups for rouging and climate-resilient strategies (staggered sowing, drainage) are essential for smooth implementation.
- Early market linkage is important: Future scaling should involve advance demand assessment and stronger partnerships with FPOs and local buyers.
- Replication prerequisites: Basic seed supply, processing infrastructure, certification support, and transparent procurement agreements are essential for scaling

CONCLUSION

The implementation of the seed production program for pulses, oilseeds, cereals, and millets led to an overall increase in the area under these crops. It enhanced the adoption of improved, high-yielding varieties and good agricultural practices. The program attracted 516 farmers from the district to take up participatory seed production of millets not only in main fields but also on marginal lands forpulses, cercals, oilseeds and millets. As a result, the area under quality seed replacement expanded to 74,321.54 ha during the last five years (2019–2023), comprising pulses (29,994.42 ha), oilseeds (444 ha), cereals (11,362 ha), and millets (29,020 ha). Productivity of pulses, cereals, oilseeds, and millets increased by approximately 200–300 kg/ha due to the seed production program. This initiative generated a two- to three-fold increase in income for farmers, ensuring year-round earnings. Overall, the program not only facilitated horizontal expansion of area but also promoted adoption of good agricultural practices, creating a collaborative environment that enhances agricultural sustainability and productivity.

Authors



M. Sudhakar
Subject Matter Specialist (Agronomy)
KVK Yagantipalle
mallela1970@gmail.com



G. Dhanalakshmi
Senior Scientist & Head
KVK Yagantipalle
dhanaguru12@gmail.com



E. Ravi Goud
Subject Matter Specialist (Agricultural Extension)
KVK Yagantipalle
eravigoud068@gmail.com

ICAR-KVK Jammikunta, Karimnagar, Telangana

Boosting Quality Seed Production of Improved Rice Varieties in Karimnagar District

In this Good Practice Note, J. Vijay, N. Venkateshwar Rao, and L. Mahesh discuss their experiences in boosting paddy productivity through the adoption of improved rice varieties in the Karimnagar District of Telangana State.

CONTEXT

Paddy seed producers in Karimnagar district of Telangana have been experiencing a steady decline in productivity and seed quality over the past five years. The major challenge was the continued cultivation of old, long-duration rice varieties that were highly prone to lodging, grain shattering, and severe incidence of pests and diseases, particularly Brown Planthopper (BPH) and blast. These constraints resulted in frequent crop losses, reduced seed recovery, and poor market acceptance of seed produced. Conventional crop management practices and chemical control measures proved inadequate, as they could not address the inherent susceptibility of the existing varieties, and farmers had limited access to improved, resilient varieties and updated technical knowledge. Considering the economic importance of paddy seed production and the increasing incidence of pests and diseases affecting it, the KVK Jammikunta functioning under Grama Nava Nirman Samithi (GNNS) initiated the introduction of high-yielding, pest- and disease-tolerant paddy varieties in the district. The intervention targeted small and medium farmers engaged in certified and truthfully labelled seed production under irrigated rice-based farming systems.

GOOD PRACTICES

Participatory Problem Diagnosis and Planning

From June, 2018 to June, 2021, the KVK conducted participatory problem diagnosis with small and medium paddy seed producers from the Ellanthakunta and Huzurabad mandals of Karimnagar district. Through group discussions, focused interactions, and joint field observations with farmers, they collectively analysed crop ecosystem conditions. They identified varietal susceptibility—rather than management alone—as the major cause of lodging, shattering, pest incidence, and yield decline.

Introduction of Improved Paddy Varieties

To address the identified constraints, KVK introduced improved paddy varieties, including JGL-24423 and KNM-118 (medium-duration, lodging-resistant, low-shattering) and RNR-15048 and KNM-1638 (short-duration, fine-grained, blast-tolerant). These varieties were sourced through institutional collaboration with Regional Agricultural Research Station (RARS) Jagtial, Agriculture research station (ARS) Kunaram, and Agricultural Research Institute (ARI) Rajendranagar. Breeder seed was accessed through coordinated indents, and foundation seed production was undertaken at the KVK farm to ensure timely availability of quality seed.

Front Line Demonstrations

From 2018–19 to 2020–21, six Front Line Demonstrations were conducted across 60 farmers in 6 villages, covering 24 hectares and enabling direct comparison with existing varieties under real field conditions.

Participatory Varietal Evaluation and Experiential Learning

KVK promoted participatory varietal evaluation by actively involving farmers in observing and recording crop performance at different growth stages. Parameters such as plant height, stem strength, panicle architecture, disease incidence, shattering resistance, crop duration, yield, and economic returns were jointly assessed. Regular field visits, review meetings, and on-field problem-solving sessions enabled farmers to analyse varietal performance and compare profitability with traditional varieties independently. Continuous technical backstopping was provided throughout the crop cycle to strengthen farmer capacity and reduce risk.

Training of seed producers

A total of 12 training programmes were conducted for paddy seed producers across



Demonstration on Paddy Seed Production

two mandals, focusing on stage-wise crop management, pest and disease diagnosis, and need-based interventions. Regular follow-up visits and personalised counselling ensured timely correction of practices and reduced unnecessary pesticide use.

Field Days

To enhance visibility and horizontal spread, in 2018-2021, KVK organised four large-scale field days during harvest, involving over 510 farmers, seed growers, and line department officials. These events facilitated farmer-led evaluations, interactive discussions, and side-by-side comparison of improved and traditional varieties. These helped accelerate demand for these varieties.

CHALLENGES

One of the primary constraints during the initial phase of implementation was farmers' resistance to shifting away from long-established traditional varieties, driven by concerns about grain quality, market acceptance, and the perceived risk of yield loss. Many seed producers were reluctant to experiment due to the economic risks involved in seed production. In addition, limited availability of quality seed during peak demand periods posed a logistical challenge in the early seasons. Environmental factors further complicated implementation, as unexpected rainfall coupled with high humidity created favourable conditions for disease outbreaks, affecting early crop performance in some demonstration plots.

To overcome these challenges, the KVK organised regular village-level meetings, exposure visits and on-field demonstrations to address scepticism and build farmer confidence. Demonstration plots clearly showcased the advantages of improved varieties, such as reduced lodging, lower shattering, and greater tolerance to BPH and blast, gradually changing farmers' perceptions. Continuous technical advisory support, through frequent field visits and real-time WhatsApp alerts, helped farmers effectively manage emerging technical issues. To address seed shortages, KVK strengthened coordination with the Department of Agriculture and nearby research stations, while simultaneously promoting local seed multiplication through progressive farmers to ensure future availability.

Learning from initial setbacks, KVK recognised that reliance on printed leaflets and classroom-style advisories was ineffective in influencing farmer behaviour. Consequently, the approach shifted towards participatory varietal evaluation and farmer-led assessments, which significantly enhanced ownership and trust. Adaptive nutrient management schedules and need-based plant protection strategies were also refined based on field observations. Persistence, continuous engagement, and strong institutional partnerships played a crucial role in sustaining the initiative and successfully addressing deployment challenges.

BENEFITS AND IMPACT

Over five years, the KVK produced and supplied 3,618.25 quintals of quality foundation seed to 6,232 farmers, covering an area of 5,782 hectares. (Fig1).

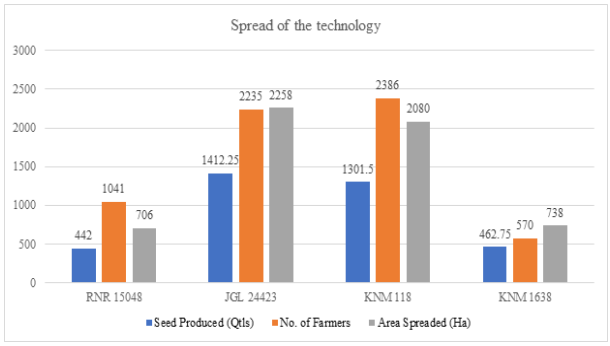


Fig 1: Spread of the technology over a period of 5 years

Improved varieties such as JGL-24423 and KNM-118 recorded an average yield of 71.25 q/ha, while RNR-15048 and KNM-1638 yielded 65 q/ha, compared with 68.75 q/ha for MTU-1010 and 61.25 q/ha for BPT-5204. The non-shattering and pest-tolerant nature of the improved varieties resulted in an average yield increase of 3 q/ha. Farmers realised an additional net income of ₹8,637 per hectare, generating a cumulative economic gain of ₹4.99 crore, with cost–benefit ratios improved to up to 1:2.89.

Qualitatively, access to high-quality seed reduced dependence on external markets, while training and demonstrations enhanced farmers' confidence and decision-making. Immediate impacts included higher yields, reduced pest damage, and rapid adoption. In contrast, long-term impacts were reflected in large-scale varietal spread, farmer-led seed multiplication, strengthened institutional linkages, and sustained improvements in productivity and livelihoods across the district.

SUSTAINABILITY AND SCALING UP

The intervention demonstrates strong potential for long-term sustainability and continued impact, driven by sustained demand for high-yielding paddy varieties such as JGL-24423, KNM-118, RNR-15048, and KNM-1638. Financial sustainability is assured, as farmers achieve additional net returns of ₹8,637 per hectare, thereby incentivising the independent purchase of quality seed.

Institutional sustainability is reinforced through the KVK's ongoing seed production programme, which supplied 3,618.25 quintals of foundation seed to 6,232 farmers across 5,782 hectares over 5 years. The improved varieties are technically sustainable due to their suitability for local agro-climatic conditions and their lower susceptibility to pests and diseases. Social acceptance has increased as farmers directly observe higher yields, reduced shattering, and stable performance under field conditions.

The model is highly scalable and can be replicated in other districts with similar rice-growing conditions. Post-project evidence shows continued farmer adoption and institutionalisation of seed production within KVK, ensuring both horizontal and long-term sustainability. Their acceptance across multiple states—Telangana, Andhra Pradesh, Karnataka, Tamil Nadu, and Chhattisgarh—highlights their adaptability and potential for broader replication.

For scaling up, key prerequisites include timely availability of breeder and foundation seed, capacity building through farmer training, and strong convergence with the Department of Agriculture and research institutions.

LESSONS LEARNED

The experience demonstrated that frontline demonstrations combined with farmer-led evaluations are the most effective drivers of varietal adoption, proving far more convincing than meetings or printed leaflets alone. Timely availability of quality seed, ensured through planning and strong coordination with research stations, is critical for successful scaling. Continuous technical handholding via regular field visits, WhatsApp advisories, and follow-ups builds farmer confidence and reinforces adoption. Strengthening nursery management training helps reduce early-stage crop variability, while engaging line departments from the outset and clearly demonstrating economic benefits encourages wider acceptance. Promoting local seed multiplication further enhances reach and sustainability. Overall, the key lesson is that farmers adopt improved technologies primarily when they observe visible results in the field, coupled with consistent guidance and support, rather than through information dissemination alone.

CONCLUSION

The successful promotion of improved rice varieties—JGL-24423, KNM-118, RNR-15048, and KNM-1638—demonstrates the significant impact of KVK's extension efforts in enhancing productivity, profitability, and resilience among paddy seed producers. Through systematic frontline demonstrations, participatory varietal evaluations, continuous technical hand-holding, timely seed production and supply, farmer-centric training, and interactive field days, KVK effectively accelerated adoption across the Karimnagar district.

Overall, the programme underscores that proactive extension support, strong institutional linkages, and context-specific varietal recommendations are key to scaling agricultural innovations. The experience reinforces the need for continued research, robust quality seed systems, and sustained KVK engagement to meet evolving farmer needs and ensure long-term sustainability of improved rice cultivation.

Acknowledgements: The authors express their gratitude to Sri. P. Vijay Gopal Reddy, General Secretary of the Grama Nava Nirman Samithi (GNNS)-KVK, for his unwavering support and inspiration. We also thank officals of the Department Agriculture, the Agriculture Technology Management Agency (ATMA), Karimnagar, and other line departments for their continued partnership in serving the district's farming community. Furthermore, the authors are grateful to Dr Shaik N. Meera, Director of ICAR-ATARI Zone X, Hyderabad, for facilitating the financial support that enables the KVK to provide essential technical backstopping to the district.

Authors



J. Vijay
Subject Matter Specialist (Agronomy)
GNNS-KVK Jammikunta
vijayjakkula86@gmail.com



N. Venkateshwar Rao
Senior Scientist and Head
GNNS-KVK Jammikunta
neelamrao2000@gmail.com



L. Mahesh
Subject Matter Specialist (Agricultural Extension)
GNNS-KVK Jammikunta
maheshagri07@gmail.com

ICAR-KVK Thiruvannamalai, Tamil Nadu

Promoting IIHR Vegetable Special for Enhanced Vegetable Productivity

In this good practice note, V. Suresh, R. Vijayakumar, P. Narayanan, and M. Ishwarya discuss their experiences in promoting IIHR micronutrient technology to achieve higher yields and better quality of vegetable produce.

CONTEXT

In Thiruvannamalai District, vegetables, including chillies, brinjal, bhendi, and gourds, are cultivated across 12,171 hectares. Despite intensive fertiliser application accounting for 60-70% of production costs, the average vegetable yield is only 11.86 metric tonnes, 26% below the state average. Through farmer interactions, KVK scientists identified a critical knowledge gap: farmers apply fertilisers without expert consultation, they lack awareness of recommended dosages, and have a limited understanding of the importance of micronutrients.

The KVK Thiruvannamalai functioning under the Tamil Nadu Board of Rural Development (TNBRD), has been collaborating with vegetable growers for over a decade, aiming to enhance production, productivity, and the quality of the final produce. In 2014, KVK signed a Memorandum of Understanding with the ICAR-Indian Institute of Horticulture Research (IIHR), Bengaluru, for the commercial production and supply of micronutrient formulations, with financial support from National Bank for Agriculture and Rural Development (NABARD). IIHR developed

a cost-effective, crop-specific foliar micronutrient technology (IIHR vegetable special) based on soil and crop analyses and physiological studies of vegetables cultivated in all major agro-climatic zones across the country, and has standardised the doses (gm/litre) for different vegetables.

GOOD PRACTICES

On-farm trials and Front-Line Demonstrations

The KVK has recognised vegetable special as a significant critical input within its mandated activities concerning vegetable crops. To evaluate the effectiveness of the IIHR Vegetable Special technology, KVK conducted tests in the brinjal field at its instructional farm in 2014. Following the positive results, KVK implemented the technology in On-Farm Trials for Chilli and Front-Line Demonstrations for Ridge gourd during 2014-15. Applying IIHR Vegetable Special has resulted in a yield increase of 26.54% in Chilli and 24.97% in Ridge gourd. Subsequently, KVK resolved to vigorously promote this technology for the benefit of vegetable growers.



"The vegetable special drives substantial economic benefits, produces premium-quality fruits, and engenders happiness, as illustrated by the smiles it inspires." Says Rajendiran, Desur, Thellar block, Thiruvannamalai Dt.



On-farm Trial in Brinjal

During 2015-2023, the KVK organised 14 on-farm trials and 26 Front Line Demonstrations benefiting a total of 527 farmers.

Trainings

During the same period the KVK conducted extensive training programs reaching 1,547 farmers directly, with an additional 2,415 farmers covered through collaborative programs with the Department of Horticulture in a year.

Training covered recommended dosages, application timing (3-4 foliar sprays at critical growth stages), integration with existing fertiliser practices, and compatibility with plant protection chemicals. Programs were delivered both on-campus and off-campus, including sponsored training in partnership with the department. Scientists simplified technical information into practical, actionable recommendations.

Collaboration with NGOs and other stakeholders

The successful assessment and demonstration of IIHR vegetable special technology in farmers' fields since 2015 has motivated the KVK to further promote it through additional collaborative programs involving the horticulture department,

NGOs and other stakeholders. The collaborations were made with NGOs such as TVS SST Trust, Hand in Hand, FPOs like Aaramudhu, Uyirppu, Mannuyir, Cheyyar, and Thellar Farmer Producer Company Ltd to create awareness of the IIHR Vegetable Special. A total of 121 training sessions were organised for the shareholders of the FPOs to promote the technology among vegetable growers in the district extensively.

KVK experts have consistently participated in and advocated for the technology during farmer field schools, training programs, Kisan melas, Exhibitions, field days and Kisan ghostis organised by the Department of Horticulture in the district.

Production and Supply of IIHR Special

Since 2014 then, an average of 1,200 to 1,500 kg of IIHR vegetable special has been produced and supplied to vegetable growers at Rs 200 per Kg in the district. The farmers themselves are currently coming to the KVK to purchase the product, and the KVK has the capacity to supply it through courier and parcel networks to distribute it throughout the state.



Assessment of the Yield and Quality of Brinjal.

CHALLENGES AND SOLUTIONS

Farmer Scepticism: Farmers initially doubted that a foliar spray could significantly improve yields, given their heavy investment in conventional fertilisers. Many were reluctant to change established practices.

Knowledge Gaps: Most farmers lacked understanding of micronutrient deficiencies and their symptoms. The concept of "hidden hunger among crops" was unfamiliar.

Supply Constraints: Initial demand outstripped production capacity, creating concerns about consistent availability.

Limited Reach: The technology could not reach all potential beneficiaries through KVK's resources alone.

To address these changles, the KVK established demonstration plots showing visible results-healthier plants, reduced flower/fruit drop, and superior fruit quality. These demonstrations served as "living evidence" that shifted farmer perceptions. Success stories from early adopters were documented and shared widely.

Knowledge gaps were also addressed through sustained training programs emphasising practical, field-based learning. Scientists used simple analogies and visual aids to explain complex nutritional concepts.

Supply capacity was gradually expanded with KVK's Revolving fund, and production planning was aligned with peak demand seasons by creating special infrastructure including required machineries and workforce.

IMPACT

The KVK has implemented the technology across 4,260 hectares, benefitting 8,362 farmers to date. Net income improvements were substantial: tomato farmers gained Rs. 93,339/ha (2.27 to 2.98 BCR), brinjal farmers Rs. 35,476/ha (2.57 to 2.92 BCR),

chilli farmers Rs. 58,713/ha (1.86 to 2.59 BCR), and gourd farmers Rs. 1,15,389/ha (2.41 to 3.15 BCR) (table:1). Fertiliser costs were reduced by 15% as the micronutrient formulation eliminated the need for multiple individual nutrient applications. The above results have been collected from 100 FLD/OFT beneficiaries selected in Vandavasi, Thellar, Arni, Cheyyar and Chetpet blocks in Thiruvannamalai District.

Farmers reported improved fruit quality in terms of size, weight, appearance, flavour, and shelf life. Enhanced crop resistance to pests and diseases reduced reliance on plant protection chemicals. Farmers gained confidence in scientific nutrient management. The area and productivity of vegetables in Thiruvannamalai district have consistently increased.

Short-term gains included visible improvements in flowering, fruit set, and quality within the first season of adoption. Long-term benefits include sustained productivity improvements and reduced input costs. Spillover effects include increased awareness of balanced nutrition practices among neighbouring farmers and integration of micronutrient application into regular extension programs.

Table1: Effect on yield and income

Parameters	Tomato		Brinjal		Chillies		Gourds	
	BI	AI	BI	AI	BI	AI	BI	AI
Yield (Q/ha)	463.35	596.12	271.38	344.61	24.63	29.53	342.62	428.20
Yield increase (%)	-	28.65	-	26.98	-	19.89	-	24.98
Net income (₹.)	176908	270247	210855	246331	95249	153962	234332	349721
BCR	2.27	2.98	2.57	2.92	1.86	2.59	2.41	3.15

Note: BI: Before Intervention, AI: After Intervention

There has been a steady increase in the area and productivity of vegetables in Thiruvannamalai district since the IIHR vegetable special technology was introduced in 2014. As per the statistical handbook, the area under vegetable crops in the year 2014-15 was 4619 ha (Page No.41), and it has increased to 12171 ha (Page No.45) in the year 2024-25.

SUSTAINABILITY AND SCALING UP

This technology's is sustainable profitability as farmers are continuing its adoptation because of demonstrated returns. The KVK is ensuring the availabiliy of IIHR Vegetable Special through in-house production meeting the quality standards. The partnership with the Department of Horticulture embeds the practice within government extension programs.

The practice is replicable across similar vegetable-growing regions. Prerequisites include: awareness of micronutrient deficiencies, availability of formulation, farmer training on application methods, and institutional support. Horizontal scaling is already occurring through collaborative programs with other KVKs. Vertical scaling can be achieved through integration with the Department of Horticulture's regular activities. Policy support could futher accelerate scaling through subsidies or inclusion in government schemes.

CONCLUSION

The IIHR Vegetable special technology has been implemented across 4260 hectares in the Thiruvannamalai district, benefiting 8362 farmers to date. This achievement is the result of the collaborative efforts of KVK and the State Department of Horticulture, and it is anticipated that the technology will extend to all areas of vegetable cultivation within the district.

Acknowledgements: The authors thank Dr. Shaik N Meera, Director of ICAR-ATARI-Zone-X Hyderabad, for the support in promoting the technology through SCSP and TSP programmes and DDM NABARD, Thiruvannamalai for the financial assistance in acquiring the technology from IIHR, Bengaluru.

Authors



V. Suresh
Senior Scientist and Head i/c and Subject Matter Specialist (Agricultural Extension)
KVK Thiruvannamalai
agrisuresh.v@gmail.com



R. Vijayakumar
Subject Matter Specialist Horticulture
KVK Thiruvannamalai
vijidhana472@gmail.com



P. Narayanan
SMS Plant Protection
KVK Thiruvannamalai
palaninarayana@gmail.com



M. Ishwarya
SMS Agronomy
KVK Thiruvannamalai
ishwaryamanickavel@gmail.com

ICAR-KVK Virudhunagar, Tamil Nadu

Promoting Improved Variety of Barnyard Millet

In this good practice note, ChelviRamessh, B. Venudevan, A. Sheeba, S. Krishnakumar, J. Kannan, B. Nallakurumban and T. Balaji discuss how the KVK promoted the improved variety of barnyard millet (MDU 1) in Virudhunagar District of Tamil Nadu

CONTEXT

Rainfed agriculture predominates in most parts of Virudhunagar district, where crop production is highly vulnerable to climatic variability, including delayed monsoon onset, prolonged dry spells, and early monsoon withdrawal. During the rabi season, farmers traditionally cultivate millets, with barnyard millet occupying approximately 2,000 ha. Initially, farmers cultivated traditional local varieties with low yield potential, which were later replaced by the improved variety CO (KV) 2. However, the productivity of CO (KV) 2 remained limited to about 1,200 kg/ha due to fewer productive tillers, shorter panicles with smaller grains, and a lower milling recovery of around 60%.

To overcome these constraints, the KVK Virudhunagar functioing under the Tamil Nadu Agricultural University (TNAU) introduced the high-yielding barnyard millet variety MDU 1 (released in 2017 from the Agricultural College and Research Institute, Madurai, Tamil Nadu). MDU 1 possesses several desirable traits, including large and compact panicles, bold white grains, higher grain yield, and an improved milling recovery of about 70%. Its adoption has significantly enhanced both

productivity and farmers' income. As a result of its superior performance and successful extension efforts by the KVK, MDU 1 has completely replaced the earlier varieties and is now cultivated across nearly 100% of the barnyard millet area in Virudhunagar district.

GOOD PRACTICES

Training farmers

KVK Virudhunagar organised awareness training programmes, exhibitions, and field days during 2017-18 and 2018-19 to raise awareness of the newly released high-yielding Barnyard millet variety MDU 1. Lectures were delivered on the special features of the variety, Integrated Crop Management (ICM) and Integrated Pest Management (IPM) techniques, and value-added techniques through mass media, kisan melas, training, and exposure visits organised by the Department of Agriculture and Farmers Welfare. Information regarding this new variety, seed availability, ICM, IPM, Integrated Nutrient Management (INM) and post-harvest technologies was made available through mobile apps and web-based platforms.

Front Line Demonstrations (FLDs)

A total of 20 Front Line Demonstrations (FLDs) were conducted during the rabi seasons of 2017–18 and 2018–19 to promote the improved barnyard millet variety MDU 1 under Integrated Crop Management (ICM) practices. Ten progressive farmers were selected each year from the villages of Melathulukankulam, Gopalapuram, W. Pudupatti, Agathakulam, and Melakallankulam in Virudhunagar district to participate in the demonstrations. The FLDs were established to evaluate and compare the performance of the newly released variety MDU 1 with the farmers' existing varieties, including traditional local cultivars and CO (KV) 2, under recommended crop management practices. The demonstrations enabled farmers to directly assess the superior performance of MDU 1 in growth, yield attributes, grain yield, and economic returns under real-world farming conditions. The successful performance of the variety enhanced farmers' confidence in its adoption and facilitated its large-scale dissemination across the district.

Field Days

To demonstrate the performance of Barnyard millet variety MDU 1 under farmers' field conditions, two field days were organised at the demonstration sites during the crop season. Around 100 farmers from neighbouring villages participated in these programmes, along with officials from the Department of Agriculture and Farmers Welfare, including the Assistant Director of Agriculture (ADA) and Agricultural Officers (AO).

During the field days, participants observed the performance of MDU 1 compared with the existing local varieties and CO (KV) 2, interacted with the KVK scientists and beneficiary farmers. They discussed the recommended package of practices for MDU 1. The demonstrations clearly showcased



Barnyard Millet MDU1 Variety

the superiority of MDU 1 in plant growth, grain yield, and economic returns. The yield superiority and enhanced economic returns were presented and discussed, emphasising its higher productivity, net income, and improved benefit–cost ratio compared with existing varieties. The field days served as an effective platform for technology dissemination, experiential learning and farmer-to-farmer knowledge sharing.

Regular Monitoring

To ensure the successful implementation of the FLD, critical inputs, such as quality seeds of the barnyard millet variety MDU 1 and biofertilizers, were supplied to all participating farmers. Scientists from the KKV, Virudhunagar, regularly monitored the demonstration fields at critical crop growth stages, including the vegetative, flowering, and maturity stages, and provided timely technical guidance. The participating farmers were trained on the complete package of recommended production technologies, encompassing seed treatment, nutrient management, weed management, plant protection measures, harvesting, post-harvest handling and value addition.

Regular field visits, farmer–scientist interactions, and continuous advisory support facilitated the effective adoption of improved cultivation practices, resulting in better crop performance, enhanced productivity, and increased farmers' confidence in cultivating MDU 1. These extension interventions played a pivotal role in accelerating the large-scale adoption of the variety across the district.

Participatory Seed Production Programme

To ensure the sustained availability and adoption of the barnyard millet variety MDU 1, the KVK, initiated a participatory seed production programme during 2023–24, involving progressive farmers in quality seed production. The participating farmers received comprehensive technical guidance on quality seed production practices, including maintaining the prescribed isolation distance, roguing off-types, field inspections, timely harvesting, careful threshing, and proper post-harvest handling to maintain genetic purity and seed quality. Then, the seed lots were tested for key quality parameters, including physical purity, germination percentage, moisture content, and seed health. Only those seed lots that satisfied the prescribed quality standards were accepted for procurement and subsequent distribution by KVK Virudhunagar.

This participatory seed production and procurement model ensured a reliable supply of high-quality MDU 1 barnyard millet seeds for future dissemination while creating an additional income opportunity for participating farmers. This initiative also strengthened the local seed production and distribution system and reduced dependence on external seed sources. It contributed to the long-term sustainability and wider adoption of the MDU 1 barnyard millet variety in Virudhunagar district.

Tthe sequential process advocated to promote the Barnyard millet variety MDU 1 is illustrated in Figure 1.

CHALLENGES

The major challenge encountered during the promotion of the Barnyard millet variety MDU 1 was the limited awareness among farmers of its yield potential, nutritional benefits, and market opportunities. Most of the farmers preferred traditional millet varieties or major cereal crops due to familiarity and assured marketing. In addition, the initial availability of quality seed was limited, and farmers were hesitant to adopt a relatively new variety without observing its field performance. Lack of technical knowledge on improved crop management practices, seed production techniques and value addition also restricted its wider adoption.

These challenges were addressed through a systematic extension approach, including On-Farm Trials, Front-Line Demonstrations, training programmes, field days, and regular advisory services. Quality MDU 1 seeds were supplied to the identified farmers, and technical guidance was provided throughout the crop growth period. Successful demonstration plots showcasing higher yield, early maturity, drought tolerance and superior grain quality created confidence among neighbouring farmers. Awareness programmes on

Fig 1: Schematic diagram for Promoting Barnyard millet, MDU 1

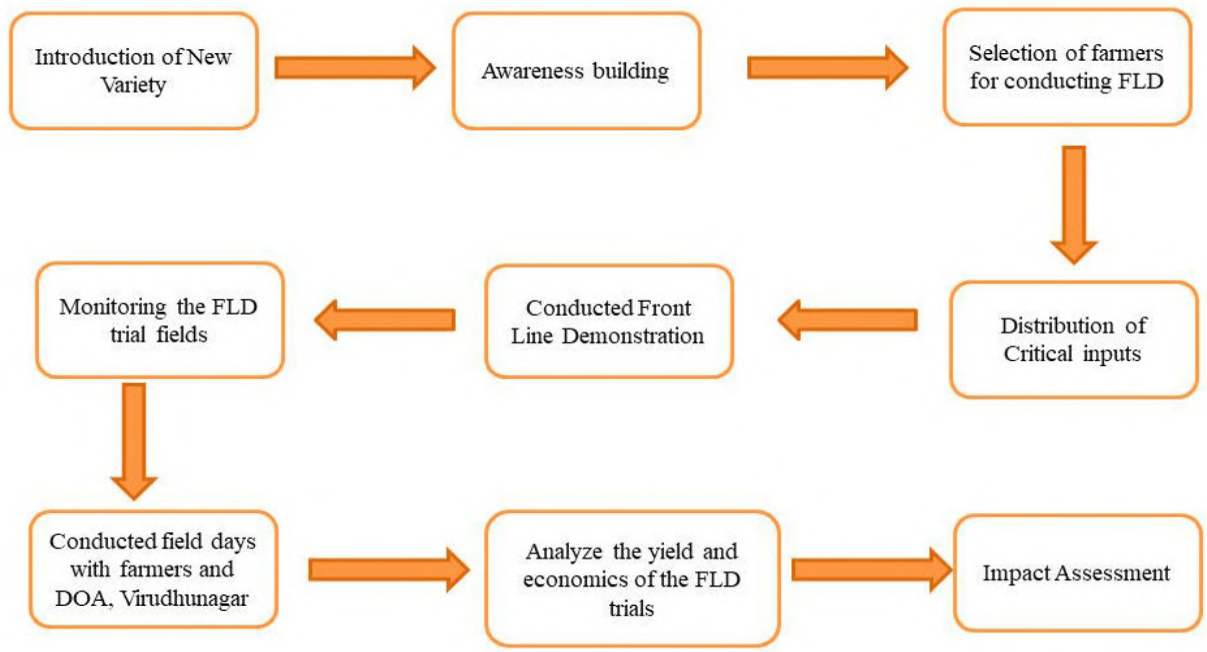


Table1: Increase in area under MDU1 in Virudhunagar district

Year	Barnyard millet area (ha)	MDU 1 varietal spread (ha)	% coverage
2019-20	1599	959	60
2020-21	1617	1229	76
2021-22	1721	1721	100
2022-23	1864	1864	100
2023-24	2060	2060	100



Field day organised to Promote MDU 1

the nutritional importance, processing opportunities and market potential of barnyard millet further enhanced the adoption rate. Continuous interaction between scientists, extension personnel and farmers helped resolve field-level problems, resulting in increased acceptance and gradual expansion of MDU 1 cultivation in the target areas.

BENEFITS AND IMPACT

The variety MDU 1 has recorded 17.67 per cent higher yield than CO (KV) 2. The increased yield resulted in higher gross return (₹24,222/ha), net return (₹13,569/ha), and a better Benefit-Cost Ratio (2.28) over CO (KV) 2 under the rainfed ecosystem. KVK's interventions have also resulted in an increase in the area under Barnyard millet, MDU 1, in Virudhunagar district (Table 1).

The KVK initiated seed production in barnyard millet MDU 1 through farmers' participatory mode during 2023-24. Training was given to the selected farmers about seed production and certification. Quality seeds produced by farmers were procured (4305kg) during 2023-2 by the KVK, Virudhunagar, through the KVK Revolving Fund.

SUSTAINABILITY AND SCALING UP

100 per cent of the barnyard millet area in Virudhunagar is now covered under MDU 1 variety. The FLDs organised by the KVK have led to increased demand for this variety's seeds in neighbouring districts. Many farmers have been visiting the KVK to understand the technical know-how of this variety.

To scale up the success of MDU 1 in other districts and states, a systematic approach is required. Initially, the variety should be evaluated through adaptive trials under different agro-climatic conditions to confirm its suitability and performance. Adequate production and distribution of certified quality seeds through public and private seed agencies should be ensured before large-scale promotion. Capacity building of extension personnel and farmers through training programmes, demonstrations, field days and exposure visits is essential for effective technology transfer. Continuous technical support during crop growth, timely supply of critical inputs, and development of strong market linkages and value-addition opportunities will encourage sustained adoption. While scaling up, special consideration should be given to local soil and climatic conditions, rainfall pattern, farmers' preferences, and availability of processing and marketing facilities. Integrating these efforts with government millet promotion schemes and Farmer Producer Organisations (FPOs) will further enhance the sustainability and wider adoption of MDU 1 across millet-growing regions.

LESSONS LEARNT

- Front Line Demonstrations (FLDs) are the most effective tool for convincing farmers about the performance of a new variety under real farming conditions.
- Farmer-to-farmer dissemination plays a crucial role in accelerating the adoption of improved varieties since farmers observe visible field results.
- Timely availability of quality seed is essential for rapid expansion and sustained adoption of the variety.
- Continuous technical guidance and regular field monitoring significantly improve farmers' confidence and ensure successful crop establishment.
- Training and capacity-building programmes enhance farmers' knowledge of improved production practices and increase productivity.
- Field days and farmer–scientist interactions provide an excellent platform for knowledge sharing, addressing field problems, and motivating neighbouring farmers.
- Demonstrating the economic benefits, including higher yield and better profitability, is more effective than promoting the variety based only on its technical superiority.
- Strong collaboration among KVK, the Department of Agriculture, research institutions, and farmers is essential for successful technology dissemination.
- Local adaptation and validation under farmers' field conditions are necessary before recommending the variety for large-scale

cultivation in new regions.

- A reliable seed production and distribution system should be established simultaneously with variety promotion to meet the increasing demand.
- Market linkages and value-addition opportunities encourage long-term cultivation and improve farmers' income from barnyard millet.
- Regular feedback from farmers helps refine extension strategies and identify practical challenges for improving future promotion programmes.

These lessons highlight that the successful promotion of MDU 1 depends not only on the variety's genetic potential but also on effective extension support, the availability of quality seed, farmer participation, and sustained institutional collaboration.

CONCLUSION

The KVK successfully promoted the Barnyard millet variety MDU 1 through a comprehensive extension strategy involving capacity-building programmes, Front Line Demonstrations (FLDs), field days, regular field monitoring, and continuous technical guidance. These interventions effectively demonstrated the superior yield potential, adaptability and desirable milling qualities of MDU 1 to both farmers and traders. As a result, the variety gained widespread acceptance, leading to the complete replacement of traditional local varieties and CO (KV) 2 across the barnyard millet-growing areas of Virudhunagar district within five years (2019–2023).

To ensure long-term sustainability, KVK facilitated participatory seed production in farmers' fields, enabling the timely availability of quality seeds while providing an additional source of income to seed growers. This community-based seed production model has strengthened the local seed supply chain and ensured the continued availability of MDU 1 for future cultivation. The increasing demand for MDU 1 seeds from neighbouring districts further demonstrates the intervention's success and scalability.

The experience gained from Virudhunagar indicates that successful scaling up of MDU 1 in other districts and states requires a combination of quality seed availability, adaptive field demonstrations, continuous extension support, farmer training, strong institutional collaboration, and market linkages. Validation of the variety under local agro-climatic conditions, along with active participation of the Department of Agriculture, Krishi Vigyan Kendras, Farmer Producer Organisations (FPOs) and seed agencies, will facilitate wider adoption. With these enabling conditions in place, MDU 1 has the potential to contribute significantly to enhancing millet productivity, strengthening seed systems, improving farmer incomes and promoting climate-resilient agriculture in other millet-growing regions.

Acknowledgement: The authors thank Vice-Chancellor and Director of Extension Education of Tamil Nadu Agricultural University (TNAU), Coimbatore and Director (ATARI), Zone X for continues support and inspiration

Authors



Chelvi Ramessh
Programme Coordinator
KVK Virudhunagar
chelviramessh@tnau.ac.in



B. Venudevan
Subject Matter Specialist (Seed Science)
KVK Virudhunagar
venudevan.b@tnau.ac.in.



A. Sheeba
Subject Matter Specialist (PBG)
KVK Virudhunagar
sheeba.a@tnau.ac.in



S. Krishnakumar
Subject Matter Specialist (Soil Science)
KVK Virudhunagar
krishnakumar.s@tnau.ac.in



J. Kannan
Subject Matter Specialist (Environmental Science)
KVK Virudhunagar
kannan.j@tnau.ac.in



B. Nallakurumban
Subject Matter Specialist (Home Science)
KVK Virudhunagar
nallsfoodtech1977@gmail.com



T. Balaji
Subject Matter Specialist (Soil Science)
KVK Virudhunagar
alwartbalaji@gmail.com

ICAR-KVK Darsi, Prakasam, Andhra Pradesh

Promoting Multi-Cut Fodder Varieties in Prakasam District

In this good practice note, N. Leela Krishna, T. Manasa and G. Ramesh from the KVK Darsi discuss their work on introducing high-yielding multi-cut fodder varieties in Prakasam District of Andhra Pradesh.

CONTEXT

Prakasam district ranks second in total livestock population and first in milch animal population in Andhra Pradesh, indicating a strong dependence on dairy- and livestock-based livelihoods. Despite its large livestock base, the district faces a severe feed and fodder deficit of –76.7% on a dry-matter basis, which significantly constrains livestock productivity. The fodder scarcity is driven by erratic rainfall, prolonged dry spells, limited irrigation facilities, shrinking cultivable land, and farmers' preference for food and commercial crops over fodder cultivation. Degradation of natural grazing lands and reliance on traditional single-cut fodder varieties further worsen the situation, as these varieties fail to meet year-round fodder requirements. Seasonal shortages, especially during summer and drought years, have adversely affected milk yield, animal health, and household income. In this context, the KVK, Darsi functioning under Acharya N. G. Ranga Agricultural University (ANGRAU) identified the urgent need to introduce high-yielding, multi-cut fodder varieties such as CO-4 Bajra Napier Hybrid, COFS-29, and Super Napier to ensure continuous availability of green fodder and improve livestock-based livelihoods.

GOOD PRACTICES

Training

KVK, Darsi conducted six two-day training programmes on "Fodder Production and Feeding of Dairy Animals" during 2024, organised in six batches of 40 farmers each, covering 240 dairy farmers from six villages of Prakasam district. These programmes aimed to educate and sensitise farmers on suitable fodder crops for the district and their cultivation practices; fodder preservation techniques (silage and hay) to overcome drought-period scarcity; preparation of least-cost rations using locally available feed resources; and utilisation of unconventional feed ingredients in dairy animal feeding.

Knowledge Dissemination through Publications

KVK, Darsi published a farmer-friendly book titled "Pashugrasaala Pempakam Mariyu Paadi Pashuvula Yaajamaanyam" (Fodder Cultivation and Dairy Cattle Management), covering suitable fodder crops, cultivation practices, and dairy animal management. The book was distributed to all training participants to reinforce learning and promote adoption.



Establishment of Fodder Cafeteria (Demonstration Units)

Live demonstration plots (fodder cafeteria) were developed at the KVK to showcase different fodder crops suitable for the district. These demonstrations enabled farmers to visually assess the performance of different fodder varieties, management practices and biomass yield, thereby enhancing awareness and confidence in adoption.



Providing Fodder seed to farmers under OFT's & FLD's

Distribution of High-Yielding Fodder Seed

To promote on-farm green fodder production, certified CoFS-31 multi-cut fodder seed was procured from Tamil Nadu Agricultural University (TNAU) Coimbatore and distributed to 350 dairy farmers. The introduction of this high-yielding variety aimed to help farmers establish their own fodder plots, ensure year-round availability of green fodder, and reduce dependence on costly commercial feed.

CHALLENGES

Initially, farmers were hesitant to cultivate newly introduced multi-cut fodder varieties due to unfamiliarity and concerns about their performance under local conditions. Farmers also demanded field-level evidence of yield advantage and adaptability before adoption, necessitating demonstrations in real-world farm conditions. In addition, limited awareness of scientific fodder production and conservation practices constrained effective utilisation of fodder resources.

To mitigate these challenges, KVK, Darsi conducted on-farm trials and frontline demonstrations of high-yielding multi-cut fodder varieties to showcase their performance and benefits. Simultaneously, awareness and training programmes on fodder production and conservation techniques were organised, thereby enhancing farmers' knowledge, building confidence, and facilitating the wider adoption of improved fodder technologies.

BENEFITS AND IMPACT

The interventions initiated by KVK, Darsi have demonstrated significant benefits in improving fodder availability and farmer awareness, with a positive response indicating strong potential for scaling up multi-cut fodder cultivation in Prakasam district. Although the immediate replacement of 50–60% of single-cut fodder crops is constrained by factors such as limited irrigation, seed availability, and landholding size, the rising adoption trend suggests a gradual, sustained shift toward multi-cut fodder varieties over the next three years. Enhanced access to quality seed, coupled with continued demonstrations and capacity-building programmes, is enabling dairy farmers to ensure year-round availability of green fodder, reduce dependence on costly commercial feed, and improve milk productivity.

The promotion of fodder conservation techniques such as silage and hay making has further strengthened fodder security by allowing farmers to store surplus green fodder for use during drought and scarcity periods. In addition, simple practices such as urea and molasses treatments of crop residues and dry fodder have improved nutrient availability and digestibility, contributing to better animal health and productivity. Overall, sustained awareness creation and frontline demonstrations in KVK-adopted villages are motivating farmers to expand fodder cultivation as an integral component of dairy farming, leading to improved livelihood security and resilience of livestock-based production systems.

SUSTAINABILITY AND SCALING UP

Ensuring Availability of Quality Seed:

Sustained access to certified multi-cut fodder seeds is essential for scaling adoption. KVK, Darsi will continue to procure and distribute quality seed to farmers to promote on-farm fodder production.

Infrastructure Support for Fodder Conservation:

Providing facilities for fodder conservation, such as chaff cutters and silage-making infrastructure, supports sustainable fodder management. KVK has supplied 6 chaff cutters to SC and TSP farmers under the special plan SCSP (Scheduled Cast Sub



Providing Fodder Seed to Farmers

Plan) and TSP (Tribal Sub Plan). At the same time, support from the Department of Animal Husbandry, Government of Andhra Pradesh, is also extended through physical inputs.

Community-Level Resource Sharing:

Establishing community-based fodder conservation and processing units (chaff cutters, silage pits) will reduce investment costs and encourage collective adoption.

Continuous Capacity Building and Demonstrations:

Regular frontline demonstrations and training programmes will be conducted in KVK-adopted villages to build confidence and motivate farmers toward large-scale fodder cultivation.

LESSONS LEARNED

- Continuous awareness creation is essential to enhance adoption of improved fodder varieties. On-farm trials and frontline demonstrations are effective in convincing farmers about the performance of new fodder varieties under local conditions.
- Continuous training and technical support ensure long-term success: Regular training, guidance, and follow-up are key for sustained adoption and scaling of fodder cultivation.
- Quality seed availability drives scaling: Providing certified multi-cut fodder seeds is crucial for successful adoption and expansion of fodder cultivation.
- Fodder conservation enhances resilience: Silage and hay-making practices help farmers manage fodder scarcity during summer and drought periods.
- Low-cost feed improvement increases profitability: Simple treatments like urea or molasses application to dry fodder improve nutrient value and digestibility, reducing feed costs.
- Shared infrastructure supports sustainability: Group access to chaff cutters and silage facilities under SCSP/TSP schemes reduces investment burden and encourages collective adoption.

CONCLUSION

The introduction and popularisation of high-yielding multi-cut fodder varieties by KVK, Darsi has proven to be a viable and sustainable solution to address the chronic fodder deficit in Prakasam district. Through farmer training, demonstrations, quality seed distribution, and fodder conservation practices, the initiative has enhanced year-round availability of green fodder, reduced feed costs, and strengthened dairy productivity. Continued support and scaling of this approach will further improve livestock resilience, livelihood security, and overall rural prosperity in the district.

Acknowledgements: The authors gratefully acknowledge Acharya N.G. Ranga Agricultural University and Krishi Vigyan Kendra (KVK), Darsi, for institutional support in implementing the impactful interventions. We sincerely thank the Hon'ble Vice-Chancellor, ANGRAU, for their valuable support. The authors also thank Dr Shaik N. Meera, Director, ICAR–ATARI, Zone X, Hyderabad, for coordinating and facilitating the program.

Authors



N. Leela Krishna
Subject Matter Specialist (Veterinary Sciences)
KVK Darsi
krishnaripeddi94@gmail.com



T. Manasa
Subject Matter Specialist (Home Science)
KVK Darsi
manasamsd11@gmail.com



G. Ramesh
Senior Scientist and Head
KVK Darsi
g.ramesh@angrau.ac.in

ICAR-KVK Mamnoor, Warangal, Telangana

Promoting Area Specific Mineral Mixture for Enhancing Milk Yield in Warangal

In this good practice note, N. Rajanna, J. Sai Kiran, G. Ganesh, R.Arunjyothi, Ch. Sowmya, and A. Raju discuss interventions to improve production, productivity, and the sustainable livelihoods of farmers through the introduction of the Area Specific Mineral Mixture.

CONTEXT

Most people in Warangal District of Telangana state depend solely on agriculture and animal husbandry. Marginal and small farmers constitute about 79.5% and 13.5% of the farming community, respectively. Out of the total livestock population of 6,29,088, the cattle and buffalo populations account for 78,369 and 1,07,069, respectively. Most farmers maintain 2–3 dairy animals under extensive grazing systems without scientific feeding practices and mineral supplementation. As a result, milk yield per animal is low and reproductive problems such as repeat breeding and infertility are common due to micronutrient deficiencies. A method that can potentially enhance milk production is mineral mixture feeding, which can enhance the nutritional intake of dairy cattle. Since 2021-22, KVK Mamnoor functioning under P.V. Narsimha Rao Telangana Veterinary University (PVNRTVU) has been promoting area-specific mineral mixture feeding among farmers in Warangal, resulting in improved dairy cattle production and productivity.

GOOD PRACTICES

Identification of Field Gaps

Through regular field visits and diagnostic surveys undertaken during Decemeber 2020, the KVK staff identified the following major reasons for low milk yield and fat percentage. These include: lack of balanced feeding practices, low awareness of micronutrient supplementation, dependence on grazing-based feeding systems, low plane of nutrition and high incidence of infertility and repeat breeding. During diagnostic visits, scientists observed that several dairy animals were weak, lethargic, in poor body condition, with low appetite, reduced milk yield, and reproductive disorders. These symptoms clearly indicated mineral deficiencies prevalent under field conditions.

Front Line Demonstrations

Frontline demonstrations on area-specific mineral mixture supplementation were conducted for three consecutive years (2021–2024) by the KVK in its adopted villages, Malkapally, Gavicherla and Mahabubnagaram of Warangal district. A total of 30 lactating dairy animals with nearly uniform lactation stage, milk yield, and parity were selected. From each farmer, two milking animals were selected: one as the treatment (T) and the other as the control (C). A total of 30 farmers from adopted villages were selected for this demonstration. While the animals in the control group were fed with 25–30 kg green fodder, 4–5 kg paddy straw and 1.5 kg concentrate mixture per day, without mineral mixture, those in the treatment group were fed with the same ration along with 50 g/day of area-specific mineral mixture for a period of three months. The mineral mixture contained calcium (18.5%), phosphorus (10.6%), zinc (0.65%), copper (0.28%), manganese (0.36%) and common salt (25%). Clean drinking water was provided ad libitum.

The area-specific mineral mixture was supplied free of cost to farmers as part of FLD by KVK Mamnoor and was developed by P.V. Narsimha Rao at Telangana Veterinary University (PVNRTVU). Farmers recorded daily data, and KVK scientists conducted weekly monitoring. Frequent training programmes and demonstrations on scientific feeding, low-cost concentrate preparation, green fodder cultivation and silage making were also conducted. The area-specific mineral mixture produced by PVNRTVU is lower in cost than farmers' market purchases, reflecting an economic impact on farmers, and milk yield increased by approximately 1.0 litre after feeding the area-specific mineral mixture.



Distribution of Area Specific Mineral Mixture

BENEFITS AND IMPACT

Minerals play a crucial role in growth, bone development, milk synthesis, immune response and reproduction in dairy animals. Although roughages and concentrates supply some minerals, they are often insufficient to meet the actual requirements, especially during peak lactation. Area-specific mineral mixtures are formulated to address regional deficiencies, ensuring targeted supplementation.

Supplementation of mineral mixture resulted in the following improvements:

- Average increase in milk yield: 0.95–1.05 litres/day
- Milk fat improved up to 6.1%
- SNF improved up to 9.08%
- Calf mortality reduced to 1–3%
- Average monthly weight gain in calves improved to 15–20 kg
- Incidence of silent heat reduced from 20% to 10%
- Conception rate improved significantly
- Number of artificial inseminations reduced from 3–4 to 1–2
- Postpartum estrus period reduced from 90 days to 60–65 days

The cost of PVNRTVU mineral mixture is Rs. 45 per kg, whereas commercial mineral mixtures cost around Rs. 180–200 per kg. Thus, farmers saved nearly Rs. 150 per kg, resulting in substantial economic benefits.

On observing the positive results, Janagaon Dairy procured 10 tonnes of area-specific mineral mixture from the Department of Animal Nutrition. Farmers also began purchasing the mineral mixture directly from the College of Veterinary Science in Rajendranagar, Hyderabad.

CHALLENGES

At first, the task of convincing the farmers about PVNRTVU-produced mineral mixture supplementation for their livestock was quite difficult due to a lack of knowledge about mineral deficiencies in their animals, and mineral mixture supplementation was not considered a necessary feeding practice by the farmers. Also, the commercial mineral mixtures were costly and not available on time, additional hurdles that prevented adoption. In addition to all this, there was no prior research or field demonstrations in the area.
To address the above-mentioned problems, the KVK adopted a participatory extension approach through awareness programs, field demonstrations, and interactions with farmers. The benefits of using a balanced mineral mixture for improving milk yield, reproduction, and animal health were evident in the field. Thus, farmers began to gain confidence in the technology.



Training /Group Discussion on Feeding Management

Also, to make it affordable and sustainable, the KVK facilitated the distribution of the mineral mixture through the cooperative dairy. The mineral mixture was made available to over 500 farmers at the purchase price, with no profit margin.

SUSTAINABILITY AND SCALING UP

Krishi Vigyan Kendra (KVK), Mamnoor has made continuous efforts to sustain the practice of mineral mixture supplementation among farmers through regular training programmes, frontline demonstrations, field visits and technical advisory services. The area-specific mineral mixture is produced by PVNRTVU at a much lower cost than commercial mineral mixtures, making it

economically feasible for long-term adoption by small and marginal farmers.

Further, KVK Mamnoor facilitated linkages among farmers, dairy cooperatives, and the College of Veterinary Science, Rajendranagar, to ensure the easy availability of mineral mixture even after the demonstrations were completed. Farmers were motivated to procure mineral mixtures on their own, and local dairy societies were encouraged to take up bulk procurement and distribution. This institutional support system, along with visible improvements in milk yield, reproductive performance and animal health, has ensured sustained adoption of mineral mixture feeding as a regular practice in the region.

Scaling up mineral mixture feeding requires developing scientifically balanced formulations, partnering with dairy cooperatives and universities, establishing local production units, providing continuous farmer training, engaging veterinarians and nutritionists, and implementing monitoring systems for productivity and health.



Demonstration on usage of chaff cutter

LESSONS LEARNED

The implementation of this project demonstrated that technology adoption depends not only on its scientific validity but also on farmers' confidence in its benefits. Generating local evidence through on-farm demonstrations and validating the technology under farmers' field conditions were more effective in influencing adoption than awareness programmes alone. Farmers who experienced positive results became credible advocates, accelerating the technology's dissemination through peer learning.

Another important lesson was that affordability and timely availability are critical for sustained adoption. Facilitating the distribution of mineral mixture through a Dairy Cooperative ensured continuous access to quality input at an affordable price, overcoming a major barrier to adoption. The project also highlighted that strong collaboration among KVKs, research institutions, veterinarians and extension agencies is essential for scaling up and sustaining nutritional interventions in dairy production.

CONCLUSION

Feeding of area-specific mineral mixture is a simple, low-cost and highly effective intervention for improving milk production, reproductive performance and health of dairy animals. The frontline demonstrations conducted by KVK Mamnoor clearly established its technical and economic feasibility. Hence, mineral mixture supplementation should be promoted as a core component of sustainable dairy farming systems.

Acknowledgements: The authors sincerely thank the Director, ICAR-ATARI, Zone X, for sanctioning funds, and the Vice Chancellor and the Director of Extension, , P.V. Narsimha Rao Telangana Veterinary University (PVNRTVU), and Krishi Vigyan Kendra, Mamnoor, Warangal District, Telangana State-506166 for providing facilities.

Authors



N. Rajanna
Professor, Dept of LPM, CVSc Hyderabad
neeradiraj@gmail.com



J. Sai Kiran
Subject matter specialist (Livestock production and management)
KVK Mamnoor
sai.shiva.meena@gmail.com



G. Ganesh
Subject matter specialist (Aquaculture)
KVK Mamnoor
gugulothuganesh007@gmail.com



R. Arunjyothi
Senior Scientist & Head (Home Science)
KVK Mamnoor
arunjyothir@pvnrtvu.ac.in



Ch. Sowmya
Subject matter specialist (Agronomy)
KVK Mamnoor
sowmyachetty7@gmail.com



A. Raju
Subject matter specialist (Plant protection)
KVK Mamnoor
agurla25@gmail.com

भाकृअनुप-कृषि तकनीकी अनुप्रयोग अनुसंधान संस्थान (अटारी)
ICAR-AGRICULTURAL TECHNOLOGY APPLICATION RESEARCH INSTITUTE (ATTARI)
ZONE-X/क्षेत्र 10, क्रीडा परिसर/CRIDA CAMPUS,
संतोषनगर/SANTOSHNAGAR, हैदराबाद /HYDERABAD - 500059

CENTRE FOR RESEARCH ON INNOVATION AND SCIENCE POLICY (CRISP)
ROAD NO.10, BANJARA HILLS,
HYDERABAD-500034
TELANGANA