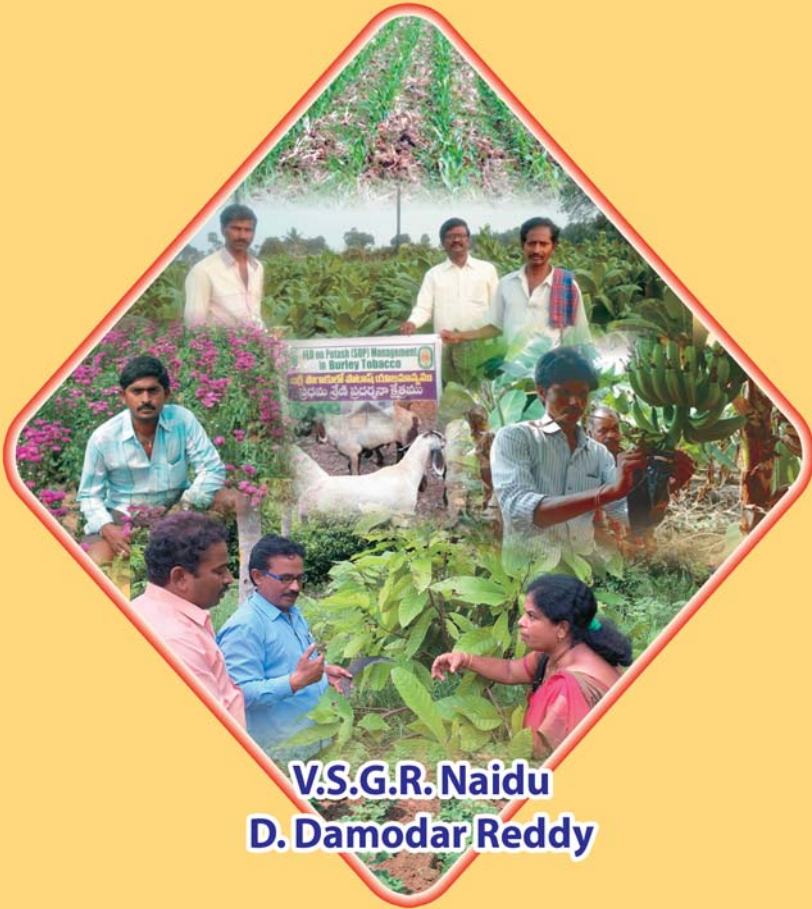


FRONTLINE DEMONSTRATIONS (2012-17)



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D. Damodar Reddy



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ICAR-Central Tobacco Research Institute
(Indian Council of Agricultural Research)
KALAVACHARLA - 533 297, Rajanagaram Mandal,
East Godavari District, Andhra Pradesh
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FOREWORD

Front-Line Demonstration is a concept of field demonstration evolved by the Indian Council of Agricultural Research (ICAR) with the inception of the Technology Mission on Oilseed Crops during mid-eighties. The field demonstrations conducted under the close supervision of scientists of the National Agriculture Research System are called front-line demonstrations because the technologies are demonstrated for the first time by the scientists themselves before being fed into the main extension system of the State Department of Agriculture. "Seeing believing" is the main principle behind the demonstrations.



The main objective of Front-Line Demonstrations is to demonstrate newly released farming technologies and its management practices in the farmers' field under different agro-climatic regions and farming situations. Frontline Demonstrations are used as a source of generating data on factors contributing higher production and constraints of production under various farming situations. The recipient farmers of FLDs also play an important role as source of information about the technologies for wider dissemination among the neighbour farmers.

This technical bulletin is a compilation of technologies of Agriculture, Horticulture and Animal Science that were successfully demonstrated through FLDs by the KVK during 2012-17. I hope this technical bulletin will be useful for farmers, researchers, students and other stakeholders.

A handwritten signature in blue ink, appearing to read 'D. Damodar Reddy', with a large blue flourish on the left side. Below the signature is a horizontal line with three small dots underneath it.

(D. DAMODAR REDDY)

Director

25 March, 2017
Rajahmundry

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Zero tillage maize after Kharif rice

Rice-relay pulse crop sequence is an important crop sequence covering about 0.4 lakh hectares in East Godavari district. Due to problems of Yellow Mosaic Virus in green gram and black gram rice-pulse sequence was replaced by rice- maize sequence in about 10, 000 ha. Generally rice is harvested during second fortnight of November. If maize is planted after repeated conventional tillage, the planting gets delayed for ploughing and farmers have to wait for optimum soil moisture. In case of zero tillage under rice-maize rotation, the farmers can plant maize in time. Considering the above points, FLD was conducted in farmers' fields to popularize zero tillage maize among farmers. In this technology the field was not ploughed and soil was opened up for sowing the seed and fertilizer was placed in adjacent slot. The comparison was made between zero tillage maize and farmers practice (conventional tillage).

Location: Seethanagaram and Korukonda mandal

Results

Treatments	Grain Yield (q/ha)	Cost of cultivation	Gross Income (in Rs.)	Net Income (in Rs.)	B :C Ratio
Conventional tillage maize	57q/ha	22,500	85,500	63,000	3.8
Zero tillage maize	62q/ha	17,650	93,000	75,350	5.2

Farmers' Field School (FFS) was conducted to upscale the technology and gather feedback from farmers before the harvest of crop. Farmers' perceptions were drawn on different factors such as tillage cost, yields, Net returns, weed management and nutrient and pest management aspects.

Observation/Feedback

- Savings on cost of tillage in zero till crop in comparison to conventional practice, as rice fallows possess hard sub surface soil on account of flooding of previous season crop.
- Weeds were the problem in zero till maize but weed management was taken care of by herbicides mainly to control weeds and prevent the emergence of rice stubbles.
- Zero tillage maize resulted in 20 percent higher net returns when compared to conventional tillage grown maize



Potassium management in Burley Tobacco

Burley tobacco is one of the important cash crops in uplands and also tribal areas in East Godavari district. Potassium is very essential for burley tobacco for enhancing the quality of cured leaf. Potash improves colour, texture, body, spotting and elasticity of the cured leaf. Most of the farmers in burley growing area are not applying the Potash (SoP) due to lack of awareness and also its higher cost. The FLD was conducted to create awareness among the farmers about the benefits of applying SoP in burley tobacco.

Location: Manyavaripalem village of Jaggampet mandal

Results

Treatments	Yield (q/ha)	Gross Income (in Rs.)	Net Income (in Rs.)	B:C Ratio
T-1: Farmer's practice: SoP is not applied	13.22q/ha	99,150	51,720	1:1.7
T-2: Application of Sulphate of Potash @40 kg/ac 20 kg at 10 DAP 20 kg at 25 DAP	17.50q/ha	1,31,250	56,160	1:2.1



Observation/Feedback

- Quality of cured leaf enhanced with application of Sulphate of Potash (SoP).
- Farmers adopted this technology.

Weed management in Cotton

Cotton is one of the major commercial crops in East Godavari District. Effective weed management is one of the many critical components of successful cotton production. Cotton requires better weed control because cotton does not compete well with weeds, especially early in the season and a given number of weeds will reduce cotton yield drastically. Weeds also interfere more with harvesting of cotton and they can reduce lint quality because of trash or stain. The first intercultural operation is always a manual operation which ensures a complete removal of weeds at very early stage of crop growth in the crop. However, it adds to production cost due to higher labour charges and non-availability

of labour is also a problem. FLD was conducted to demonstrate chemical weed control in order to minimize the cost of cotton cultivation and timely weed management.

Location: Pedarayavaram village of Rangampet mandal.

Results

Treatments	Yield (q/ha)	Gross Income (in Rs.)	Net Income (in Rs.)	B:C Ratio
T-1: Farmer's Practice: Pendimethalin @ 1 lit/ac 2-3 DAS. Hand weeding at 40 DAS.	36.00q/ha	1,54,800	66,800	1:1.75
T-2: Chemical Weed Management: i. Pendimethalin @1.5 l/ac 2 DAS. ii. Tank mix application of Quizalofop-p-ethyl @ 400ml+ Pyriithiobac sodium @250 ml/ac at 25-30 DAS.	40.00 q/ha	1,72,000	83,000	1:1.9



Observation/Feedback

- Increased net returns due to yield increase as well as reduced cost of cultivation.
- Pest and Disease incidence has also reduced in the weed managed fields.
- Combination of pre and post emergence herbicides is an alternative to manual weeding and can help the farmers where labor availability is scarce.

Bark eating caterpillar management in Cocoa

Bark eating caterpillar is polyphagous, widely distributed and very common especially in neglected Cocoa orchards. Larva bores short distances in bark or stem usually at the forking of branches and hides there during day; constructs rope-like galleries of silk, frass and fecal matter, plastered on trunk, moving inside and feeds on the bark of the tree. FLD was conducted to demonstrate the management of bark eating caterpillar.

Location: Mummidivaram and Kothalanka villages of Mummidivaram mandal.

Results

Treatments	Results
T-1: Farmer's practice: No control measures	Bark feeding was evident
T-2: Inserting cotton swab soaked in kerosine or petrol. Injecting Dichlorovos @ 2ml/l. or Quinolphos 25 EC 0.1% @ 2ml/l.	As compared to check no additional bark feeding was observed in the treated gardens.



Observation/Feedback

- No fecal matter was observed in treated areas.

Demonstration of 'Arka Mohini' Capsicum variety

In East Godavari district, Capsicum is cultivated under protected condition i.e., in shadenet houses and polyhouses. However, in irrigated medium soils of Kadiapulanka, Choppella and Allavaram villages where chillis is the predominant crop, demonstrated capsicum variety 'Arka Mohini' in open condition, as a varietal demonstration in 6 locations. Demonstrated the methodology of seed treatment, nursery bed preparation, spray schedule and transplanting method. Farmers benefited with high market price for capsicum.

Result

Treatments	Yield t/ha	Net returns	B:C Ratio
T-1:Chillies (FP)	10.5 t/ha	70,500	1.8
T-2: Capsicum (Arka Mohini)	8.2 t/ha	1,51,700	2.95



Observations/ Feedback

- Arka Mohini capsicum performed well with average fruit weight of 175g each and more shelflife
- Though chillis is the practicing crop in these mandals, due to high market price and quality produce Capsicum has gained importance and farmers adopted the technology.

Small sized tubers as seed material in Elephant Foot yam

Farmers usually select large size (more than 1 kg) elephant foot yam tubers at higher price, cut into 4 to 6 pieces each with a part of depression (eye/sprout) as seed material for sowing. To reduce cost and wastage of seed material, FLD was conducted to demonstrate small tubers (variety 'Gajendra') as seed material. Tubers were drenched by spraying with Copper Oxy Chloride (COC) 30g. and Streptomycin sulphate 1g. in 10 litres of water and were shade dried. Seed treatment done with Dimethoate 2 ml per litre and Dithane M-45 3g per litre for 5-10 minutes just before sowing in main field.

Results

Treatments	Yield	Net returns (in Rs.)	B:C Ratio
T-1: Large size tubers (cut into pieces) (FP)	33.75 t/ha	2,58,000	2.4
T-2: Small size tubers	37 t/ha	3,27,000	3.1



Observations/ Feedback

- Small size tubers (less than 0.5 kg) as seed material reduced the cost on seed material. Cost of small size tubers for seed purpose is Rs.2,000/- and large size seed tubers is Rs.3,000/- per 230 kg (locally known as Puttu).
- Saving in labor cost towards cutting large yams into pieces.

Spiny gourd as alternate crop to *Coccinia*

In Alamuru, Ravulapalem and Athreyapuram Mandals of the district *Coccinia* crop was affected with virus incidence and caused heavy crop lossess. FLD was conducted to demonstrate Spiny gourd as alternate to *Coccinia* (Little gourd).

Results

Treatments	Yield	Gross returns (Rs.)	Net returns (Rs.)	B:C Ratio
T-1: <i>Coccinia</i>	13 t/ha	1,56,000	91,000	2.4
T-2: Spiny gourd (Agakara)	7.5 t/ha	2,85,000	1,94,000	3.1



Observation/ Feedback

- Farmers realized higher price for spiny gourd @ Rs.40/- to 50/- per kg due to good market demand.
- Though yields were considerably low in spiny gourd, net returns were high due to remunerative price.
- Only constraint expressed was to maintain male and female tubers for further propagation.

Trelly method of tomato cultivation

Tomato is an important vegetable crop in the district. Farmers generally grow tomato allowing the plants to trail on the ground without any staking. In this case yields and net returns are low due to damaged and poor quality fruits. Demonstrations were conducted on trellis method of tomato cultivation in tomato growing villages Baduguvanilanka, Kanupuru, Allavaram. Trellies were erected with bamboo stakes connected with PVC coated G.I.wire and country twine for supporting the plants.

Results

Treatments	Yield	Gross returns (Rs.)	Net returns (Rs.)	B:C Ratio
T-1: No stacking (FP)	26.25 t/ha	2,36,000	1,29,000	2.2
T-2: Trellies method	35 t/ha	3,15,000	1,94,000	2.6



Observation/ Feedback

- Trellis method of tomato cultivation enhanced the fruit quality and yield.
- Fetched better price for the product due to better quality.
- Irrigation and intercultural operations in the field were easy in trellis method of cultivation.

Demonstration of China Aster variety 'Kamini'

In irrigated, black soil conditions of Choppella, Burrilanka and Kadiapulanka villages demonstrated China Aster variety 'Kamini' in 3 locations. Chrysanthemum is the predominant crop in these mandals. Demonstrated nursery bed preparation, seed treatment, fertilizer management and spray schedules for China Aster 'Kamini' in farmers fields. China Aster 'Kamini' adopted well in the situation with improved yields and gained remunerative price and higher net returns.

Results

Treatments	Yield	Gross Income (in Rs.)	Net returns (in Rs.)	B:C Ratio
T-1: Chrysanthemum (Yellow Gold)	6.25 t/ha	1,87,500	97,500	2.0
T-2: China aster 'Kamini'	6.5 t/ha	2,92,500	1,65,500	2.3



Observation/ Feedback

- China Aster 'Kamini' flowers are attractive with bright pink colour and demand for decoration purpose. Flowers gained higher market price compared to chrysanthemum.

Bunch feeding in banana

Direct feeding of nutrients to banana bunch after de-navelling produced healthy bunch with more weight and bulky fingers. Banana bunches of 1000 nos. were fed directly, after denavelling with nutrient mixture of one kg cow dung in 500 ml of water, 7.5 gm. of Urea and 7.5 gm of Sulphate of Potash (dissolved SOP in luke-warm water) were added to 100 ml. of water and mix this to cow dung slurry. This slurry was poured into 200 gauge 15 cm x 25 cm size alkathane bags and tied to distal end of banana bunch after denavelling the male flower. In Alamuru, Kadiam and Dulla villages this demonstration was conducted in 4 farmers' fields.

Results

Treatments	Yield	Gross Income (in Rs.)	Net returns (in Rs.)	B:C Ratio
T-1: No bunch feeding (FP)	25.31 t/ha	1,55,783	58,783	1.6
T-2: Bunch feeding	29.57 t/ha	1,82,000	92,000	2.0



Observation/ Feedback

- Direct feeding of nutrients to banana bunch yielded healthy and quality fingers even at distal end. Uniform fingers observed in bunches. Increase in bunch weight of 1.75 to 2kg recorded in this methodology.

Integrated management of snails in horticultural crops

'Snail' is one of the major gastropods identified damaging horticultural crops (Papaya, Amorphophalus, Brinjal, Chillies, Bhenidi, Bottlegourd, Coccinia and also flower crops (Tagetes, Chrysanthemum, Crossandra) in irrigated heavy soils of East Godavari District. Farmers faced heavy crop losses due to snails attack in horticultural crops especially in Alamuru, Kadiam Mandals of the district. Accordingly, initiated FLD with chemicals and bait formulations in snail infested fields.

Results

Treatment	Observation
T-1: (Farmer's practice) Spreading salt in crop borders	Snails gathered at salt applied borders and found motionless in groups. Mortality (6%) observed after 72 hours.
T-2: Application of Metaldehyde Pellets (@ 1 kg/acre)	Observed immediate mortality (80%) of snails i.e., within 24 hours and is also effective against leaches. No egg masses observed in metaldehyde spreaded area.
T-3: Bait formulation made of Jaggery slurry (Jaggery 6 kg in 12 litres of water) + Dichlorovas 750 ml. + 25 kg wheat flour and made into small lumps.	Recorded 23%-28% mortality and also no egg masses observed in bait spreaded area.



Observation/ Feedback

- Least infestation observed in pellets and bait treated fields of horticultural crops like cabbage, cauliflower, brinjal, bhendi, pandal creepers and chillies.
- Farmers adopted bait formulation methodology as it is a cheap source of controlling snails compared to Metaldehyde pellets.
- KVK intervention with suitable bait application methodology reduced the intensity of snail damage.

Demonstration of Pole type bunch-harvester in Oil Palm

Oil palm (*Elaeis guineensis*) is the major oil yielding palm and widely extended in medium to light soils of the district. Drudgery is involved in harvesting fresh fruit bunches and is labour oriented. To address this problem, 'pole type bunch harvester' was demonstrated in farmers' field with modified sickle.

Location: Kalavacharla and Nidigatla, Rajanagaram Mandal and Gadarada, Korukonda Mandal

Observation

- Malaysian Pole Bunch Harvester is a simple structure with curved sickle.
- Curved sickle is not suitable for harvesting bunches with no concrete grip.
- Modified sickle manufactured locally which suited the purpose with comfortable grip.
- Height of poles can be adjusted according to the age and height of plants.
- 50 feet pole can be adjusted into a single 25 feet length pole for easy operation.
- Modified pole harvester is light in weight and rust proof.
- Manually operated and easy carrying device.
- It is available on subsidy basis from Department of Palm-Tech (India) Limited.



Observation/ Feedback

Farmers adopted this device easily and felt comfortable in harvesting bunches

Demonstration of tuberose variety 'Prajwal'

Tuberose (*Polianthes tuberosa L.*) is an important flower crop in the district. Tuberose is marketed as cut flower for bouquets and loose flowers for garlands and decoration purpose. Existing local varieties are of low yields and farmers are not getting good profits due to low yields. FLD was carried out with tuberose hybrid 'Prajwal' in farmers' fields at five locations.

Location: Madhavarayuni palem, Kadiyam Mandal

Results

Treatments	Yield (t/ha)	Gross Income (in Rs.)	Net Income (in Rs.)	B :C Ratio
T-1: Tuberose - M.R.Special (Local variety)	6.8	2,04,000	84,000	1.7
T-2: Tuberose 'Hyderabad Single'	8.7	2,61,000	1,33,000	2.0
T-3: Tuberose 'Prajwal'	9.5	2,85,000	1,57,000	2.2



Observation/ Feedback

- Germination percentage in 'Prajwal' (88%) is higher compared to 'Hyderabad Single' (62%).
- In 'Prajwal' spikes are strong with quality flowers and flowers are highly scented.
- Higher yields were observed in 'Prajwal' compared to 'Hyderabad single'.
- Farmers preferred 'Prajwal' variety because of its easy establishment, better shelf life and quality flowers.

Correction of micro-nutrients deficiency in Elephant foot yam

Elephant foot yam (*Amorphophallus companulatus* B.) is cultivated in rich loamy and well drained irrigated soils in the district. Micro nutrients deficiency symptoms were noticed in Elephant foot yam in Athreyapuram and Ravulapalem Mandals of the district. Accordingly demonstration on correction of micronutrients was carried out at five locations in farmers' fields. The treatment includes foliar spray of micro-nutrients mixture (Formula 4) @ 5gm. per litre at 30 days after sprouting of the tubers and after at 30 days intervals.

Location: Athreyapuram, Athreyapuram Mandal and Kothapeta, Kothapeta Mandal

No. of farmers: 5

Results

- Micronutrients deficiency symptoms specifically observed in young plantation i.e., 30 to 60 days after sprout where light yellow leaves turns to pale colouration.
- Foliar spray of micro-nutrients mixture @ 5 g. per litre @ 30 days after sprout and also one spell @ 30 days interval was demonstrated.



Observation/ Feedback

- Foliar spray of micronutrient mixture of 5g per litre reduced the intensity of deficiency symptoms and plants regained healthy growth and vigour.

Demonstration of pruning and canopy management in Cocoa

Cocoa is one of the permanent intercrops in coconut. In East Godavari district the crop is extended in an area of 5,920 ha and gaining importance as intercrop due to high market price for cocoa beans. However, in majority locations the crop left without canopy management resulting into reduced yields and low net returns. Pruning in mature cocoa is of two types viz., structural pruning and sanitary pruning. Structural pruning (June-July-August) is done to shape the canopy to desired size and architecture. In case of

sanitary pruning (October-November), diseased or unnecessary branches were removed. When the first jorquette is developed at about 1.5 - 2 m height, the canopy will be at a convenient height for harvesting and other operations. FLD on pruning and canopy management was conducted in 6 locations.

The main objective of pruning is for:

- Height control.
- Production of strong/well-balanced framework of branches.
- Maintenance of balance between vegetative vigour/fruit production.
- Rejuvenating disease/pest damage bushes.
- Proper aeration for better photosynthetic ability and improved yield

Location: Nandampudi, Machavaram, Munganda, Bandarulanka - Ambajipet Mandal and Bommuru, Rajahmundry Rural Mandal.

No. of farmers: 6

Methodology

Pruning was carried out during June-July before the main flushing /monsoon showers. In structural pruning, only one main chupon stem with single jorquette was allowed and additional chupons developed from the main chupon and also from basal collar region were removed periodically. The height of the jorquette was restricted to 1.5 - 2.00 m height with strongly extended 4-5 fan branches. In sanitary pruning, unwanted branches, rodent damaged branches and water shoots were removed. Foliar spray of Copper Oxy Chloride (COC) @ 3 g per litre was done immediately after pruning.



Result

- Timely pruning resulted in 28% more flowering in cocoa.
- Yield: Dried beans of 1080 kg/ha.

Feeding Azolla (10% replacement) in regular poultry feed

Azolla is very rich in proteins, essential amino acids, vitamins (vitamin A, vitamin B₁₂ and Beta- Carotene), growth promoter intermediaries and minerals like calcium, phosphorous, potassium, ferrous, copper, magnesium etc. *Azolla* cultivation is cheap and a cost-effective sustainable technology. FLD was taken up to demonstrate *Azolla* as a feed supplement for poultry. 10% of the regular feed was supplemented with *Azolla*.

Results

Treatment	Normal Feed requirement	Cost of 1 kg feed	Net gain (Rs./ha)
T-1: Normal feed. (Farmer's practice):	50 g per bird per day. (1 kg of feed can be fed for 20 days)	Rs. 20/-	—

T-2: *Azolla* supplementation

10% feed is supplemented with *Azolla*. Therefore feed requirement is 45 g per bird per day. (1 kg of feed can be fed for 22 days).

Rs. 18/-

Saving in feed cost by Rs. 2/- per kg.



Observation/Feedback

- No bird mortality and no reduction in egg production was observed

Mortality control in Kids & Lambs

Kid and lamb mortality is high due to diarrhoea, internal and external parasites. The mortality is more during rainy and winter seasons.

Reasons for mortality

- Scours is mainly observed which is responsible for most of the deaths.
- Mortality is more in overcrowded flocks than small flocks.
- External parasites are also observed.

- Excess milk and insufficient milk are responsible for mortality.
- Wrong drenching is responsible for mortality.
- Farmers are not feeding starter feed.
- Tr. Iodine is not applied to umbilicus immediately after kidding.
- Demonstrated the antibiotic treatment (package) to the kids and lambs. A total of 120 kids were administered the treatment.

Location: Katheru, Konthamuru, Raidupakala, Gadarada, Kolamuru and Venkatapuram

Results

Treatment	Cost of treatment (Rs.)	Mortality
T-1: No treatment (Farmers' practice)	-	Mortality 24 out of 120 kids(Survived: 96 kids)
T-2 : Ciprofloxacin T.Z and Fenbenbazole (External parasiticide)	3000/-@ 250/10 kids	Mortality 12 out of 120 kids(Survived: 108 kids)



Observation/feedback

- Farmers were convinced and most of the farmers are consulting the veterinary practitioners for diagnosis and treatment for the herds.

Demonstration of Black Bengal goats

Prolific goat breed is the need of the hour to meet the demand of meat market as the local goats have low population build up. Black Bengal is very suitable for meat, milk and skin production. The milk and meat of this goat is very tasty and nutritious than any other goat breed. Supplied 11 units (each unit is of 2 females and 1 male) to the farmers for demonstration.

Location: Pandirimamaidi (Rampachodavaram mandal), G Yerram palem, Korukonda (Korukona mandal), Rajavaram, Nidigatla (Rajanagaram mandal).

No. of farmers: 11 (33 no. of goats)

Results

Treatment	Kidding	Average population build up	Gross income (from each unit)	B:C Ratio
T:(Farmer's practice): (Local goats)	One kidding in a year. One kid per kidding	5 number (average 20 kg each)	Rs.25,000/-	3.3
T:Black bengal goats	Kidding twice in a year. Two kids (avg.) per kidding	9 number (average 18 kg each)	Rs.40,500/-	5.4



Observation/feedback

- Rearing black Bengal goats is profitable compared to that of local goats.

