

# FRONT LINE DEMONSTRATIONS

## CTRI - KVK



**S. Jitendranath**  
**J.V.R. Satyavani**  
**E. Vijaya Prasad**  
**Dr. B. John Babu**  
**Dr. P. V.V.S. Siva Rao**  
**V.V. Lakshmi Kumari**  
**R. Sudhakar**  
**Dr. C.Chandrasekhara Rao**



**Krishi Vigyan Kendra**  
**CENTRAL TOBACCO RESEARCH INSTITUTE**  
( Indian Council of Agricultural Research )  
KALAVACHARLA - 533 294, E.G. District, A.P.





# **FRONT LINE DEMONSTRATIONS**

## **CTRI - KVK**

**S. Jitendranath**, Subject Matter Specialist

**J.V.R. Satyavani**, Subject Matter Specialist

**E. Vijaya Prasad**, Subject Matter Specialist

**Dr. B. John Babu**, Subject Matter Specialist

**Dr. P.V.V.S. Siva Rao**, Subject Matter Specialist

**V.V. Lakshmi Kumari**, Subject Matter Specialist

**R. Sudhakar**, Subject Matter Specialist

**Dr. C. Chandrasekhara Rao**, Programme Co-ordinator



**KRISHI VIGYAN KENDRA**  
**CENTRAL TOBACCO RESEARCH INSTITUTE**  
( Indian Council of Agricultural Research )  
KALAVACHARLA - 533 294, E.G. District, A.P.



# **FRONT LINE DEMONSTRATIONS**

## **CTRI - KVK**

**March, 2012**

Published by

**Dr. T.G.K. Murthy**

Director

**Central Tobacco Research Institute**

Rajahmundry - 533 105

Phone : 0883 - 2449871-4

Fax : 0883 - 2448341

e-mail : [ctri@sify.com](mailto:ctri@sify.com)

Authors

**S. Jitendranath**

**J.V.R. Satyavani**

**E. Vijaya Prasad**

**Dr. B. John Babu**

**Dr. P.V.V.S. Sivarao**

**V.V. Lakshmi Kumari**

**R. Sudhakar**

**Dr. C.Chandrasekhara Rao**

All rights reserved. No part of this book may reproduced or transmitted in any form by print, microfilm of any other means without written permission of Director, CTRI

Printed at

New Image Graphics, Vijayawada - 2 Ph : 0866 2435553

# FOREWORD

Krishi Vigyan Kendra of the Central Tobacco Research Institute, established in 1983 has done commendable service to the farming community, rural youth, women and tribal people of the East Godavari district. Front Line Demonstration (FLD) is the new concept initiated by Indian Council of Agricultural Research, where field demonstrations are conducted under the supervision of the Scientists



of National Agricultural Research System. The main objective of FLDs is to demonstrate and popularise the newly released Crop Production and Protection technologies among the farmers in different agro-climatic regions. The Krishi Vigyan Kendra conducted a number of FLDs to disseminate the scientific knowledge in Agriculture, Horticulture, Animal Husbandry, Home Science and Rural Crafts among various stakeholders. These efforts have made a significant impact by increasing fodder production, reducing the cost of cultivation of rice, increasing its productivity, increasing the family income through income generation activities.

The bulletin contains details of different FLD's conducted by KVK-CTRI, which will be useful to extension scientists of Agriculture, Horticulture and Animal Husbandry. I compliment the Programme Co-ordinator, Subject Matter Specialists and Ch. Sudhakara Babu, Programme Assistant associated with this publication.

A handwritten signature in green ink, appearing to read 'T.G.K. Murthy', with a long horizontal flourish extending to the right.

Rajahmundry  
28-3-2012

**( T.G.K. Murthy )**  
**Director, CTRI**

# Contents

	Page No.
Introduction	05
District Profile	06
Technological Profile of Agriculture	08
Front Line Demonstrations (FLDs)	09
Agriculture	10
Horticulture	19
Animal Husbandry	23
Home Science	25
Rural Crafts	25

---

# INTRODUCTION

Krishi Vigyan Kendra, unique system established by Indian Council of Agricultural Research (ICAR) functioning as knowledge and resource centre to address the emerging challenges while effectively providing technological backstopping and advisory to the farming community and feedback to the research and extension system as well.

## **Mandate of the KVK**

- ❖ Conducting On-Farm Testing for identifying the location specificity of Agriculture technologies under various farming systems and sustainable land use systems.
- ❖ Organize Front-Line Demonstrations to establish its production potentials on the farmers fields and to generate feed back information.
- ❖ Organise training to update the extension personnel with emerging advances in agricultural research on regular basis.
- ❖ Organise short and long term vocational training courses in agriculture and allied vocations for the farmers and rural youth with emphasis on “learning by doing” for higher production on farms and generating self employment.

The Krishi Vigyan Kendra of CTRI at Kalavacharla in East Godavari district of Andhra Pradesh, established in the year 1983, has completed 28 years service to the rural and tribal people, farm youth, farm women and other beneficiaries. During this period it has conducted a number of short term and long term on and off campus training programmes in the major disciplines of Crop Production, Horticulture, Plant Protection, Animal Science, Home Science and Rural Crafts sections. The CTRI-KVK has done commendable work in technology validation, demonstration, training and in transferring the proven agricultural technologies to the farming community based on pro-nature, pro-poor and pro-women orientation. These technologies have social relevance and helped in economic up-liftment of rural and tribal people of this region in general and East Godavari district in particular. The interventions of the KVK promoted job-led economic growth and brought

a revolutionary change in the living standards of the socially and economically weaker sections of the society. The technology excellence of the KVK has reached far and wide in the country and also to the abroad. The KVK is serving as a lighthouse of the farming community in the district. The scientific excellence of innovations made by this KVK are recognized through NRDC awards, Govt. of India and other rewards.

## DISTRICT PROFILE

**Table 1 : Population Statistics**

1	Total no. of block/taluk/mandals in the district	60
2	Total population of the district (lakhs)	51,51,549
3	Total population of the farmers of the district (lakhs)	6,85,784
4	Large farmers (in terms of land holding)	1,031
5	Medium farmers (in terms of land holding)	5,82,019
6	Small farmers (in terms of land holding)	90,324
7	Total land in the district (ha.)	7,39,271
8	Total cultivable land in the district (ha.)	5,03,128
9	Irrigated land (ha.)	4,90,580

**Farming systems in the district :** Important farming systems are Agriculture+dairy, Agriculture + Horticulture + dairy; Horticulture + dairy, Agriculture + Fisheries.

**Table 2 : Cropping systems in the district**

S.No	<i>Kharif</i>	<i>Rabi</i>	Summer
1	Rice	Rice	Pulse
2	Rice	Rice	Fallow
3	Rice	Blackgram/greengram	Fallow
4	Rice	Maize	Fallow
5	Fallow	Tobacco	Fallow
6	Sugarcane	Rice	Fallow
7	Rice	Sesamum	Fallow
8	Fallow	Cotton	Fallow
9	Burley tobacco	Fallow	Fallow
10	Tapioca	Fallow	



**Major agro-ecological situation in the district** : Depending upon type of soil, irrigation source, rainfall and temperature four situations viz., Central Delta, Eastern Delta, Upland and Agency area were identified. Four farming situations identified are:

- **Godavari alluvial soils** :- Canal irrigated : Rice, pulses, coconut and sugarcane, Banana, Elephant foot yam, cocoa main source of irrigation by canals
- **Red loams with clay base** :- Rice, blackgram, greengram, sesamum, groundnut, mango, cashew, tapioca and coconut. Irrigation by bore wells and also rain fed.
- **Black soils – Rained** :- Tobacco, maize
- **Lanka lands** :- Rice, Floriculture, maize, sugarcane, tobacco and chillies

**Besides agriculture** : abundant cattle, sheep, poultry are present.

**Table 3: Area/productivity under agriculture and allied enterprises**

S.No.	Commodity	Area (ha)		Productivity (q/ha)	
<b>Agriculture</b>					
A)	Cereals	K	R	<i>Kharif</i>	<i>Rabi</i>
	Rice	1,98,119	1,73,396	30.50(K)	43.72(R)
	<b>Pulses</b>				
	Blackgram	4,000	32,000	2.95	4.4
	Greengram	1000	22,000	1.78	2.54
	Sugarcane	11,000	--	93.53 (t)	
	Tobacco	9,000	1,000	19.64	28.53
	Maize	1,000	8,016	36.00	75.00
<b>Horticulture</b>					
S.No.	Commodity	Area in ha.		Production in tonnes	
1	Coconut	49,621		11,000 tonnes / ha.	
2	Cashew	34,189		10,960	
3	Mango	18,957		27,114	
4	Citrus	18,020		4,936	
5	Banana	18,000		1,59,57,000 bunches	
6	Tapioca	12,301		1,47,612	
7	Oil Palm	17,822		105	

Animal Husbandry & Dairying			
S.No.	Type of Animal	Population	Productivity
1.	Cattle	3,36,073	3-6 lit/ animal/ day (milk)
2.	Buffaloes	4,98,448	4-6 lit/ animal /day (milk)
3.	Goat	1,55,110	20-25 kg (meat)
4.	Sheep	63,355	20-25 kg (mutton)
5.	Poultry including ducks	76,50,344	60-80 / year (eggs)

## TECHNOLOGICAL PROFILE OF AGRICULTURE

Imbalanced fertilization, use of excess nitrogen and low phosphorus and potash (rice and banana) coupled with inefficient time and method of application (all crops), non application of micro nutrients viz., zinc and iron (rice), boron (oil palm and coconut), calcium and sulphur (groundnut) are leading to unsustainable yields and low returns in rice, sugarcane, tobacco, groundnut, mango, oil palm and cashew.

**Insect pests and diseases** are the major limiting factors in the production of field crops, commercial crops and plantations. Brown Plant Hopper, Sheath Blight, Rice Blast in rice; YMV, Leaf and blossom Webber, *Heliothis* sp, *Spodoptera litura*, and Powdery Mildew (black gram and green gram), Root grub, leaf spot (ground nut), Leaf eating caterpillar, Stem bleeding (coconut), *Spodoptera litura*, aphids, brown spot (tobacco), viral diseases (banana) and hoppers (mango), tea mosquito bug (cashew) are the major pests and diseases which are causing the problems to above crops. Farmers are using non- specific conventional chemicals in indiscriminate and irrational manner which has developed various problems like pest resurgence and pesticide residue in the produce causing heavy damage to the crops in respect of the yields and returns.

**Livestock viz.,** buffaloes, sheep, goat and cows are playing an essential role predominantly in small and medium farmers. Paddy straw and dry matter of blackgram and greengram are the major feed for the livestock. Non availability of sufficient green fodder, diseases, reproductive problems, high feed cost are the important problems.

## FRONT LINE DEMONSTRATIONS (FLDS)

Front line demonstration is the new concept of field demonstration evolved by the Indian Council of Agricultural Research with the inception of the Technology Mission on oil seed crops during mid eighties. The field demonstrations conducted under the close supervision of the scientists of the National Agricultural Research system are called Front Line demonstrations because the technologies are first time demonstrated by the scientists themselves before being fed into the main extension system of the state department of Agriculture. The main objective of the front line demonstration is to demonstrate the newly released crop production and protection technologies and its management practices to the farmers' field under different agro-climatic regions and farming situations. While demonstrating the technologies to the farmers fields the scientists are required to study the factors contributing higher crop production, field constraints of production and there by generate production data and feed back information. Front-line demonstrations are conducted in a block of 2-4 ha land in order to have better impact of the demonstrated technologies on the farmers and field level extension functionaries.

The special features of front line demonstrations are

1. Front line demonstrations are conducted under the close supervision of the scientists of the National Agriculture Research System comprising ICAR institutes, National Research Centers, Project Directorates, Krishi Vigyan Kendras and State Agricultural Universities and its Regional Research Stations.
2. Only newly released technologies or those likely to be released in near future are selected for the front line demonstrations
3. Front line demonstrations are organized in a block of two to four hectares involving all those farmers whose plots fall in the identified demonstration block
4. Only critical inputs and training are provided from the scheme budget remaining inputs are supplied by the farmers themselves.
5. Training of the farmers associated with the front line demonstrations is a prerequisite for conducting such demonstrations.
6. The largest audience of front line demonstrations are both farmers and extension functionaries. The purpose is to convince the

extension functionaries and farmers together about the potentialities of the technologies for further wide scale diffusion and

7. Front-line demonstrations are used as a source of generating data on factors contributing higher crop yields and constraints of production under various farming situations.
8. Conducted to show the maximum production potentiality of the latest agricultural technologies to the farmers and extension functionaries with a view to reduce the time lag between technology generation and its adoption, and to receive first hand feed back pertaining to new released technologies so as to reorient research by the scientists. After assessment location specific, viable technologies were demonstrated to spread in a large area.

## AGRICULTURE

### TNAU Drum Seeder

In East Godavari district rice is cultivated in an area of 3.71 lakh ha (*Kharif* and *rabi*). The cultivation of paddy is becoming uneconomical due to increase in cost of cultivation. The increase in cost of cultivation is due to increase in labour cost and also the input cost. Some times the nursery raising of paddy is delayed due to non-availability of sufficient water. In these circumstances direct sowing of paddy through TNAU drum seeder will help in reducing the cost of cultivation as there is no need to raise the nursery, labour shortage can be managed, paddy cultivation can be taken up in late sowing condition and the duration can be reduced by 10 days. Direct sowing of paddy through drum seeder was taken up in two consecutive years (2010-12) both in *kharif* as well as in *rabi*. In both the seasons yield was improved. Farmers are of the opinion that direct sowing is more preferable in *rabi* as there is control on water management.

#### *Kharif*

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Direct sowing with paddy row seeder	54.3	19,264	1.54	13
FP : Farmers practice (Transplantation)	48.0	3,010	1.04	

### **Rabi**

<b>Technology</b>	<b>Average yield (q/ha)</b>	<b>Net returns (Rs)</b>	<b>C:B ratio</b>	<b>% increase in yield</b>
RP : Direct sowing with paddy row seeder	103.5	83,331	4.08	6
FP : Farmers practice (Transplantation)	97.5	64,435	2.63	

### **Weed management in direct sown paddy**

Due to labour shortage and also to reduce the cost of cultivation direct sowing through drum seeder was popularized in East Godavari district both in *kharif* as well as in *rabi*. The extent of area under direct sown paddy is increasing day by day. Weed management is a problem in direct sown paddy. Due to non availability and high labour cost the chemical weed management is popularized in direct sown paddy. Post emergence application of Bispyribok sodium @ 100 ml 18-20 DAS controlled the weeds effectively as a result yields were improved by 10.9% in *kharif* and 16% in *rabi*

### **Kharif**

<b>Technology</b>	<b>Average yield (q/ha)</b>	<b>Net returns (Rs)</b>	<b>C:B ratio</b>	<b>% increase in yield</b>
RP : Nominigold (bispyribok sodium) 100 ml (18 -20 DAS)	60.6	27,669	2.03	10.9
FP : Hand weeding	54.6	12,398	1.40	

### **Rabi**

<b>Technology</b>	<b>Average yield (q/ha)</b>	<b>Net returns (Rs)</b>	<b>C:B ratio</b>	<b>% increase in yield</b>
RP : Nominigold (bispyribok sodium) 100 ml (18 -20 days)	103.5	69,181	1.27	16.0
FP : Hand weeding	89.0	53,874	1.23	

### **Control of zinc deficiency in rice**

Zinc deficiency is one of the major problems in *rabi* rice. Majority of the rice farmers are not aware about the identification of zinc deficiency and its control measures KVK organised training programmes

and demonstrations to create awareness on management of zinc deficiency which improved the rice yield in *rabi* by 7.5%.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Use two foliar sprays of zinc sulphate 0.2% with 5 days interval.	57.64	34,371	1:2.92	7.5
FP: No zinc application	53.62	30,980	1:2.76	

### Management of Brown Plant Hopper (BPH) in rice

Brown Plant Hopper (BPH) is one of the major pest in rice as the varieties cultivated are susceptible indiscriminate (non-specific and higher doses) use of pesticides. Farmers are following higher nitrogen application is also one of the reasons for BPH incidence. Cultivation of BPH tolerant variety MTU -1081, formation alleyways, split application of recommended N fertilizers, proper water management and need based chemical application (Ehophenprox 2ml/l) minimized the pest incidence and increased the yields by 15% in *rabi*.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Tolerant variety (MTU-1081) with integrated management practices	80.0	44,000	1:3.20	15
FP: Indiscriminate use of pesticides with existing variety (BPT 5204)	69.4	36,309	1:2.89	

### Chemical weed control in maize

Maize is an important crop cultivated in an area of 8,500 ha in alluvial lands of Godavari river for the purpose of green cobs and also for seed purpose. The maize cultivation is increasing year by year due to its increasing demand for poultry feed and also due to increase in human consumption. Weeds are the main problem due to non availability of labour and also proper machinery. Preemergence application of Atrazine @ 2.5kg a.i./ha improved the C:B ratio as well as the yield (29.2%) and net return (₹14,000).





TNAU Drum Seeder



Weed management in direct sown paddy



BPH management in Rice



Weed management in Maize



Blackgram variety : LBG 752



Sesamum variety : YLM 66



Bengalgram variety : JG 11



Sucker control in tobacco



Cassava mosaic virus in tapioca



Scale insect management in tapioca



Boron deficiency in Oil Palm



Hopper damage in Mango



Tea mosquito bug damage in cashew



Stem bleeding management in coconut



Thrips and mites damage in chillies



Co-4 Fodder





CoFS-29 Fodder variety



Azolla rearing



Deworming in Goats



RD Vaccination



Ragi Laddu



Palmyrah fibre separator



Banana fibre extraction



Coir pith composting



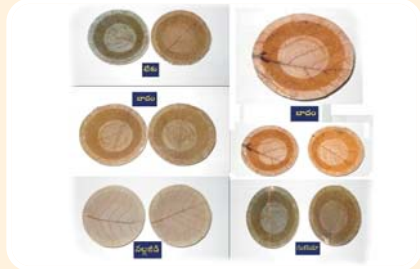
Cup making machine



Bamboo nodal sheath cup making



Bamboo nodal sheath cups



Eco-friendly cups with different leaves



Coirpith composting



Incense stick making machine



Cashew apple utilization



Maggam embroidery

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Pre emergence weedicide application (Atrazine @ 2.5 kg/ha)	73.0	38,475	1:4.00	29.2
FP: Manual weedings (Four)	56.5	24,375	1:2.60	

### Performance of black gram variety LBG – 752 in rice fallows

In East Godavari dist. black gram is the major pulse crop grown in an area of 32,000 ha as a relay crop after rice on conserved soil moisture and residual soil fertility. Low yields are due to poor quality seed, non adoption of seed treatment and excessive weed growth. LBG 752 variety is shining, photo insensitive, bold variety suitable for rice fallows. It is resistant to YMV and wilt. Yield potential is 18-20 q/ha. Training and demonstration on improved variety LBG-752 along with seed treatment with imidacloprid increased the average yield and net returns (₹13,791).

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Improved variety - LBG-752	6.35	20,378	2.87	142
FP: Local variety	2.62	6,587	2.31	

### Leaf and blossom webber (Maruca) management in green gram.

Green gram is cultivated in rice fallows in *rabi* as relay crop in uplands in an area of 22,000 ha. Leaf and blossom webber is causing severe damage leading low yields. Application of specific chemicals at appropriate time and dose reduced the infestation and improved the yields by 2.83 q/ha.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Chlorpyphos – 2.5 ml, Novaluran - 0.75 ml, Lambda cyhalothrin -1 ml, Spinosad – 0.25g, Dichlorovas – 1ml /lt	5.68	19,750	4.08	540
FP : Farmer's practice Monocrotophos – 2ml, Dithane M-45 -2g / lt	0.875	1,725	1.25	

## Yield improvement of sesamum through improved variety YLM - 66

Sesamum is the major oil seed crop grown in East Godavari dist. Sesamum yields were low because of lack of awareness about the cultivation of improved varieties. KVK made an intervention in terms of training and demonstration on cultivation of improved variety viz., YLM-66. YLM 66 seed is light brown in color suitable to coastal area. Duration is 80 days in *kharif* and 75 days in *rabi*. It is resistant to powdery mildew and leaf spot. By adopting the new variety YLM-66 the average yields were improved by 2.12 q.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Improved variety YLM-66	6.75	25,740	1:3.41	45.8
FP: Local variety	4.63	16,375	1:4.21	

## Balanced fertilization in sesamum

Sesamum is one of the important oilseed crops cultivated in uplands of East Godavari district. Farmers are applying high nitrogen fertilizers leading to imbalance in nutrients. Balanced fertilizer application increased the yield by 1.15 q/ha. Higher benefit cost ratio of 1.88 was obtained as against 1.17 through balanced fertilization.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP: Balanced fertilization (40-20-20)	4.82	10,739	1.88	31
FP: Farmers practice(115-0-0)	3.67	5,664	1.17	

## Yield improvement of bengalgram through improved variety JG-11

Bengalgram is newly introduced *rabi* crop in East Godavari dist. It is grown after rice on conserved soil moisture and residual soil fertility. It is a high yielding bold variety tolerant to wilt. Duration is 100-105 days. Improved variety JG-11 increased the yield by 20 % over the local check.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Improved variety JG-11	6.75	6,845	1:2.02	20
FP : Local variety	5.60	4,755	1:1.73	

### Management of suckers in natu tobacco with suckercide

Tobacco is a polymorphic crop. Different tobacco types viz., FCV tobacco, Natu tobacco and Burley tobacco are the important types grown in the district. Topping is a practice followed in FCV and Natu tobacco for leaf expansion and leaf weight. After topping suckers will emerge from leaf axils which are to be removed to improve the nutrient use efficiency. In natu tobacco the farmers are topping the leaves at 16 leaves stage and suckers are removed manually 2-3 times. Non availability of labour along with higher labour wages led to higher cost of sucker control. Sucker control through application of 4% Deconol reduces the labour problem and cost of cultivation. The deconol application plots effectively controlled the suckers. Yields were improved by 11% and saved an amount of Rs.9,840/- per ha. towards cost of manual labour.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Topping at 14 leaves stage and sucker control by deconol 4%	20.7	50,477	1:1.52	11.3
FP : Topping at 16 leaves stage and removal of suckers manually	18.5	33,823	1:1.31	

## HORTICULTURE

### Management of 'Cassava Mosaic' in Tapioca (*Manihot esculenta*)

Tapioca crop is grown as sole crop and also as an intercrop in cashew orchards in *rainfed* situation. Due to non-adoption of seed treatment and un timely nursery sprayings, farmers incurred heavy losses (68–80%) due to severe incidence of cassava mosaic in the entire belt. Cassava Mosaic incidence was reduced by adopting seed treatment methods and timely pesticide spray schedule. Seed treatment and timely spray of insecticides resulted in less incidence and recovery of plants from mosaic incidence.



Technology	Average yield (t/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP: Planting material (stem cuttings) treatment with mancozeb 3 gm. + Dimethoate 2 ml./lit. of water for 5-10 minutes. One spray of neem oil (Azadirachtin 1500 ppm) 3 ml./lit at 30 days after transplanting. Two sprays of Triazophos 40% E.C. @ 2 ml./lit. at 60 and 90 days after transplanting.	8.9	34,515	1 : 3.1	31
FP : Farmer's practice (No seed treatment and spraying)	6.8	24,148	1 : 2.6	

### Management of Scale insects in tapioca (*Manihot esculenta*)

Scale insects are sucking pests causing damage to tapioca stems that are being used as seed material during the storage after the harvest. Scheduled based application of neem and chemical insecticides effectively controlled the scale insects and improve yield by 3.4 t/ha.

Technology	Average yield (t/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Spraying Malathion 25% E.C. @ 2 ml./lt. water followed by Azadirachtin 1500 ppm @ 50 ml/10 litres of water	11.3	22,674	2.67	43
FP : Farmers practice (No spray)	7.9	12,049	2.21	

### Management of magnesium and boron deficiencies in Oil Palm

Oil palm is grown in an area of 17,822 ha in uplands having good irrigation and drainage facilities. Identified boron and magnesium deficiencies in old orchards and demonstrated the methodology for its control. Application of boron @ 100 gm. / palm / year and 500 gms. of magnesium sulphate per palm per year resulted in recovery from nutrient deficiencies and observed 1.8 tonnes more yield.

Technology	Average yield (t/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Soil application of Boron (@ 100 gm. / palm / year) and Magnesium sulphate 500 gms.	8.6	32,985	1:3.0	26.4
FP :Farmer's practice (No nutrient application)	6.8	24,148	1:2.6	

### Mango hopper management

In East Godavari district mango is cultivated in an area of 18,957 ha. Mango hopper damage is very much prevalent in the mango cultivated area. They are the sucking pests affecting the tender branches, leaves and also flowers. Schedule based application of insecticides reduces the hopper infestation there by increasing the yield (7 t/ha) and net returns.

Technology	Average yield (t/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Monocrotophos 1.6 ml Carbaryl - 3 gm /Imidacloprid 0.3 ml /l	20	1,60,000	2.55	53.8
FP : Farmer's practice (No spraying)	13	1,04,000	1.88	

### Tea mosquito bug management

In East Godavai district cashew is cultivated in an area of 34,189 ha in uplands as a rainfed crop. Cashew yields are low due severe incidence of tea mosquito bug. The incidence occurs between October and April. It is a sucking pests affects the crop in early flowering and fruiting stage. Schedule based application of insecticides controls the incidence of tea mosquito bug and increases the yield by 2.5q/ha.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Monocrotophos 1.6 ml - 1 <sup>st</sup> spray, Endosulphon-2ml /lt - 2 <sup>nd</sup> spray, Carbaryl - 3 gm/l	4.35	26,665	3.42	135
FP : Farmer's practice (No spraying)	1.85	14,250	2.58	

## Efficacy of *Trichoderma viride* against Stem Bleeding in coconut

In East Godavari coconut is one of the important horticultural crop cultivated in 47,621 ha. Most of the orchards are old and East coast tall is major variety grown in this area. Stem bleeding is a major disease because of which there is reduction in yield and some times death of the tree is observed. Demonstrated the control of stem bleeding through soil application and smearing of *T.viridae* paste along with neem cake. Integrated management of stem bleeding helped in increasing the nut yield and also the net returns

Technology	Average yield	Net returns (Rs)	C:B ratio	% increase in yield
RP : Soil application of Neem Cake @ 5 kg / palm / year alongwith; <i>Trichoderma viride</i> powder @ 50 gm / palm / year. Smearing of <i>T.viride</i> paste (5 ml. of water to 10 gm. <i>T.viride</i> talc powder) on the stem bleeding lesions.	12,555 nuts	31,385	1:3.4	35
FP : Farmer's practice : No application of biofungicide	9,300 nuts	23,250	1:2.6	

## Popularization of varieties tolerant to shoot and fruit borer and bacterial wilt in Brinjal

Brinjal is cultivated in an area of 3,461 ha in East Godavari district. Identified the incidence of shoot and fruit borer and bacterial wilt in the major pockets of upland area. Evaluated two improved varieties viz,, Pusa Purple Cluster and Bhagyamathi which are tolerant to shoot and fruit borer and bacterial wilt. Both the varieties showed better performance compared to local check and increased the yields by 35%.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : (Bhagyamathi)	35.0	11,700	1 : 3.0	35.0
RP : (Pusa Purple Cluster)	35.5	11,950	1 : 3.0	36.5
FP : (Local variety)	26.0	6,800	1 : 2.3	



## Thrips and Mites Management in Chillies

Green chillies are cultivated in Lanka lands. Thrip and Mites are the important pests causing severe damage to crops. As the identification of these pests is difficult, demonstrations and training programmes were conducted for the management of thrips and mites. Schedule based application of insecticides effectively controlled the thrips and mites there by improved the yields and net returns in green chillies.

Technology	Average yield (t/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : Acephate - 1.5 g, Pirpronil - 2 ml, spinosad - 0.25 ml, pegasus - 1g / lt, Wettable sulphur - 3 g, Dicofol - 5ml	62.8	4,17,375	3.54	73.1
FP : Farmer's practice Bavistin - 2g/t, Ekalux - 2ml /lt	36.1	1,81,228	2.34	

## ANIMAL HUSBANDRY

### Fodder variety CO-4

It is a perennial fodder crop. It is a hybrid between napier and Bajra. Co-4 variety has got the high yield potential compared to the para grass. CO-3 variety was introduced initially which has revolutionized the fodder production in East Godavari district. Co-4 got higher yield potential than Co-3 variety and can be grown as sole crop and also as an inter crop in coconut gardens. Co -4 variety increased the yield by 12.5% over Co-3 variety.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP : CO-4 variety of Hybrid Napier Bajra	135	2,25,000	2.81	12.5
FP : CO-3 variety of Hybrid Napier Bajra	120	1,54,000	2.05	

### Fodder variety CoFS-29

It is a multicut high yielding jowar variety. It can be cultivated in irrigated as well as in rainfed condition. COFS-29 showed significantly higher yield over local sorghum variety.

Technology	Average yield (q/ha)	Net returns (Rs)	C:B ratio	% increase in yield
RP: COFS-29 variety of Jowar	50	83,500	2.26	100
FP: Jowar (MP Chari)	25	38,250	2.58	

## Azolla as a cattle feed

Cattle feed is the key for milk production. No sufficient fodder is available for the cattle. Azolla can be used as a cattle feed. Azolla can be reared in back yard in a silpaulin sheet. Azolla is as good as concentrate feed. It can be mixed with concentrates and can be fed to cattle.

Treatments	Reamarks
RP : Feeding of 2 kgs azolla by spending ₹ 2	Production cost is less by ₹ 10
FP : Feeding 1kg of concentrates by spending ₹ 12	No change in quantum of milk produced.

## Internal & external parasite control

Mortality in kids and lambs is due to external, internal parasites, Deworming was done with oxclozanide and tetramesole and butox spray was given to control external parasites. Deworming reduced the mortality by 100%.

Treatments	Mortality	Remarks
RP : Deworming with oxclozanide and tetramesole and butox spray	75 kids (Nil mortality)	Deworming and deticking reduced the mortality
FP : Deworming with albendazole	100 kids (5% mortality)	

## RD Vaccination

Backyard poultry suffers heavy losses due to Raniket disease. The mortality rate is upto 90% in affected flock. RD vaccination both lasota and R2B was administered for 734 birds in. No bird is died due to RD in the vaccination birds.

Treatments	Mortality	Remarks
RP : RD vaccination	734 country birds were vaccinated – mortality nil	Mortality is nil with RD Vaccination
FP : No vaccination	Mortality is 90% in effected flock	

## HOME SCIENCE

### Management of anaemia in rural women through iron and protein rich food

Anaemic situation is prevalent in adolescent girls in rural areas of East Godavari District due insufficient intake of Iron and other nutrients.. The anaemic situation is identified as major reason for miscarriages, low birth weight babies in married women. Supplementation of iron folic acid and vitamins tablets along with diet supplementation is essential for anemic situation to achieve desired level of haemoglobin, body weight and body mass index. Since diet supplementation food bring considerable increase in weight hemoglobin percentage and BMI. Hence, diet supplementation is preferred.

## RURAL CRAFTS

### Palmyrah Fibre Separator

Fibre extraction from palmyrah frond is a tedious and cumbersome process. An amount of 5-6 kg fibre can be produced /day by a family of 4-5 members. It involves high drudgery and low fibre productivity. The KVK of CTRI has designed and developed a machine christened Palmyrah Fibre Separator for extraction of fibre from palmyrah fronds. The machine works on the principle of beating and scraping. An amount of 50-60 kg fibre can be produced as compared to 5-6kg fibre/day. Net income will be 500-700/day. Drudgery is removed and health problems can be prevented. It is easy to operate and less maintenance cost is involved. Quality fibre can be produced compared to manual process.

Method of extraction	Output	No. of persons engaged	Drudgery (%)	Net income
Palmyrah Fibre Separator	50-60 kg	4	50	500-700
Manual method	5-6 kg	4-5	100	

## Banana Fibre Extractor

India accounts for 26% of global banana production. About 1000M banana pseudostems are dumped as waste and its disposal is a problem. In Andhra Pradesh annually 80 million banana pseudostems are dumped as waste. It is estimated that 17000 tonnes of fibre can be extracted from waste portions of banana worth ₹ 85 crores @ ₹ 50,000/tonne. Manual fibre extraction process is a cumbersome process. In manual process only 500-600 gms dry fibre can be produced in eight hours. It is a tedious process involving drudgery. Staining of palms, blackening of nails, finger tips and nail ulcers are some of the common problems. Hence commercial extraction of banana fibre has not received desired attention even though good quality of fibre material can be extracted and used for commercial purpose. The Krishi Vigyan Kendra of CTRI, Rajahmundry has designed and developed user friendly machine named Banana Fibre Extractor for extraction of fibre from waste portions of banana plant such as pseudo stems, petioles and fruit stalks. The machine works on the principle of beating and scraping. An amount of 15-20 kg fibre per day can be produced against 500gms of fibre production through manual operation. Superior quality fibre in terms of length, softness, strength and colour can be produced.

	No. of persons engaged	Output	Waste fibre (%)	Drudgery involved (%)	Net income per day per head
Banana Fibre Extractor	2	15 kg	8	25	300
Manual	2	500-600g	20	100	50

## Coir pith composting by PVC method

In East Godavari district nearly 40 coir fibre extraction industries are established for fibre extraction. Coir pith comes as a waste during the fibre extraction. Coir pith can be effectively utilized as a manure after composting using *plurotus* fungus. There are two methods in composting. 1. Heap method 2. PVC method. In both the methods 100 kg coir pith + 400 g *plurotus* fungus + 1000g urea are used. Heap method takes 40 days for composting where as PVC method takes 30 days for composting.

## Eco friendly Cup making with bamboo nodal sheath

Eco friendly cups of different sizes can be prepared with nodal sheaths of bamboo. Front line demonstrations were conducted for preparation of cups of different sizes from bamboo nodal sheaths. Vocational training programmes were conducted on eco-friendly cup making with bamboo nodal sheaths. Self help groups were identified for establishing the units. A total No of 2000 cups can be prepared with the machine. Cost involved is ₹ 400/2000 cups and the gross returns is ₹ 800/2000 cups and the net profit is ₹ 400/2 persons

**Incense stick making :** Preparation incense sticks from bamboo is a tedious process. It involves the drudgery and out put also low. Incense stick making machine designed and developed by KVK is user friendly and output is more. Manual production is 2 kg/day and the machine production is 8kg/day. Production efficiency is 300%.

## VALUE ADDITION TO CASHEW APPLE

- ❖ In India an estimated 40 lakh tonnes of cashew apple fruit is thrown as waste.
- ❖ Cashew Apple is rich in nutritive values with sugars, minerals and vitamin 'C'.
- ❖ Value addition of cashew apple promote home-stead/small scale entrepreneurship to rural, tribal women and youth.
- ❖ Unit cost for establishment at home- stead level ₹ 30,000/-
- ❖ Infrastructural facilities required: Mixer/ Grinder (Pulper), strainers, Juice extractor, Pressure Cooker, Stainless steel containers, Bottles and Jars and Crown corking machine.
- ❖ Cashew Apple syrup : Production cost ₹ 50 / 750 ml, Market Price ₹ 62 / 750 ml, Net Profit ₹ 12/ 750 ml
- ❖ Cashew Apple Jam : Production cost ₹ 48 / 1 kg, Market Price ₹ 60/ 1 kg, Net Profit ₹ 12/ 750 ml
- ❖ Two women can prepare 15 litres of juice and 10 kg jam and get a net profit of ₹ 300 per day at home- level.
- ❖ Cashew Apple residue could be converted into 'Vermi-compost' with nutrient composition of 1.69% N, 0.44% P and 0.58% K.

# COIR YARN-MAKING WITH AUTOMATIC MACHINERY

## Introduction

- Coir extracted from coconut husk is the raw material.
- Raw material abundantly available in southern states.
- Two kg of yarn production by manual methods.
- Six kg of yarn production by traditional charakas
- Manual yarn productivity is low and is of low quality.
- Yarn-making with automatic machinery is highly profitable.

## Methodology

- Assessed Automatic Coir Yarn Making machines developed by Coir Board.
- Machine converts fibre into yarn in three steps viz., willowing, slivering & spinning.
- Simple machinery with low cost maintenance and high efficiency.
- Two persons required for machine operation.
- 2 ply, 3 ply & rope can be prepared
- Out put per day per machine : 30 kg.
- Cost of the machine : 90,000

## Quantitative and qualitative Impact of the Technology

- Superior quality yarn can be produced, hence profit is more.
- Five fold increase in yarn production.
- Net income per month 5,000 to 6,000.
- Value addition, through eco-friendly packing material, door mats, corridor mats, geo-textiles etc.,
- Coir Board provides 40% subsidy.
- Total no. of units established : 27





