

Tribal Sub Plan (TSP) Activities of ICAR-CTRI for Empowerment of Tribal Farm Families



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ICAR - CENTRAL TOBACCO RESEARCH INSTITUTE
(ICAR-NATIONAL INSTITUTE FOR RESEARCH ON COMMERCIAL AGRICULTURE)

(An ISO 9001 : 2015 Certified Institute)

RAJAHMUNDRY - 533 105, ANDHRA PRADESH, INDIA



Technical Bulletin No. 05/2024

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Citation: Suman Kalyani, K., M. Sheshu Madhav, B. Hema, K. Viswanatha Reddy and J. Poorna Bindu. 2024. Tribal Sub Plan (TSP) Activities of ICAR-CTRI for Empowerment of Tribal Farm Families. *Technical Bulletin No. 03/2024*. ICAR-CTRI, Rajahmundry. pp.37.

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Published by

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May, 2024

Preface

Tribal communities of India have played a vital role in conserving the rich culture and heritage of our country. According to the 2011 census, the tribal population in India was 10 crores 40 lakhs, which constitutes 8.6% of the country's population. Tribal agriculture is characterized by small land holdings, improper land utilization, inadequate farming techniques, low capital investment and low production inputs.

The farming in tribal India evolved a unique way of farming within the ecosystem, which lacks diversification and highly vulnerable to the climate change. In recent years, the tribes have faced many agro-ecological challenges and new constraints due to the degradation of natural resources, and increasing demand for food. In the hilly upland, it is particularly important to address the tribal eco system concerns and inculcate stability to the tribal farming system.

An attempt was made by ICAR-CTRI during 2014-15, to address these challenges with the help of Tribal Sub Plan (TSP) activities through awareness, capacity building, skill development and income generation programmes. The institute has implemented various activities by which, there has been an increased interaction of ICAR-CTRI with the tribal farming community in planning and implementing various welfare and developmental programmes. The TSP team of ICAR-CTRI has identified and implemented several agricultural technologies, which has made a positive impact on livelihood and nutrition security of tribal farm families.

The TSP activities implemented at ICAR-CTRI and its regional stations were documented in the form of bulletin. The TSP technological interventions presented in the bulletin were well designed by taking account of the locally available resources, their land use pattern, the traditional podu cultivation practices and also the tribal customs and rituals into account. These diversified programmes, novel strategies and concerted efforts enhanced the farm production and family income of tribal poor there by helped to meet the challenge of doubling the farmers' income.

This bulletin discusses the problems and constraints confronted by the tribal farmers and suggest suitable interventions in the field of agriculture and allied activities. The information presented in the bulletin will be useful for several stakeholders, policy makers and programme planners for successful implementation of developmental plan and welfare measures for up-liftment of tribal communities.

I congratulate the authors for bringing out this booklet containing valuable information about various innovative technologies offered to tribal farming communities depending on their socio-economic conditions and primitive cultural heritage of tribal population.



Dated: 26-04-2024


(M. SHESHU MADHAV)
DIRECTOR

Acknowledgements

The authors (TSP Committee 2023-24) acknowledge the previous Chairpersons, Dr. C. Chandrasekhara Rao (2014-17), Dr. S.Kasturi Krishna (2021-23), Dr. Y. Subbaiah and respective committee members for their valuable contributions.

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TRIBAL SCENARIO OF INDIA

The tribal population in India have contributed their rich heritage of culture, life style and ethnicity to the country. Indian tribes are also called as *Atavika* (forest dwellers), *Vanavasis* or *Girijans*. Tribal people in India spread in the states of Orissa, Madhya Pradesh, Chattisgarh, Rajasthan, Gujarat, Maharashtra, Andhra Pradesh, Bihar, Jharkhand, and West Bengal and also in the North East regions *viz.*, Assam, Meghalaya, Nagaland and Mizoram. The tribal population is scattered among all the states and union territories in India.

According to the 2011 census, the tribal population in India was 104 million, constituting 8.6% of the country's population. There are about 1,45,000 tribal villages in India, out of the total 6,49,481 villages in the country. The places with maximum tribal settlements are Mizoram (94.4% of the population), Lakshadweep (94%), Meghalaya (86.1%), and Nagaland (86.5%). Madhya Pradesh, Orissa, Maharashtra, Rajasthan, Chhattisgarh, Assam, West Bengal, combined Andhra Pradesh (5.3%) also have important tribal settlements. Despite of sincere efforts by the Government, many of the interventions have not reached these tribal populations. Even after seventy-six years after India's independence, there is a significant economical and social disparity among tribal and urban population.

The tribes in Andhra Pradesh and Telangana present a fascinating diversity with its variegated socio-cultural traditions and diversified occupations. Their habitat spreads along the coastal and mountain strip of Bay of Bengal from the Bhadravari agency in Srikakulam district to Bhadrachalam in Khammam and Godavari districts further spreading to Adilabad region. The tribal population is concentrated mainly in hilly and forest areas of Srikakulam, Vizianagaram, Visakhapatnam, East Godavari, West Godavari, Khammam, Warangal, Adilabad and Mahaboobnagar districts of combined Andhra Pradesh with a total population of 26.3 lakhs according to 2011 census.

As the tribal villages are located in remote areas, far from the urban and rural sectors, there is an imperative need to take up ecologically sound, economically viable, and easily adoptable technologies in agriculture and allied activities for increasing the quality of life for integrating them in the main stream of the society. The targeted welfare programmes should be planned properly with effective economic utilization of untapped local natural resources through proper value addition for strengthening the income generation with the support of local agencies.

Need based vocational training programs which are technologically sound and economically productive will help the tribal youth to sustain themselves through self employment and making them self-reliant over a period of time. Adoption of appropriate technologies for on-farm value-addition of agricultural by-products and agro-wastes will result in greater economic dividend and help to solve their agro-based problems effectively. The increased living standard will ensure the quality of health, education and employment leading towards empowerment. The proposed interventions through Tribal Sub Plan (TSP) intended to bring desirable and qualitative change in the living system of the targeted groups.

Tribal Sub Plan ICAR-CTRI

Identified Problems and Suitable Interventions

In order to bring the schedule tribes to the mainstream development process and also to percolate the welfare schemes of Government of India to scheduled tribe population of the country, the Tribal Sub-Plan (TSP) was initiated during Fifth Five Year Plan for socio-economic up-liftment of the tribal communities in India. The basic objective of Tribal Sub-Plan is to channelize the flow of outlay and benefits from the general sectors in the Central Ministries/Departments for the development of Scheduled Tribes at least in proportion to their population, both in financial and physical terms.

Objectives

- Substantial reduction in poverty and un-employment of tribal population
- Creation of productive assets in favour of Scheduled Tribes to sustain the growth through development efforts by providing adequate educational and health services
- Human resource development of the Scheduled Tribes
- Provision of physical and financial security against all types of exploitation and oppression

TSP implementation at ICAR-CTRI

Tribal Sub-Plan (TSP) programmes were initiated by ICAR-CTRI during the year 2014-15. A committee has been constituted to implement the activities of the Tribal Sub Plan of ICAR-CTRI for preparing and implementing the Tribal Sub-Plan as per the guidelines and modus operandi.

Selection of the villages

Surveillance of the tribal areas was conducted by the committee under the jurisdiction of Integrated Tribal Development Agency (ITDA) of Andhra Pradesh. Project Officers of ITDA at Rampachodavaram, East Godavari District and KR Puram, Joint Director of Agriculture, West Godavari District and Regional Manager-Tobacco Board, Rajahmundry were consulted and discussions were held for identification of interventions and implementation of TSP programmes. Based on consultations and available data, representative villages of East and West Godavari districts located at a distance of 60-80 km from ICAR-CTRI, Rajahmundry were selected for implementation of the TSP activities.



Triangulation of information with key informants



Interaction with the Project Officer, ITDA

Methodology

The committee has visited Seethappagudem panchayat, hamlet villages and collected relevant information through **Participatory Rural Appraisal (PRA) tools**, which are the complementary to conventional survey. Collected information is verified by triangulation among various key informants (KI's) in addition to on-site observation by the team constituted for implementation of TSP of ICAR-CTRI. Sampling tools like surveillance, interviews, group discussions were conducted in eleven hamlet villages viz., Lankallapalli, Rachuru, Kummari kunta, Pedakapavaram, Chinnakapavaram, Manchalavarigudem, Padmavarigudem, Dasayyapalem, Kollaigudem, Buddulavarigudem and T.Kattupalli for preparing constructive action plan.



Collecting and analyzing information through PRA techniques and tools

Methodology used to collect information is as follows

1. Direct observation, collection and verification of primary data
2. Collection of secondary data from panchayat members and officials of the State Department of Agriculture, Horticulture and Animal Husbandry
3. Preliminary rapport building with villagers for easy interaction and spontaneous involvement
4. Semi structured interview to motivate villagers' participation in different aspects of the villages
5. Collection of detailed information by approaching representative key informants
6. Seasonal analysis to understand different time bound farm activities, problems and opportunities throughout the year
7. Problem identification and prioritisation to identify the important problems and formulated problem solving technology interventions
8. Building rapport with villagers through transect walks and focussed group discussions

Problem identification and need based interventions

A socio-economic survey was carried out by using PRA techniques to analyze the tribal scenario. The major problems were identified and the interventions were proposed. The committee analyzed and prioritized the problems, identified the needs and requirements to address the prioritized problems aiming at the enhancement of on and off farm income and to improve the livelihood conditions of beneficiary tribal famers.

Prioritized agricultural problems

- Low productivity and low net returns in FCV tobacco, paddy, maize, cotton, jowar, green gram, black gram
- Low productivity and low net returns in cashew and mango
- Non-availability of sufficient irrigation water
- Lack of awareness of improved farm machinery and non- adoption
- Post harvest losses and storage losses of food grains
- Lack of improved poultry breeds in tribal area

- Ineffective utilization of local resources
- Low income from self- help groups
- Low milk yields in buffaloes
- Low egg productivity in local chicks
- Non-availability of improved seed varieties and seedlings in tribal areas
- Lack of knowledge on IPM, INM and disease management
- Drudgery and lack of hand tools and agricultural implements
- Poor health and nutritional status in women and children

Flue Cured Virginia (FCV) tobacco, burley tobacco, maize, cotton, jowar and paddy are the major cultivated crops in addition to cashew and eucalyptus plantations. The farmers are not adequately and qualitatively equipped with the technologies. Further, there is a vast scope for livestock to play an important role in supplementing farmers' income apart from providing nutritional requirements. There is a need to make more efforts to broaden the knowledge base of farmers to enable them to make optimum use of resources and new technologies utilizing available information about farming practices, policy initiatives and market intelligence. Hands on experience, skill up-gradation would help in augmenting their efficiency and enhance their income generation opportunities.

Action Plan

In the back drop of prioritized agricultural problems, problem cause relations, available technologies, knowledge base of farmers and with a view to ensure direct benefits to the individual or families and for substantial improvement in the on and off farm income of tribal population in operational area, ICAR-CTRI has prepared an action plan with a focus on awareness creation, technology demonstration, good agricultural practices, value addition, water harvesting & storage, creation of physical assets like farm machinery and enhancement of income through upgradation of technical skills. Keeping in view of existing needs and resource endowments of the farming community, crop specific, resource specific and farm specific technological interventions were proposed to address the prioritized problems.

Technological Interventions Implemented

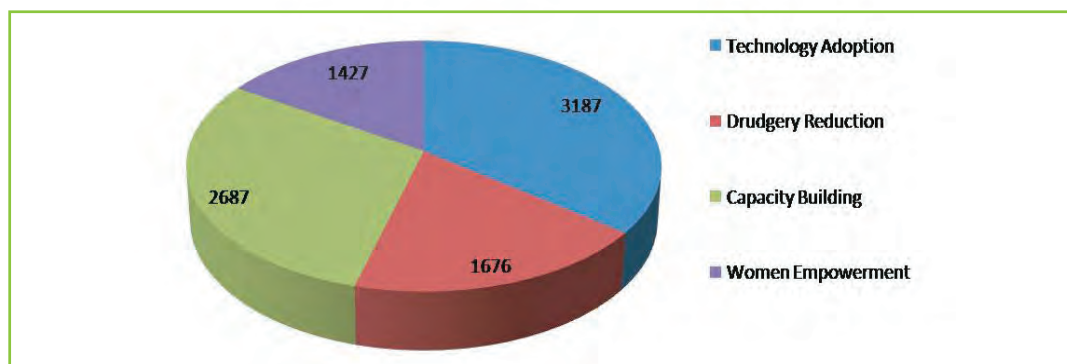
Based on the problems identified among the tribal population, the following need based, location specific agro based interventions were identified for up-liftment of tribal communities under TSP.

- Popularisation of package of practices of existing crops through proper extension methods.
- Providing irrigation facility through motor pump-sets and de-silting of water ponds.
- Providing improved farm machinery
- Construction of permanent storage grain structures
- Introduction of high yielding improved poultry breeds in tribal backyards
- Supply and popularization of solar lanterns in PHPM operations of tobacco
- Proper utilization of locally available resources viz., palmyrah and Minor Forest Produce
- Establishment of home stead units by providing need based machinery and tool kits
- Entrepreneurship activities among self- help groups
- Introduction of cattle feed and fodder
- Introduction of improved seed in pulses, jowar, maize and paddy
- Introduction of improved seedlings and saplings in cashew and mango
- Backyard kitchen gardening for nutritional security with improved seeds
- Training and awareness programs among farmers
- Skill up-gradation and capacity building among tribal youth
- Drudgery reducing and time saving hand tools and implements
- Supplementary nutrition and awareness programmes for women and children

Budget Allocation, Beneficiaries Covered and Classification of TSP Programmes

The implemented TSP programmes were categorised in to the following classification of technology adoption, drudgery reduction, capacity building and women empowerment based on the context. The numbers of beneficiaries trained were provided under each category were given below. Till now, a total of 8977 farmers were benefitted through TSP programmes. Process of implementation was in a participatory mode with the villagers and other stakeholders.

Classification of TSP Programmes during the past decade



Year-wise budget allocation and beneficiaries covered

S. No	Category	No of Beneficiaries Covered (Year Wise) & budget outlay (in lakhs)										Grand Total (105.2 L)
		2014	2015	2016	2020-21		2021-22		2022	2023		
		-15 (10)*	-16 (10)*	-17 (8)*	(6.67)*	NEH (6.12)*	(18)*	NEH (12.2)*	-23 (25)*	-24 (22)*		
1	Technology Adoption	492	370	165	90	-	720	-	750	600	3187	
2	Drudgery Reduction	125	120	376	75	-	270	170	225	315	1676	
3	Capacity Building	425	240	467	260	60	350	80	380	425	2687	
4	Women Empowerment	250	220	157	85	85	110	-	250	270	1427	
	Total	1292	950	1165	510	145	1450	250	1605	1610	8977	

* The figures in the parenthesis represent amount sanctioned in lakhs; NEH: North Eastern Hilly region (The TSP budget has not been granted during the years; 2017-18, 2018-19 & 2019-20)

Aiming at the broad based development of diversified activities in the village without affecting the natural resource base and also to build environment friendly practices based on the potential and priorities of the village, technological interventions were formulated and implemented

Technology Adoption Programmes

- FCV Tobacco nursery management practices and Seed supply of improved varieties *viz.*, FCJ 11, CH3, Kanchan *etc.*
- Training on tray seedling production for healthy seedling production in FCV tobacco and distribution of pro-trays
- Good Agricultural Practices of FCV tobacco and supply of green shade nets
- Distribution of improved variety seeds of important crops like paddy, sorghum, maize *etc*
- Integrated Nutrient Management in FCV tobacco
- Integrated Pest Management (IPM) in FCV Tobacco and supply of marigold saplings
- Pesticide Application Technology in chilli crop
- Commercialised Technologies in FCV tobacco *viz.*, topping tools, poly tray pressing tools and bale pressing units
- Supply of curometers and solar lanterns as a part of PHPM
- Preparation and utilisation of vermi-compost and supply of vermi-beds
- De-silting of water storage structures for efficient water utilisation
- Construction of permanent grain storage structures for reducing storage losses of farm produce
- Supply of Fish Nets

Drudgery Reduction Programmes

- Palmyrah Fibre Extraction units to reduce the drudgery and improve the family income.
- Demonstration and supply of farm implements to enhance time efficiency.
- Supply of Knapsack and Power sprayers for efficient and effective pest management
- Supply of Agricultural Implements *viz.*, Paddy threshers, Maize Shellers, Rotovators *etc.*,
- Distribution of agricultural hand tools (Spades, Crow bars, Hand Hoes, Sickles *etc.*,)
- Supply of Protective Equipment (Hand gloves, Gum boots and Masks)
- Supply of Pumpsets and Electronic Weighing Machines

Awareness and Capacity Building Programmes

- Capacity building on improved agricultural practices and skill up-gradation in off-farm activities through trainings/demonstrations/ awareness programmes.
- Establishment of Custom Hired Centres
- Awareness Programmes on GAPS for Field Crops
- Exposure Visits for Tribal Farmers
- Awareness Programmes on NTRM
- Hands on training in PHPM in tobacco (Grading, Stringing, Curing, bulking and baling operations)
- Sensitisation programmes on Integrated Farming System (IFS) to double the Family Income
- Training on Natural and Organic Farming
- Distribution of Pamphlets and Leaflets on Package of Practices
- Awareness programmes on Post Harvest Product Management in Chilli and Turmeric

Women Empowerment and Skill Up-gradation Programmes

- Health and nutrition programme on protein rich diets for women and children and supply of bengal gram and jowar seed
- Supply of seedlings /grafts/ saplings for farm women for effective land use in selected villages.
- Training in post harvest losses and supply of tarpaulins for women.
- Training in backyard kitchen gardening and supply of improved vegetable seed
- Promotion of backyard poultry for enhancing the off-farm income and nutritional security in tribal families
- Training on tailoring and garment making and supply of sewing machines
- Awareness and supply of nutritious and concentrated cattle feed for improving milk yields in cattle

NEH Programmes

NEH Programme was implemented by ICAR-CTRI during the years 2020-21 and 2021-22 in collaboration with ICAR-Research complex Umiam, Meghalaya and ICAR-NRC, Mithun. During the year 2020-21, the training programmes were organized on integrated agri-horti farming system, soil health management for improving crop productivity, backyard poultry, post harvest management & value addition and integrated fish farming with an outlay of Rs 6.67 lakhs. Apart from conducting different capacity building programmes, critical inputs *viz.*, seed/ seedlings, chicks, piglets, pig feed, poultry feed, fish seed, ducklings *etc.* were supplied to the farmers. As a part of NEH programme, KVK-Tura, West Garo hills, Meghalaya was strengthened by supporting with the post harvest equipment for value addition, capacity building, digitization and ICT with a total financial outlay of Rs. 12.20 lakhs during the year 2021-22.

Technological Interventions Implemented for Tribal Communities

The existing crop technologies in the present tribal scenario are age old and conventional. Hence, there is an imperative need to utilize scientific approaches and introduce important technologies for tribal areas. The following need based location specific crop based technologies were identified and implemented in the selected tribal villages. Majority of the technological interventions were disseminated through rythu mitra groups and self help groups. In addition to that, custom hiring centres concept was introduced through TSP of ICAR-CTRI. These are basically units comprising a set of farm machinery, implements and equipment meant for hiring by the farmers of the village. This concept has facilitated wider adoption of need based farm machinery by the smallholder farmers. These centres were assigned to active Self Help Groups and Rytu Mitra Groups so as to manage the farm machinery, repair and maintenance.

1. De-silting of water pond for efficient water utilization

Existing Situation: Majority of the farmers are small and marginal in Seethappagudem village, West Godavari district, AP. which is located at a distance of 11 km from the mandal headquarters, Buttaigudem, West Godavari district. The major occupation of the villagers is agriculture, horticulture and allied activities like dairying and farm labour. The major source of irrigation is bore wells and monsoon rains. Hence, the ground water plays a major role in cultivation of crops and decides the fate of agriculture. Dummugudem pond in the village spread over an acre constructed mainly for irrigation and drinking water purpose of cattle. No proper de-silting was undertaken during last decade and as such little quantity of water is stored in the pond. The capacity of the pond is very much reduced and a lot of vegetation has grown in the

pond, making the water unhygienic. Because of the heavy siltation and unhealthy condition of the water, farmers were not able to utilize the water at least for the milch animals.

Technology Intervention:

As an effort to revive local water bodies, sincere efforts were made for rainwater harvesting to increase and maintain the ground water level. The committee held discussions with the village Sarpanch, village heads, ITDA officials and other key persons for de-silting of water pond and the same was agreed upon and work was undertaken. The pond was de-silted to a depth of five feet and the bunds were strengthened. De-silting of pond helped in harvesting of the rain water from the catchment area and enhances the water storage capacity of pond, there by the bore wells in and around the village were recharged. The efforts of ICAR-CTRI were fruitful in renovation of pond as the same was filled with rain water with the monsoon rains during June, 2015. This intervention helped the milch cattle by providing drinking water facility.

- Village** : Seethappagudem
Beneficiaries : Tribal population in Seethappagudem village panchayat
Critical inputs : De-silting of pond and strengthening of bunds using the excavator & tractors.



Farm pond with vegetation during monsoon season



Farm pond with dried vegetation during summer



De-silting of farm pond



Water accumulation just after de-silting

2. Permanent grain storage structures for reducing storage losses

Existing Situation: In the selected tribal village, farmers are using traditional and temporary storage structures made with bamboo, covered with paddy straw and coated with mud. This type of structures are exposed to the moisture during rainy season which leads to spoilage of stored grains. Further, existing practice is more vulnerable to the damage by rodents, squirrels, insects, microbes *etc.* leading to grain storage losses to an extent of 30% in tribal households. The situation often compels the tribal farmers to sell their farm produce soon after harvesting at low market price.

Technology Intervention:

In order to replace the traditional storage structures with improved concrete and permanent structures, ICAR-CTRI introduced twenty one concrete and permanent storage structures having dimensions of 6' height and 4' diameter with cement base at bottom and top cover with cement lid. The structures were established in the premises of selected tribal households. These structures have the capacity of storing food grains up to 1.5 - 2.0 tonnes apart from protecting the grains from moisture, rodents, pests *etc.* Survey reported that the post harvest and storage losses were reduced to an extent of 82 %.

Villages : Kummarikunta, Rachuru, Pedakapavaram and Seethappagudem
Beneficiaries : 21 farmers
Critical inputs : 21 grain storage structures



Existing grain storage structures (Mud plastered bamboo covered with palmyrah)



Improved concrete grain storage structures introduced

3. Tray nurseries for healthy seedling production in FCV tobacco

Existing Situation:

FCV tobacco is an important commercial crop grown in the selected tribal village of Seethappagudem panchayat. Use of quality and healthy seedlings is identified as an important intervention for getting higher yields coupled with desired quality. At present, conventional nurseries are being raised by the growers to meet their seedling requirements. Problems like poor establishment, more gap fillings and lack of uniform crop growth are associated with conventional nurseries. Further, low water and fertilizer use efficiency, problem of weeds, high incidence of pests and diseases compounded with more man days of work have greatly reduced the production efficiency of conventional nurseries.

Technology Intervention:

Tray nurseries are appropriate alternative to overcome the problems of conventional nurseries and to get disease free, sturdy and quality seedlings. Growing of tobacco seedlings in cement bins filled with coir-pith medium and resetting of 20-25 days old healthy seedlings in plastic trays for production of healthy seedlings is the underlying principle in production of tray seedlings. The growing medium for seed beds will be either coir pith alone or coir pith and FYM in the ratio of 3:1. The tribal farmers were benefitted because of cent per cent establishment, minimal gap fillings, uniform crop operations, which helped in improving the yield and quality by 10%. In addition, weed free crop, water and fertilizer use efficiency, less incidence of pests and diseases, high moisture and nutrient holding capacity by reducing the cost of cultivation. The green shade nets help in reducing light intensity/direct sun light and high temperature. It creates an appropriate microclimate conducive for plant growth.

- Village** : Lankalapalli, Kummarikunta, Seethappagudem
Jeelugumilli and Buttayigudem mandals (AP)
Katemalavadi and Mancheboyanahalli (Karnataka)
- Beneficiaries** : 250 FCV tobacco nursery growers
- Critical inputs** : Pro trays with 98 cells (3200 nos.) and 50% shade net (1200 Sq. mts)



Training of farmers on pro trays



Supply of pro- trays to tribal beneficiaries

4. Grafts of improved cultivars for higher productivity in cashew and mango

Existing Situation: Cashew and mango are the two major crops in tribal area. The existing plantations were of seedling progenies of traditional varieties / unknown origin and maintained under neglected conditions. This resulted in low productivity and poor net returns. The major reason for the reluctance of farmers to take up cashew cultivation is the long gestation period of 11-12 years in obtaining stabilized yields with seedling progenies. Cashew gives stabilized yields from eighth year onwards when grafts are planted.

Technology Intervention:

To ensure high yields of superior quality and better productivity in cashew crop, an intervention to introduce vegetative propagated quality planting material (grafts) of improved cultivars was taken up. A group of interested farmers were identified for rising of new cashew plantations with improved cashew grafts. Four to six months old healthy grafts of improved cashew cultivars (BPT-6 & 9, Vengurlay) were provided to each farmer. Suggested to plant with a spacing of 7.5m X 7.5m on the onset of monsoon. Further, in order to improve the nutritional security, the mango grafts were supplied to Devarapalli and Peda Geddada villages of Rampachodavaram mandal to plant these grafts on hill slopes and backyards for enriching their diets with fruits and vegetables. Each house hold was given with one mango graft to plant in their backyard.

Villages : Peda Geddada, Devarapalli of Rampachodavaram Mandal (EG dt.) Seethappagudem, Lankalapalli, Kummarikunta and Rachuru (WG dt.)

Beneficiaries : 120 cashew growers and 60 Mango growers

Critical inputs : 3400 healthy cashew grafts (BPT-6 & 9, Vengurlay) and 1100 healthy mango grafts and seedlings (Mallika and Banginapalli)



Demonstration on cashew grafting techniques



Supply of cashew and mango grafts

5. Improved seed for higher productivity in tobacco, maize and pulses

Existing Situation: A few progressive tribal farmers cultivate tobacco in this area although tobacco is a major crop in Jangareddy gudem area. The farmers cultivate existing local and outdated varieties. Improved seed is the critical input that the tribal farmers are often deprived off.

Technology Intervention:

About 200 progressive farmers were identified and provided with high yielding seed in order to improve their crop yields. To ensure high yields of superior quality and better productivity in tobacco, Kanchan, FCJ-11 and CH-3 were introduced in tribal areas of various stations. Improved varieties of maize (DHM117, DHM12) and bengal gram (NBeG-49) were supplied in tribal areas of Jeelugumilli and Guntur districts. In order to improve the nutritional security in the villages, training programme on protein enriched diets was imparted.

- Villages** : Jeelugumilli, Seethapagudem, Buttayigudem villages (WG Dt.), Chenchugudem village (Guntur Dt.)
- Beneficiaries** : 300 tribal farmers + 500 Karnataka farmers
- Critical inputs** : Kanchan FCJ 11, CH 3 (Tobacco - 2021-22), DHM117, DHM12(Maize), Chickpea (NBe G-49), Paddy (MTU 1010).



Supply of chickpea seed at ICAR-CTRI RS, Guntur

Inputs supply at ICAR-CTRI RS, Dinhat



6. Vanaraja chicks in tribal backyards for income generation

Existing Situation:

Tribal farmers possess one or two country/ desi type birds with low egg productivity. Despite having spacious backyards with natural food base (fallen grains, kitchen waste, green grass *etc.*), tribal farmers do not rear improved poultry breeds in their backyards. The anemia prevails among 80% of tribal women and children. Protein energy malnutrition prevails among the tribal children.

Technology Intervention:

In order to improve the nutritional and house hold security, Vanaraja breed developed by Project Directorate on Poultry, Hyderabad was identified as suitable for rearing under selected tribal village conditions. Six weeks old Vanaraja poultry birds found to be very much suitable for rearing in open free range conditions of tribal villages. ICAR-CTRI provided six weeks old poult @ 10 birds per family. These birds which attained 650 - 750 gm of body weight can be let out for foraging. As the birds are being reared for increased egg productivity, no supplementary feed is required. The birds easily attained 2.2 -2.5 kg body weight at 6.0-6.5 months of age. The birds lay eggs up to 110 per year as against 50-60 eggs in case of country birds.

Villages : Kummarikunta, Rachuru, Pedakapavaram, Seethappagudem & Lankalapalli (West Godavari Dt), Veerepalli, Ulavapadu (Prakasam Dt).

Beneficiaries : 330 smallholder farmers (2015-16)

Critical inputs : 3300 six weeks old Vanaraja poult



Vanaraja poultry unit

7. Palmyrah Fibre Separator for Livelihood Improvement

Existing Situation: Traditionally, the fibre separation is tedious and cumbersome process. People used to collect the palmyrah petioles and leaf butts during early hours from the fields and extract the fibre. In the manual extraction process, tribal farmers beat the palm fronds with the help of heavy iron rod of 1.5 kg. A family comprising of 4 to 5 members can produce 5 to 6 kg of fibre / day by manual process. Heavy drudgery causes ill-health to the rural and tribal poor which are associated with fibre separation. The middle-aged men suffer from chest pains, arthritis and respiratory disorders. Physicians have advised these workers to shift from this heavy drudgery work to other works. Though the entire family works for more than 8 to 10 hours a day, their returns are very meagre.

Technology Intervention:

ICAR-CTRI has designed and developed a drudgery reducing device, Palmyrah Fibre Separator (PFS) for the extraction of fibre from petiole and leaf butts of palmyrah. It reduces drudgery, and increases the output of fibre production. A family can extract 50-60 kg of fibre/ day against 5-6 kg fibre by manual process. It requires less maintenance cost and safe & easy to operate. These Palm Fibre Extraction units were introduced as homestead units for the benefit of self help groups. The tribal families produced 50kg of wet fibre per day and getting net income of Rs. 750/day (five members). Their produce was purchased by the traders for Rs 20/kg at their doorsteps.

- Villages** : Rachuru, Seethappagudem (WG Dt)
Beneficiaries : Tribal Farm Families (2016-17)
Critical inputs : One unit of Palmyrah Fibre Extractor machine and one unit of Palmyrah Frond Crusher



Training and demonstration on palm fibre production

8. Electronic weighing scales for proper post-harvest product inventory

Existing Situation: Private traders and middlemen were purchasing surplus agricultural and minor forest produce of tribal farmers by using traditional and improper weighing scales. The exploitation is manifested in the measurement and very often weighing higher quantities than that was indicated by the weighing scale. Though the farmers harvest economic yields, the absence of reliable weighing scales is leading to distress sales.

Technology Intervention:

With the prime objective of providing marketing assistance and to avoid the dependency on unreliable weighing scales that are being used by the private traders and middlemen, ICAR-CTRI introduced electronic weighing machines/ scales at custom hiring centres formulated under TSP. The intervention enables the tribal farmers to use them in time at nominal hiring costs and to get remunerative returns. Tobacco tribal farmers also got benefitted by weighing and preparing perfect quantity of tobacco bales before transporting to enable accuracy at auction platforms.

Villages : Seethappagudem, Rachur, Kummarikunta, PedaKapavaram

Beneficiary groups: Chaitanya Self Help Group
Priyadarsini Self Help Group
Mutyalamma Self Help Group
Kranthi Self Help Group

Critical inputs : One weighing scale with 200 kg capacity having platform size of 50 x 60 cm with battery backup to each group



Supply of weighing scales

9. Post Harvest Product Management (PHPM) measures for efficiency in curing, grading and baling of FCV tobacco

Existing Situation: Curing virginia tobacco according to fixed schedule is not possible all the time because of the variability in green leaf due to various factors like weather condition, plant position, leaf maturity, disease prevalence and in such cases slight adjustment in the process is necessary. The farmers use outdated curometers for avoiding expenditure during the curing process. In the absence of reliable curometers, farmers predominantly get dark grades in tobacco curing process.

Timely operations in grading, baling and transportation of tobacco to auction platforms help the farmers to get good weight to the tobacco bales, in turn fetching remunerative prices. The post harvest operations in tobacco are carried out intensively even late nights especially during peak harvests. As the villages are located in remote place, they face difficulty due to irregular power supply in tobacco growing villages.

Technology Intervention:

- With the prime objective of providing accuracy and efficiency, curometers were introduced in the curing process of destruction of chlorophyll, conversion of starch to simple sugars and leaf proteins to soluble nitrogenous constituents. The intervention enables the tribal farmers to use them in their curing barns to get bright grades.
- In order to rectify the problem of power fluctuations, solar lanterns were supplied to tobacco farmers for efficient time utilization

Villages : Curometers to Muppina vari gudem, Lanka Vari Gudem and Kakula Vari Gudem (W.G. Dt.)

Solar lanterns to Bannikuppe, Maralanakopalu, Hirikatnahally, Bilikere villages (Karnataka)

Beneficiary groups : Farmers from Rythu clubs

Critical inputs : Curometers at CTRI RS, Jeelugumilli and Solar lanterns (100 Nos.) at CTRI RS, Hunsur



Supply of Curometers at ICAR-CTRI RS, Jeelugumilli



Supply of solar lanterns at ICAR-CTRI RS, Hunsur

10. Maize Sheller to improve production efficiency

Existing Situation: Maize is one of the major crops in the selected tribal village. Maize seed is directly purchased by the local traders. Presently, maize shelling is being done manually by the tribal women, which involves lot of time and drudgery.

Technology Intervention:

Motor operated maize sheller was introduced to reduce drudgery and to improve the efficiency. Maize sheller is more effective in saving time, better shelling efficiency and for getting good quality grain compared to traditional practice. Maize sheller can be driven by electric motor/ diesel engine as well as tractor (35 hp). Lift attachment is provided to carry it from one place to other. The ICAR- CTRI has introduced maize sheller at custom hiring centre formulated under TSP. The customs hiring centre provides maize sheller on rental basis to the needy farmers.

Villages : Peda Kapavaram
Beneficiary group : Kapavaram Rytumitra group
Critical inputs : Motor operated maize sheller



Supply of maize sheller to Rytumitra group

11. Pesticide sprayers for effective application of pesticides

Existing Situation: Paddy, maize, cotton, FCV tobacco and cashew plantations are the major crops cultivated by the tribal farmers in the village. Though, the farmers are aware of the crop protection measures, not fully adopting those measures due to non-availability of proper plant protection equipment in time. Existing conventional practice of tribal farmers resulted in increased costs, ineffective crop protection measures leading to non-remunerative yields and returns.

Technology Intervention:

To promote the use of modern sprayers at different stages of crops grown in the village, high volume hydraulic (Knapsack) sprayers and low volume power (Taiwan) sprayers were introduced in the operated area of TSP. Generally, Knapsack sprayer is suitable for crop stage when canopy was less while Taiwan sprayer is suitable for crop stage when canopy was more. The intervention support was extended among the needy tribal farmers and disseminated slowly. The technology use and hands on training was offered as per the recommendation to reduce the pest incidence and to make their farming profitable.

Villages : Lankalapalli, Kummarikunta, Seetappagudem, Rachuru, Buttayagudem, West Godavari (AP)
Putimari, Kushiarbari, Mathabanga, Gheghrhat, Lafabari, Silbarihat villages of Dinhata (WB)
Hegannur, Kolavige, Metikupe, H.D. Kote (KA)
Kolli hills (TN)

Beneficiary groups : Rythu Mitra groups
Critical inputs : a High volume Knapsack (hydraulic) sprayers, Low volume Taiwan (power) sprayers to each centre at West Godavari (AP)
b 100 battery sprayers at ICAR-CTRI RS, Dinhata
c 50 battery operated (12 kb) power sprayers to chilli farmers West Godavari (AP)
d 100 power sprayers at ICAR-CTRI RS, Hunsur
e 50 power sprayers at ICAR-CTRI RS, Vedasandur



Supply of sprayers through TSP at Regional stations

12. Diesel engine water pump sets for enhanced production efficiency

Existing Situation: Rainfed farming is a common practice in the selected tribal villages. Generally, farmers are raising *kharif* crops at the onset of monsoon and early season / late season drought resulted in total crop failure. Though the available channels nearer to the cultivable fields are stored with runoff water for longer periods, farmers are not using the available water resource for providing critical irrigations due to lack of water pump sets. As a result, the yields obtained were not remunerative and the quality of crop was not as expected.

Technology Intervention:

With a view to facilitate the farmers for effective utilization of available water resources so as to provide critical irrigations to various crops raised, ICAR-CTRI introduced diesel pump sets and at custom hiring centres formulated under TSP. The diesel pump sets were energy efficient, easy to use and durable with 6.5 HP capacity, 1500 RPM, 4 inch delivery, 4 inch input having wheel trolley and 240 kg weight. The intervention enabled the tribal farmers to use them in time and to get remunerative returns.

- Villages** : Kummarikunta and Seethappa gudem
Beneficiary groups : Vijaya Lakshmi Self Help Group
Kanakadurga Self Help Group
Critical inputs : One number of 7.5 hp diesel pump set to each centre

13. Improved Rotavators for Soil Preparation

Existing situation:

The tribal poor depend on cattle for intercultural operations. In every tribal family, while the bullocks are drawn and lead by the farmers, the seed is sown by the farm women. This is time consuming operation and involves lot of drudgery and the farmers have to work for long time under the hot sun.

Technology intervention:

Rotavator is a tractor-drawn implement which helps in breaking down soil and leveling of land. It is equally important in seedbed preparation for sowing. Rotavator is used in primary and secondary tillage. This implement helped the farmers in reducing the cost and time in the selected villages.

- Villages** : Sirivarigudem (Jeelugumilli), Seethappagudem (Buttayigudem)
Beneficiary groups : 50 farm families
Critical inputs : Improved Rotavator (36 blades) - one

14. Improved paddy threshers for reducing time and labour

Existing situation

The tribal farmers follow primitive methods of agriculture, which is known as Podu cultivation or shifting cultivation. In plain areas where the irrigation is available, the farmers grow paddy in Kummariakunta and Seethappagudem hamlets.

Technology intervention

For paddy farmers, threshers were introduced by ICAR-CTRI for increasing their productivity and net returns and reducing the labour cost. It can be operated by any tractor or with a ten horsepower electronic motor. The farmers have readily accepted this intervention as it enhanced the quality by reducing the damage to the grain. The thresher was introduced to the customs hiring centre.

- Villages** : Seethappagudem
Beneficiary groups : Kanakadurga Self-help groups
Critical inputs : One paddy thresher



Improved paddy thresher supplied through TSP

15. Hand tools for drudgery reduction

Existing situation: The tribal farmers of Rampachodavaram and Devarapalli area subsist on agriculture and hunting. They follow primitive methods of agriculture which is known as podu cultivation and shifting cultivation. Nearly 30% of the agency area is under forests with wide variety of fauna and flora. They clear away the forest lands on hill slopes by cutting and burning, raise minor millets like jowar, bajra, tapioca which are staple food for them other than tobacco, cotton and vegetables. Lack of proper hand tools is the major problem in this area and they use outdated hand tools due to lack of purchase power.

Technology intervention:

Supply of hand tools *viz.*, spades, crowbars, hand hoes and sickles for tribal farmers is a low cost technology which has reduced the drudgery and effective utilization of time and labour was possible.

Villages : Pedageddada, Devarapalli, Maredumilli and Jeelugumilli villages
Beneficiary groups : Swayam sevak sanghas and Rythu mitra groups
Critical inputs : 300 spades and crowbars



Supply of hand tools at Pedageddada, E.G.Dt.

16. Vermi compost units for enhancing the soil organic matter

Existing Situation: Camping the sheep and goats in fields is known as penning. It is a regular practice in tribal areas where the flock of sheep is penned during nights. In addition to the existing sheep penning practice, vermi compost units were also introduced by utilizing the sheep manure and cattle waste for enhancing the soil organic matter by improving soil quality, water-holding capacity of soil and helps in plant growth. The vermi compost obtained in these units is not only a rich source of NPK, but provides additional benefit as manure for kitchen gardening (vegetables) and also for horticultural crops viz., cashew and mango. The tribal farmers were trained in establishment of vermi compost units.



Training on vermicompost preparation

- Villages** : Jeelugumilli and Aswarao pet panchayat villages
Beneficiary groups : 30 farmer groups
Critical inputs : Construction Material for Vermi Compost units (Cement, sand and bricks)

17. Improved topping tools in tobacco for improving efficiency

Existing Situation: Topping is a unique cultural operation in tobacco, arrests the apical dominance and in increasing the size & weight of leaves and thereby increasing overall yield (20-25%) in tobacco. Farmers generally do topping operation manually, which is tedious and time consuming.



Supply of topping tools through TSP

Technology Intervention:

To replace the manual topping, ICAR-CTRI has developed hand held battery operated topping tool consisting of rotating blades with leaf deflector, DC motor, battery and PVC handle. The machine works for 8 hours with 3 hours of charging. For convenience, USB port was also provided for charging and can be used with a regular USB cable. The machine was evaluated in burley tobacco and found effective in terms of ease of topping, saving labour cost and time. As a part of popularization, tribal farmers were supplied these small implements.

- Villages** : Veadntapuram, Utlapalli, Gangarama, Kollivarigudem from Buttayigudem and Aswarao pet mandals
Beneficiary groups : 250 tribal farmers
Critical inputs : Topping tools

18. Poly tray pressing tools for tray nursery seedling production in tobacco

Existing Situation: In tobacco nurseries, maintenance of healthy and uniform seedlings is a problem. In poly trays, coir pith growth medium is filled manually which is a time consuming, labour intensive and involves drudgery and moreover is not uniform. Filling of trays in a uniform manner with compact pressing establishes the healthy root growth of tobacco seedlings.

Technology Intervention:

Polytray medium pressing tool device fitted with rubber corks which exactly fits in the poly trays was designed by ICAR-CTRI. It has 36 corks, which can press half of the tray of 72 pits at a time. The device has two handles which facilitates the proper filling of the coir pith growth medium. Poly tray medium pressing tool reduces time by 47% and it compacts the soil which facilitates better root development. Tribal farmers were sensitized in adopting this technology.

Villages : Vedanthapuram, Kollivari Gudem, Krishna Puram West
Godavari Dt.

Beneficiary groups : 200 farmers from Rythu Mitra Groups

Critical inputs : Poly-tray pressing tools



Supply of poly tray pressing tools

19. Bale pressing units for drudgery reduction

Existing Situation: Traditionally the tobacco cured leaves are pressed in 100 kg. wooden box for bale preparation. It involves drudgery and time. Tobacco farmers compress the cured tobacco in the form of cubes with a standard measurement of 1x1x1 meters weighing about 100-110 kgs. It takes around 2-3 hours time and requires 2 to 3 man power for making 100 kg bale. These bales are packed air tight and transported to auction platforms for sale.

Technology Intervention:

Low cost Bale Pressing Machine was designed and developed by ICAR-CTRI which consists of a Steel plate (30x30") fixed on cement platform. After packing the required cured leaf (110-150kg), the wooden boards of the bale boxes are removed and the bale is packed with gunny bag and ropes. Baling of graded cured leaf through bale pressing machine reduces the labour, drudgery and improves the efficiency with good portability. This machine reduces 25% labour charges apart from improving uniformity in baling. ICAR-CTRI licensed this technology for the wide spread use by the farmers. After introduction of this machine, the tribal famers felt ease of operation with good leaf hygiene.

Villages : Koya-ankampalem, Antarivedigudem, Vankavarigudm, Kakulavarigudem, Regulakunta, Sirivarigudem, from Buttayigudem, Jangareddy gudem mandals.

Beneficiary groups : Tribal tobacco farmers

Critical inputs : 20 units



Supply of bale pressing units to rythu mitra groups

20. Backyard Kitchen Gardening and Supply of Improved Vegetable Seed

Existing Situation: The health and nutritional status of tribal farm families is very poor. The mortality and morbidity rates are high in tribal area due to malnutrition. The children suffer from protein energy malnutrition and nutrient deficiency disorders, whereas the tribal women suffer from anemia due to poor intake of protein, vitamins and minerals. They consume *porridge* made of cereals (rice/ragi/jowar) as breakfast in the early hours. Their meal is very simple and consists of porridge made of jowar or maize and boiled forest tuber crops like tapioca, They also consume palm toddy (*Borassus flabellifer*) and wine from *jeelugu* (*Caryota urens*) as a part of regular diet.

Technology Interventions:

Selected women farmers were provided improved seed of vegetables and seedlings of Mango, Guava, Citrus, Karonda and Papaya as a part of Tribal Sub Plan. The tribal farm women were habituated to grow greens, vegetables and one or two fruit orchards. There is a significant improvement in family health due to the consumption of fresh grown vegetables, greens and fruits obtained in backyards. There is a significant reduction in family expenditure due to the effective utilization of kitchen garden units.

- Villages** : Veerepalli, Ulavapadu (Prakasam) Vankavarigudem, Sirivarigudem, Muppinavarigudem (West Godavari), Pedageddada and Devarapalli (East Godavari)
- Beneficiary groups** : SHG groups from Prakasam and West Godavari districts
- Critical inputs** : 250 kitchen garden kits with improved vegetable and papaya seed; Guava and mango grafts



Supply of guava, papaya and mango grafts to self-help groups

21. Tailoring and Garment making for women empowerment

Existing Situation: The village scenario in Prakasam district shows that the women do not have any employment during lean period after completion of crop season. They have plenty of time but, they cannot use the locally available resources effectively. Annual income of majority (68%) of the families ranges from Rs. 30,000 - Rs 60,000. Literacy rate is around 43.72% in Veerepalli village.

Technology Intervention:

An entrepreneurial activity of tailoring and garment making has been introduced during 2016-17. This livelihood activity among self help groups has generated interest, employment and increased the family income. Significant improvement in self confidence, decision making among women was observed.

- Villages** : Veerepalli, Ulavapadu of Praksam district
Tativada, E.G.Dt.
- Beneficiary groups** : Self help groups and home stead units (40 members)
- Critical inputs** : Sewing machines (5)



Supply of sewing machines to self-help groups



Training on palm leaf decoratives

22. Integrated Nutrient Management (INM) and Integrated Pest Management (IPM) of field crops

Existing Situation: The existing crop technologies in present tribal scenario are age old and conventional. Growing a variety of crops in a region can disrupt the life cycles of pests and diseases, making it more challenging for them to establish and spread. Use of INM promotes sustainable agriculture, reducing the environmental impact of farming in crops like paddy tobacco, pluses, jowar, bajra and horticultural plantations.

Technology Interventions:

The selected interventions of INM and fertilizer management were introduced after supply of critical inputs like improved seed and fertilizers. Integrated Nutrient Management refers to the maintenance of soil fertility and of plant nutrient supply at an optimum level for sustaining the desired productivity through optimization of the benefits from all possible sources of organic, inorganic and biological components in an integrated manner. The farmers of Seethappa Gudem and Sirivari Gudem were supplied fertilizers as a component of INM strategy.

- Villages** : Sirivarigudem (Jeelugumilli), Seethappagudem (Buttayigudem), W.G., AP
Bannikuppe, Maralonakopalu, Hirikatnahally, Bilikere *etc.* (KA)
- Beneficiary groups** : 20 groups from 20 villages + 100 farmers (Marigold seedlings)
- Critical inputs** : Neem coated urea (118 bags), Single Super Phosphate (101 bags), Murate of Potash (23 bags) for paddy



Supply of critical inputs

23. Fish nets for tribal fisher men

Existing Situation: The major source of income for tribal people of Veerepalli in Prakasam district is fishing in near by streams and canals. Other than fishing they follow subsistent agriculture and engage in livestock rearing. They have very small land holdings and depend on rainfed agriculture.



They grow paddy in small holdings if sufficient water is available at *Elikeru vagu*. Due to low income, the farmers are not in position to purchase the fish nets.

Technology Intervention: The farmers depending on pisci-culture for livelihood were supplied fish nets in order to empower them with infra-structural facilities for improving their socio-economic status.

- Villages** : Veerepalli, Ulavapadu of Praksam district
Beneficiary groups : Tribal Fishermen
Critical inputs : 40 fishing nets (Nylon/*visuruvala*)

24. Post Harvest Product Management in tribal areas

Existing Situation: Tribal farmers live in huts made up of mud and bamboo walls covered with thatched roofs. They live in colonies called as gudems by constructing their huts very close to each other for protecting from wild animals. However, a small percentage of farmers possess pucca houses. All these small and marginal groups lack facilities for post harvest operations *viz.*, cleaning, drying, grading and storage of paddy.



Technology Intervention: Selected tribal farmers of paddy crop were supplied with grain-drying tarpaulins for preventing post harvest losses due to moisture, birds and rodents. This waterproof tarpaulin is ideal for drying a range of agricultural commodities including cereals, pulses and groundnut. These tarpaulins are a proven way to reduce the risk of pests, birds and rodents.

- Villages** : Sirivarigudem, Chandramma colony and Kamayyapalem
Kolli hills, Namakkal dt., Poondi and Kilavarai, Kodaikanal
Hills, Dindigul Dt., TN
Beneficiary groups : Tribal farmers and farm women
Critical inputs : 200 tarpaulins

25. Food supplements for cattle health care to women farmers

Existing Situation: Most of the tribal farm families have small land holdings and one or two milch animals for getting additional income. The milk yields of cows/buffalos are low in this area due to rain fed eco-system and there by non-availability of sufficient cattle fodder.

Technology Intervention:

Cattle feed plays a vital role in increasing milk production and to get healthy calves. Concentrated cattle feed was supplied to tribal farm women after imparting training and demonstration in cattle health management. Further, cattle food supplements were supplied to enhance the health and nutritional status of the cattle.

- Villages** : Sirivarigudem, Chandrammacolony, and Ramaanakkapeta villages
- Beneficiary groups** : 50 Tribal farm women
- Critical inputs** : Concentrated cattle feed



Supply of cattle feed at ICAR-CTRI RS, Jeelugumilli

Impact Analysis of TSP Programmes

In light of the prioritized agricultural issues, causal relationships of problems, available technologies, and the knowledge base of farmers, ICAR-CTRI has developed an action plan to ensure direct benefits to individuals or families and to substantially improve on and off-farm income of tribal groups in the operational area. The action plan focuses on creating awareness, demonstrating technology, adding value, harvesting and storing water, creating physical assets such as farm machinery and enhancing income through the upgrading of technical skills. Thus, crop-specific, resource-specific, and farm-specific technological interventions were provided to address the prioritized problems, taking into account of needs and resource endowments of the tribal farming community in this region.

Budgetary allocation under TSP and its Impact

The TSP budget allocation has significantly increased from an average of Rs 8.66 lakhs per annum during the period from 2014-15- 2020-21 to Rs 21.66 lakhs per annum during the period from 2021-22 to 2023-24. This indicates the earmarking of the higher budget under TSP over the years, which implies a greater emphasis on the overall socio-economic up-liftment of tribal communities in the region.



A variety of technological demonstration and dissemination activities have been carried out through the TSP programs. The interventions implemented during the past decade were grouped into four categories based on the theme and context *viz.*, technology adoption, drudgery reduction, capacity building and women empowerment. The beneficiaries were classified accordingly. A questionnaire was constructed to study the overall impact and assessed through village visits, personal interviews, telephonic interactions and focused group discussions with the respondents.

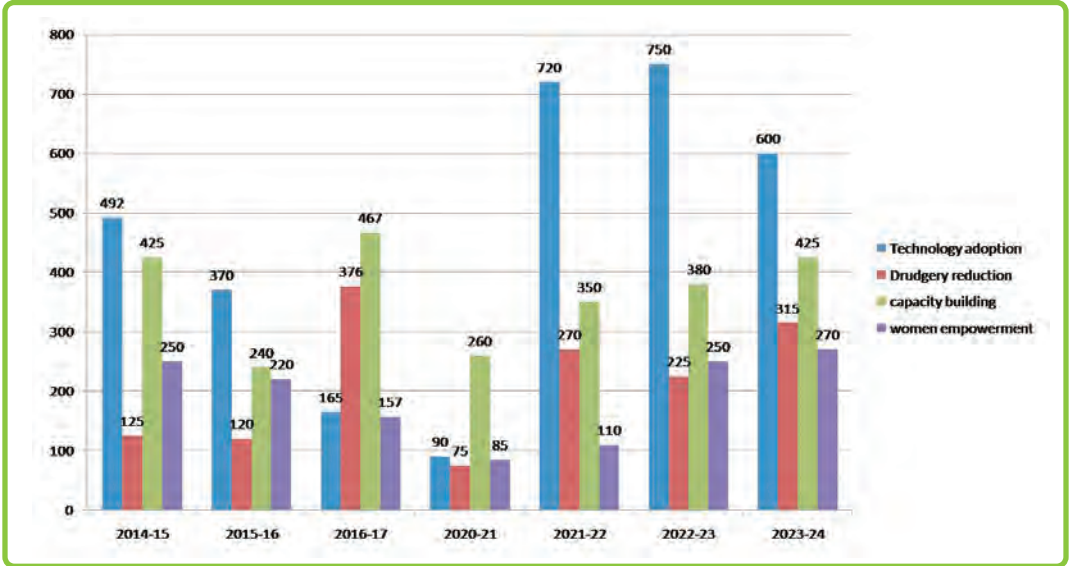
Technology adoption: Over the years, the number of beneficiaries who have adopted the technology has significantly increased in the last decaldecade. It has now doubled to

an average of 690 people per year from an average of 342 people per year during the period of 2014-2017, during the period of 2021-2024. This clearly indicates the growing number of beneficiaries under TSP and reflects the success of the program in reaching out to more people over the last decade.

Drudgery reduction: The number of people benefitting from drudgery reduction measures has substantially increased over the last decade. Between 2014-17, an average of 207 people per year were beneficiaries, while between 2021-24, the average number of beneficiaries increased to 270 per year. This indicates a consistent rise in the number of people gaining benefits from drudgery reduction measures.

Capacity building: The number of beneficiaries who have participated in the capacity-building program has remained relatively consistent over the past decade. From 2014-2017, an average of 377 people per year took part in the program, while from 2021-2024, the average has been 385 participants per year. This indicates that there has been a consistent increase in the number of people benefiting from these programmes over a period of time.

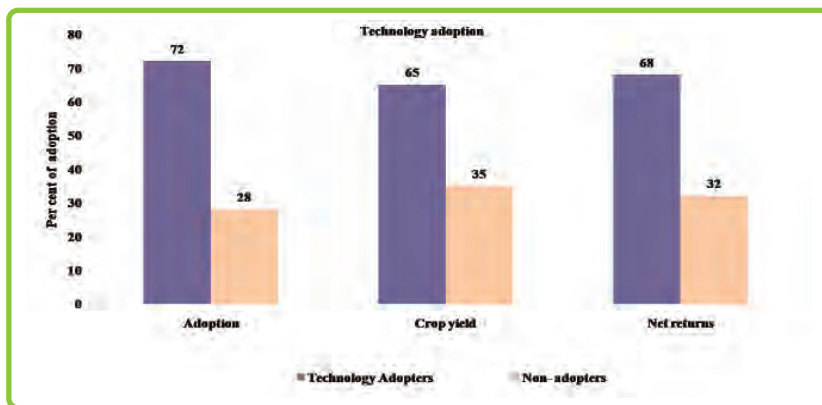
Women empowerment: The number of individuals benefitting from women empowerment programs has remained constant at 209 per year from 2014-17, with a slight decrease to an average of 210 individuals per year from 2021-24. This indicates that the number of beneficiaries under these programs has remained consistent over the past decade.



Beneficiaries covered under TSP during the past decade

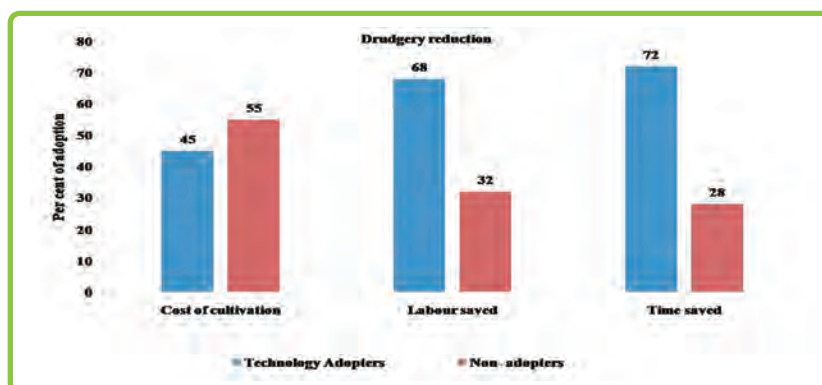
Impact of technology adoption programmes

The adoption rate of the recommended technologies by ICAR-CTRI (high yielding seed and seedlings, tray seedling production, Good Agricultural Practices (GAPs) *etc.*) was found to be 72%, resulting in increased crop yield and net returns in tobacco over the past decade. Among adopters, there is a significant improvement in crop yield (65 %) and net returns (68%) of the tribal farm families over a period of time with respect to tobacco crop. Productivity enhancement in other crops *viz.*, cashew and maize was observed. The livelihood pattern of the tribal beneficiaries was improved by implementing the innovative technologies during the last decade.



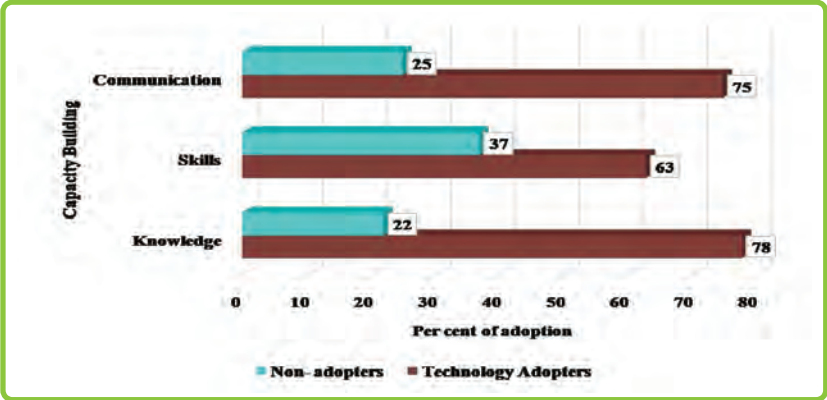
Impact of drudgery reducing implements

Regarding drudgery reduction, the adoption category has seen a 55% share of technology adopters, resulting in reduced cultivation costs, reduced labor (68%), and time-saving (72%) due to the improved agricultural implements supplied over the past decade. After introduction of latest agricultural implements, the occupational health hazards and drudgery of farmers were reduced and farm efficiency was enhanced. The adopted farmers have acquired wide multiple skills in farm mechanization which helps in enhancing productivity levels.



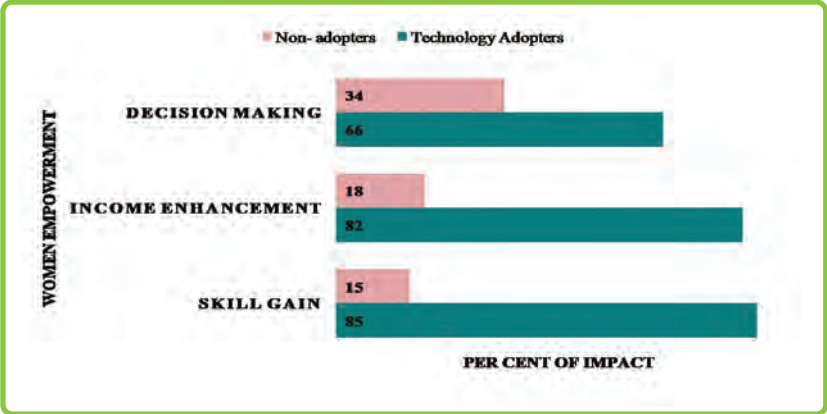
Impact of capacity building programmes

Over the past decade, the beneficiaries have significantly increased their knowledge, skills, and communication levels through capacity-building programs. Various extension activities *viz.*, awareness programmes, method demonstrations, exposure visit and diagnostic field trips were conducted from time to time in order to equip the tribal farmers with improved technologies and latest technological know- how. Under capacity-building programs, the level of knowledge (78%) skills (63%), and communication (75%) has significantly increased among the adopted beneficiaries due to the increased opportunities to interact with scientists and extension personnel.



Impact of women empowerment programs

After implementing a series of women empowerment programs (kitchen gardening, backyard poultry, tailoring and garment making, protective equipment, cattle health management *etc*), a transformative impact was observed in skills up-gradation, improved family income, decision making and knowledge levels among the adopted



group of tribal women beneficiaries over the years during the past decade. Women empowerment programs have significantly increased the skills to an extent of 85%, income enhancement to an extent of 82% and decision making level to an extent of 66 % among the tribal women beneficiaries. The home stead units introduced through TSP provided better income opportunities to the women farmers of tribal indigenous communities living in remote areas. Implementation of tribal sub-plan activities, thus lead to overall development of tribal farming communities.

CONCLUSION

The Government's focus has been on overall development of Scheduled tribes, aiming to bring them at par with the other communities in the country. Need based, technologically sound and economically productive appropriate agricultural technologies were facilitated through TSP Programmes of ICAR-CTRI. The proposed interventions in agriculture, horticulture, poultry, animal husbandry and value addition programmes have enhanced the knowledge, abilities, skills and income level of the tribal families and their living standards.

Introduction and popularization of low cost, improved farm agricultural implements have saved the drudgery and time. The yield and productivity of the field crops were increased with introduction of High Yielding Varieties. Due to the up-gradation of poultry breed, the productivity level was improved significantly. The cattle feed and fodder blocks and health camps have improved the milk yields in cattle. A desirable change was brought in economic, social, health aspects of tribal farmers with the adoption of the improved technologies. Health and nutritional status of the tribal population in the adopted villages was improved significantly due to the implementation of backyard kitchen gardening. It helped tribal women economically and socially empowered and addressed the issues of food insecurity and malnutrition.

The impact analysis of the technological interventions among tribal communities reveals a significant and transformative change towards technological advancement. Thus, these initiatives of ICAR-CTRI have paved the path for the tribal communities to be brought into the mainstream while honoring their cultures, legacies, and ways of life.





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