Machine Transplanting

- A BOON FOR RICE REVOLUTION IN TELANGANA STATE

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Vice Chancellor

FOREWORD

Farm mechanisation in India is nascent with the mechanisation level ranging from 40–45%, which is quite low compared to that of developed global economies (> 90%). India's farm equipment market is only 7% of the global market, with more than 80% of the value contribution coming from tractors. There is a need to not only find ways to promote precision farming through automation and mechanisation in India, but also ensure effective adoption of technology, to address dwindling land resources and work force. Going ahead, we need to find diligent ways to promote the 'right technology' through an acceptable 'model for maximising adoption'.

Rice being a labour intensive crop requires about 850 to 900 man hours for cultivating one hectare. In rice mechanisation can be adopted at all stages of the crop right from land levelling to harvesting. Promoting farm mechanization in rice is vital to boost economy of the state being the most important food crop grown in 28.36 lakh hectares in Telangana with an annual production of 97.92 lakh tonnes. Despite the availability of paddy transplanters from over a decade, farmers were facing difficulties in raising mat nurseries in trays, which was hampering adoption of this technology.

Professor Jayashankar Telangana State Agricultural University has initiated development and refinement of ancillary technologies like raising of mat nursery in paddy using puddle soil and promotion of mechanized paddy transplanting in a big way, to support the farmers of Telangana State in rapid adoption of this technology.

This technical bulletin is timely, as it consolidates relevant facts and contains a wealth of information on the mechanised transplanting in paddy. I am certain that this bulletin will be of interest to farmers and academia and will be helpful in opening up another facet of the expanding knowledge base of the farm machinery sector in Rice.

(V. Praveen Rao)

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PREFACE

There is a widespread realization that farm mechanization is indispensable for increasing the crop productivity under labour scarce situations and diminishing land resources. The focus on farm mechanization is driven by the need for peak season demand for labour and to reduce the costs. Mechanization enables rational use of resources, reduction in working time, and improvement of life conditions of the rural population.

In India, rice covers about one-fourth of the total cropped area, providing food to about half of the Indian population. A major population in India is engaged in agriculture with highest percentage occupied in paddy, mechanization plays a big role in this sector. Using a rice transplanting machine, the transplantation costs and time can be saved with increased productivity. In spite of having an edge over the traditional transplanting, adoption rate of mechanical transplanters is low due to high initial investment and lack of knowledge in growing mat type nursery and other associated technical proficiencies.

PJTSAU is playing pivotal role in creating awareness on machine transplanting in paddy and refining ancillary technologies periodically to promote mechanization in rice. This bulletin summarizes the rice machine transplanting duly addressing the technological gaps in adoption of mechanical transplanter to make this technology more accessible. I congratulate all the scientists, who succeeded in their efforts to bring out these novel technologies to the forefront. I hope this bulletin will serve as a ready reckoner for the farm fraternity striving to improve the socio-economic status of the farmer.

(R. Jagadeeshwar)

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MESSAGE

Mechanisation is significantly low in paddy. Land preparation or seedbed preparation across all the major crops is highly mechanised. The level of mechanisation has also been influenced by regional farmer prosperity, which is a function of irrigation status, soil type, landholding pattern, cropping pattern and farm income.

In rice mechanisation can be adopted in all stages of the crop *i.e* laser land leveller, rice drum seeder, paddy transplanter, cono weeder, brush cutter, power sprayer, tractor-operated sprayer, combine harvester/ portable rice thresher. But current level of farmers adoptability in Paddy seedbed preparation (85 %), Transplanting (5%), weed and pest control (80%) and on harvesting is 80%.

Professor Jayashankar Telangana State Agricultural University is encouraging farmers to move towards mechanisation and conducting massive front-linedemonstrations on machine transplanting which is exerting positive impact on sustained income of farmers as well as farm productivity.

This technical bulletin consolidates information on the Rice farm mechanisation. I am certain that this information will be of interest to farmers and will be useful to stimulate new ideas and bring the farm mechanisation in rice to new epoch.

(G. Samuel)

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1. INTRODUCTION

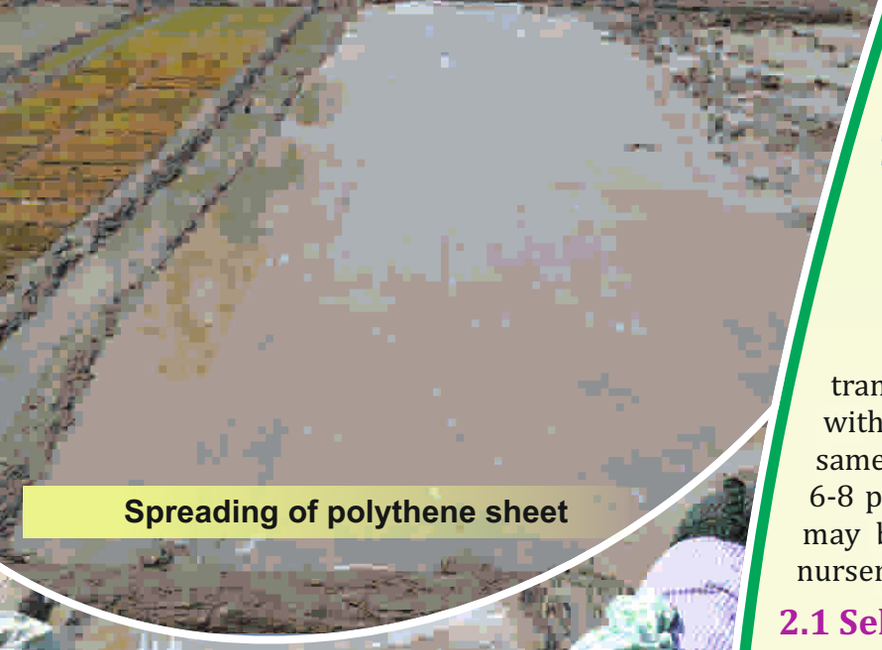
In the present days, agriculture is facing a serious threat of climate change and several production and management constraints including acute labour shortage resulting in enhanced production costs and reduced returns. As the time passes, number of people depending directly on farming are dwindling in rural areas. As a result, agricultural operations are being affected in spite of paying higher wages, resulting in poor crop yields. This situation warrants promotion of mechanization in all the major field crops *viz.,* Rice, Maize, Soybean, Groundnut, Pigeon pea, Cotton etc., in the State to ensure food security and to achieve government's envisaged goal of doubling farm income by 2022.

Rice is an important food crop grown annually in an area of 37.0 lakh ha in Telangana State. It is, relatively, a labour intensive crop which involves enormous drudgery and human stress since all the field operations *i.e.,* starting from land preparation to harvesting are carried out in wet soil. At the same time, mechanization is successful in carrying out some of the field operations *viz.,* land preparation, harvesting and to some extent for weeding in rice.

To achieve complete mechanization in rice crop, the other labour intensive operation *i.e.,* transplanting needs to be carried out by using rice transplanters to relieve women labour from drudgery and ensure timely planting. Further, with the increased irrigation potential in the state the area under rice increased to 20.5 lakh hectares (11.56 lakh hectares in *kharif* and 9.05 lakh hectares in *rabi*) during 2019-2020, which demands scientists' attention and government's policies and incentives for total mechanization in rice.

Despite the availability of transplanting machines from a decade, the technology has not advanced much due to problems associated in raising mat nurseries in trays with dry soil as medium and transporting the nurseries from long distances to main field, apart from being expensive and labour intensive.

This bulletin contains entire gamut of technical information emanated from the research work conducted both at on-station and on-farm on ancillary technologies like raising of mat nursery, main field preparation for the success and spread of machine transplanting technology. Further it is useful to the scientists, extension personnel and farmers in enhancing their skill and technical expertise for the effective transfer and adoption of the technology.



Spreading of polythene sheet

Filling puddled soil into wooden frames

Broadcasting seed in the mat

View of the beds after seeding

2. PREPARATION OF MAT NURSERY USING POLYTHENE SHEET

The required mat size for machine transplanting is 58 cm length and 28 cm width with a mat thickness of 2.5 cm. Plastic tray of the same size can also be used or wooden frame with 6-8 partitions, each of the appropriate mat size, may be prepared locally and used for raising nursery on polythene sheet.

2.1 Selection and preparation of nursery bed

A suitable area with water source may be selected and land may by prepared by ploughing twice and puddling with rotovator keeping 5-10 cm water level. After puddling, the field should be properly levelled and soil particles are allowed to settle for 24 hours. An area of 50-60 sq. m. is required for raising mat nursery, which is sufficient to plant in one hectare main field. A shallow raised nursery bed of 1.5 m width of convenient length may be prepared with provision of irrigation / drainage channels around the bed.

2.2 Seed rate and Seeding

Sowing of mat type nursery should be done 15-20 days prior to transplanting. A seed rate of 25 kg ha^{-1} for fine grain varieties and 35 kg ha^{-1} for coarse grain varieties is required. The seed should be treated with recommended fungicides, soaked in water for 12-24 hours and incubated for 24 hours. The pre germinated/ sprouted seed may be kept ready for seeding after shade drying.

On the day of seeding, spread a white polythene sheet of 60 micron thickness with width of 1.52 m on each bed. For raising 200-250 mats of nursery (sufficient for planting in 1 ha), a polythene sheet weighing 1.5 kg is required. After spreading of polythene sheet on the bed, small holes are made in the sheet with the help of a sharp nail to keep polythene sheet intact on the soil surface.

The wooden frame having 6-8 partitions is kept on the polythene sheet which was spread on the raised bed. It requires two labour standing in opposite direction in irrigation channels to fill the frame with soil. Due care may be taken to separate out stones and small pebbles from the puddled soil and filled into the individual partitions of the frame upto a mat thickness of 2.0 cm. The functioning of machine fingers in transplanting portion while planting is affected and work is hampered if pebbles / stones are present. At the same time if the thickness of the mat is increased beyond 2.5 cm, it will increase mat weight and does not fit into the machine or else the mats may break down while rolling and transporting to main field.

The pre-germinated seed @ 120 g for fine grain varieties and 150 g for coarse grain varieties per tray/mat should be uniformly broadcast manually or by seeding machine so that a density of 1 seed per square centimeter is maintained. After seeding, apply a thin layer of vermicompost / well-ground FYM @ 40 – 50 g per each mat and cover with straw of the same variety for 4-5 days. In case, the straw of same variety is unavailable, nursery bed may be covered with gunny bags. Shade net can also be used for protection from birds. After 4 to 5 days, the straw or gunny bags should be removed and seedlings are allowed to grow freely.

2.3 Water management

Initially for a week, water the nursery mats with rose can to keep the soil moist for better germination. After one leaf stage (7 DAS), the nursery should be irrigated as and when required in order to maintain 1cm water level on polythene sheet. If this water level is not maintained, the sheet gets heated up and seedlings may die. Drain out water a day before lifting of mats for transplanting.

Covering the nursery with shade net

Healthy Nursery on polythene sheet

Nursery ready for transplanting

Rolling of nursery mats

3. MAIN FIELD PREPARATION

The field must be ploughed before wet tillage, followed by tilling twice (criss - cross) and puddling with rotovator by maintaining 5-10 cm water level. After puddling, field should be levelled perfectly and allowed for settlement of soil particles for a day, prior to transplanting. Cage wheels should not be used for land preparation as deep ploughing results in sinking of the machine while transplanting.

2.4 Nutrient management

Around 40 – 50 g of vermicompost / finely ground FYM may be applied per each mat as basal application at the time of seeding. Later on, as top-dressing spray fertilizer grade 19-19-19 or DAP @ 10g l^{-1} between 7 & 10 days after sowing. Based on the growth of nursery, an additional spray of the same may be given at 15 days after sowing during *Rabi* season. If zinc or iron deficiencies are noticed, ZnSo4 @ 2.0g / Feso4 @ 5g + 1g citric acid per liter of water may be sprayed respectively to correct the deficiencies.

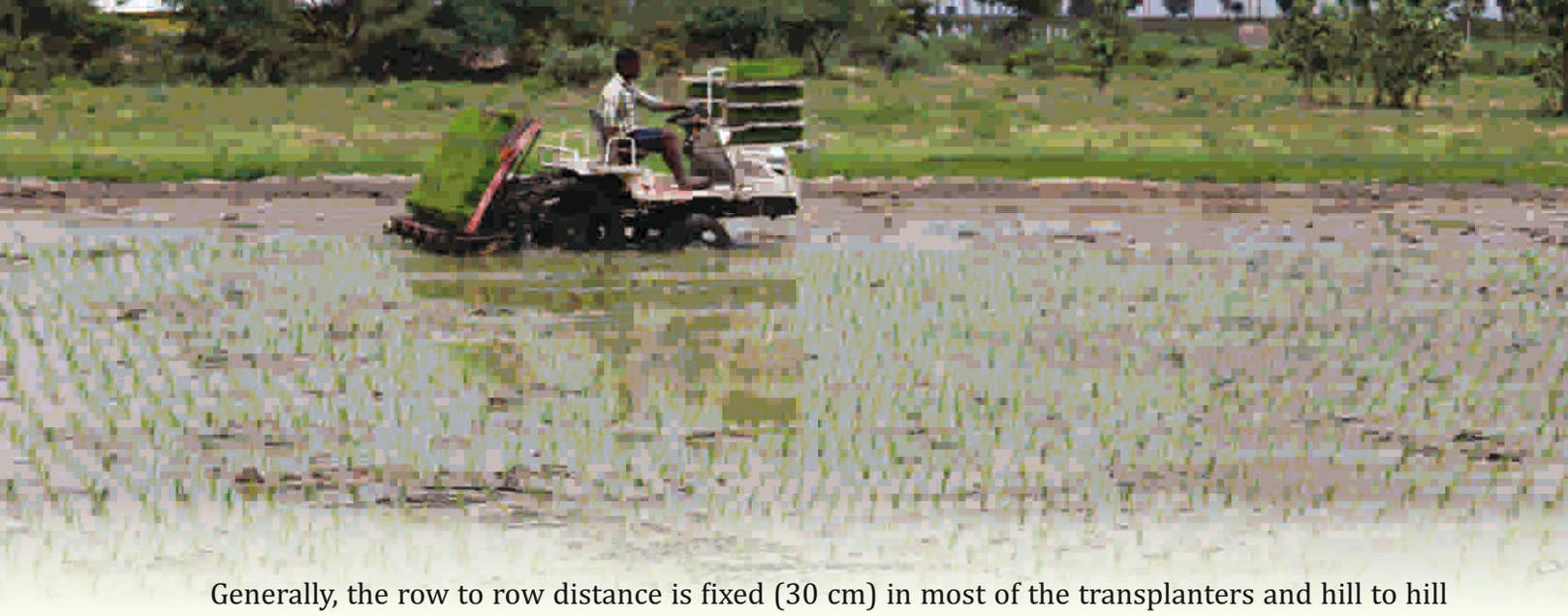
2.5 Do's and Don'ts in mat nursery preparation

Do's	Don'ts
✓ Select levelled field for nursery raising	× Don't raise nursery in the soils having pebbles and stones
✓ Spread the polythene sheet evenly without folds on the surface of puddled soil	× The soil depth should not exceed 2.5 cm in the wooden frames
✓ Puddled field to be allowed for settlement for 24-48 hrs depending on soil type	× Don't fill only mud slurry into the frames
✓ The thickness of the soil in the frame should not be more than 2.0 cm	× Don't press the soil in the frame
✓ Allow the sprouted seed for shade drying for easy handling at the time of sowing. Spread the sprouted seed uniformly	× Avoid too thick or thin seeding of nursery
✓ Cover the nursery with paddy straw or gunny bags or shade net to prevent bird/rains damage.	× The paddy straw of different variety should be used
✓ Apply water initially daily with rose can and later on irrigate the beds to see that standing water covers entire sheet	× Sheet should not get heated up
✓ Seedling of 14-17 days are ready to transplant	× Don't transplant with more than 25 days seedlings

4. TRANSPLANTING

A thin film of water (1-2 cm) has to be maintained in the main field at the time of transplanting for smooth running of the machine / rolling of wheels and for effective transplanting through better scouring of fingers after dibbling. The success of machine transplanting depends largely on main field preparation, raising of mat nursery and more importantly operator skill, planning and commitment.

Two types of self-propelled transplanters *viz.*, ride on type and walk behind type are available in the market which can plant 4-8 rows. The machine is operated after loading mats onto the transplanting unit tray. In case of ride on type machines, additional spare racks are also provided for intermittent feeding of mats onto the transplanting unit tray as and when required.



Generally, the row to row distance is fixed (30 cm) in most of the transplanters and hill to hill spacing can be adjusted from 12 to 22 cm depending on varieties and desired plant stand. Seedlings per hill and depth of planting may be adjusted depending on the variety grown and soil type. The planting depth can be set from 2.0 -5.0 cm.

The operator should start operation with utmost concentration and consciousness without any distraction and has to run the machine at steady pace without jerks and jolting's for efficient, clog free transplanting to ensure better stand establishment. For proper planting in parallel and straight rows marker unit must be used while operating the machine. This helps in effective mechanical weeding at later part of crop growth period. The speed of the machine should be selected based on soil type and field conditions and the same speed should be maintained throughout the transplanting operation.

5. AFTER CARE

After successful transplanting, field must be carefully maintained, excess water if any must be drained out and saturated field condition be maintained for 3-4 days. Once the crop is established, a thin film of water has to be maintained. To reduce weed growth, 2-3 mechanical weedings with power weeders are administered from 20th day of transplanting onwards as the row to row distance is 30cm in machine transplanted crop. In addition, mechanical running of power weeders aerates root zone and the abrasive action on roots helps in development of more tillers. Based on the field situation and requirement herbicides as recommended for normal rice may be applied in machine transplanted crop to keep the weeds under check. Once the crop attains 50 days duration normal irrigation (5cm ponding water) may be provided. The other agronomic and plant protection measures as suggested for normal rice may be followed for machine transplanted crop for reaping higher yields and income.

6. HARVESTING

The crop should be harvested when at least 80% of the grains in the panicles are matured. If the crop is harvested before maturity, it leads to loss of viability of seed and brokens in milling. The harvesting is usually done with combine harvesters which combines all the operations including reaping, threshing and winnowing/cleaning.

7. ON-STATION RESEARCH

Studies conducted at Rice Research Centre, ARI, Rajendranagar, on different methods of raising mat nursery (tray with dry red soil, tray with puddled soil and on polythene sheet with puddled soil) showed that the seedling characters (shoot length) did not differ with methods of raising mat nursery and seedlings attained optimum shoot length of > 15 cm by 15-18 DAS (Table-1).

Table 1: Seedling shoot length characters as influenced by different types of mat nurseries

Type of mat nursery preparation	Shoot length (cm)					
	6 DAS	9 DAS	12 DAS	15 DAS	18 DAS	21 DAS
Tray with dry red soil	5.52	9.10	11.48	14.65	17.60	20.40
Tray with puddled soil	5.40	9.52	12.30	13.70	16.90	19.40
Polythene sheet with puddled soil	5.14	9.10	11.57	14.94	16.10	19.85

The economics of raising different types of nurseries sufficient to plant 1.0 ha main field (Fig-1) revealed that, the production of nursery in trays with dry red soil + manure mixture was expensive (Rs. 9425) in view of cost involved in purchase of trays, red soil and manure compared to that produced on polythene sheet with puddled soil (Rs. 2710) as medium. When compared to conventional nursery preparation for manual transplanting (Rs. 3000), raising mat nursery on polythene sheet saved an amount of Rs. 300. Further, the nursery on polythene sheet can be raised in 10% of the area compared to conventional nursery raising method. This method is highly useful in labour scarce, delayed monsoon or late release of canal water situations.

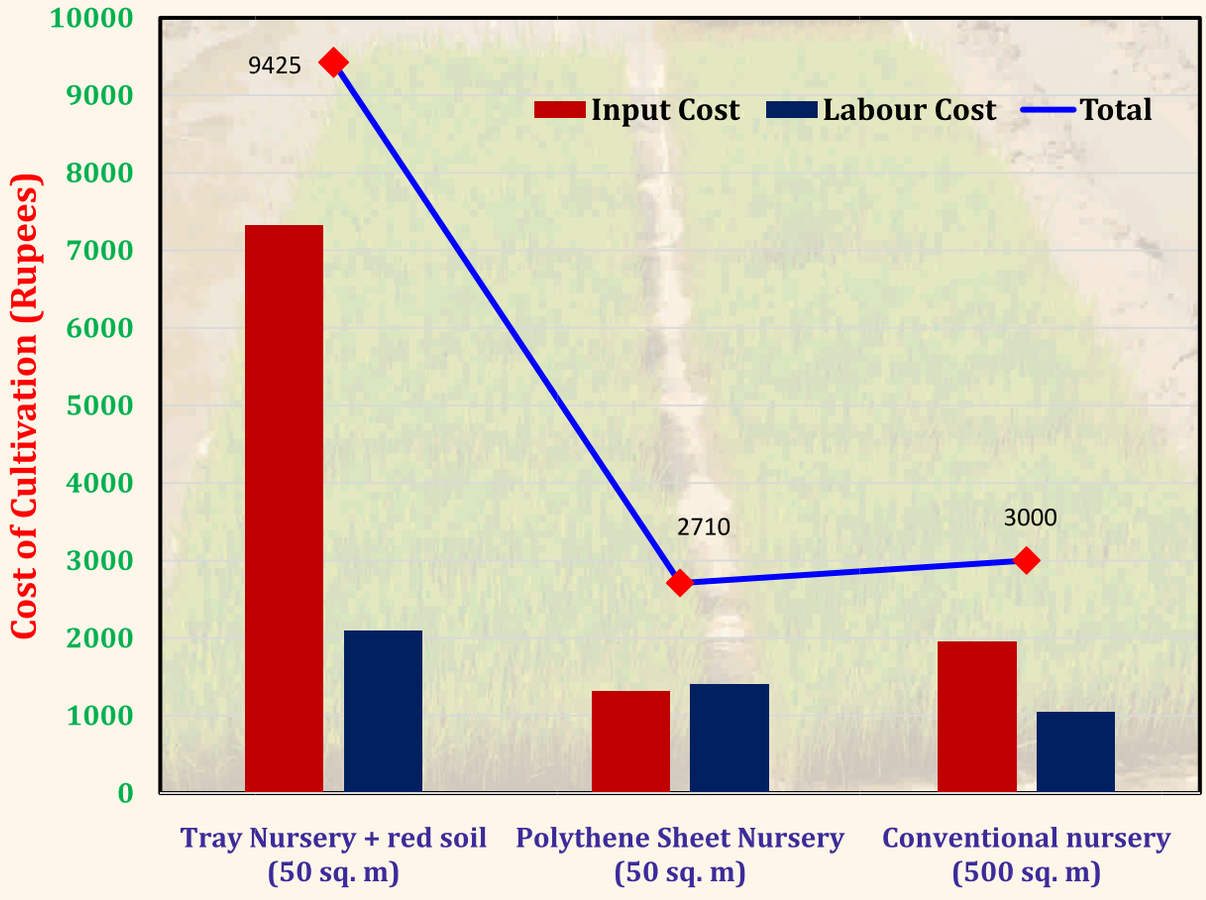


Fig.1 Cost of cultivation of raising differet types of mat nurseries *vs.* conventional nursery

The performance of 6 row ride on type transplanter using mat type nursery raised on polythene sheet was compared with that of conventional manual transplanting (CT). Since row to row spacing is fixed (30.0 cm) for the machine, with an adjustment of 14 cm between hills within the row, the transplanter achieved a plant density of 24 hills m^{-2} compared to that of manual random transplanting (hills 25 m^{-2}). Machine planted crop (MT) produced greater number of tillers (441 m^{-2}) and panicles (378 m^{-2}) over that of manual random transplanting (413 and 363 m^{-2}) and gave an additional yield of 500 kg ha^{-1} over that of farmer's manual transplanting practice (Fig.2).

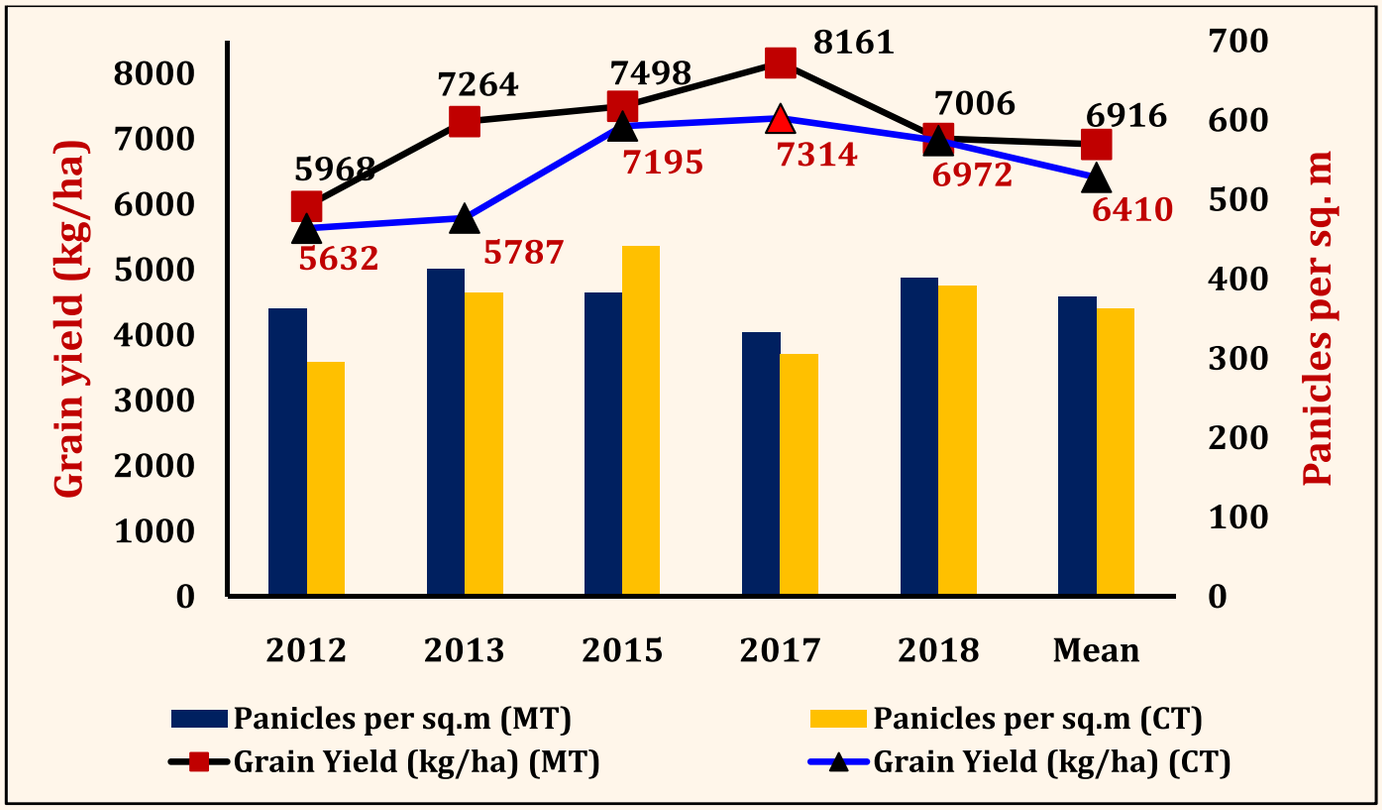


Fig. 2 : Grain yield of rice as influenced by machine transplanting (MT) and conventional transplanting (CT)

8. ON STATION DEMONSTRATIONS AND SKILL ORIENTED TRAININGS

On station / on-farm skill oriented trainings to Farmers, Scientists and Extension functionaries (DOA staff) on preparation of mat nursery on polythene sheet, main field preparation, machine transplanting using different types of planting machines were conducted at Rajendranagar, Palem, Warangal and Jagtial to develop technical expertise and enable spread of this technology throughout the state of Telangana.

8.1 Rice Research Centre, Rajendranagar

Six skill training programmes on modified mat nursery and machine transplanting were organized to farmers, extension scientist and DOA staff at Rajendranagar.

03.07.2018

04.07.2019

05.07.2018

Hon'ble Minister for Agriculture Sri P. Srininvas Reddy and
Dr. V. Praveen Rao, Hon'ble Vice Chancellor gracing the field demonstartion on machine transplanting at Rajendranagar on 08.08.2018

8.2 Regional Agricultural Research Station, Palem, Nagarkurnool district

Five skill-oriented trainings on modified mat nursery preparation and demonstrations on machine transplanting of rice were organised at Palem and at farmer's fields in Nagarkurnool and Wanaparthy districts for farmers and DOA staff.

Pothureddypalli Village, Nagarkurnool Dist. on 19-12-2017

RARS, Palem on 13-06-2018

Vasanthapur Village, Nagarkurnool District on 28-07-2018

Field Demonstration on Modified Mat Nursery and Machine Transplanting of Rice at RARS, Palem on 07-09-2018.

Planting by Yanmar - 6-Row – Diesel operated – Ride on Type machine at Palem on 07-09-2018

Farmers' Scientists' - Interaction Meeting on machine transplanting at Palem on 07-09-2018

Farmers' Scientists' - Interaction Meeting on machine transplanting organised on 07-09-2018 at Palem

Rayinpeta Village, Kothakota Mandal, Wanaparthy District on 19-01-2019.

Trainee Collector, Shri Santhosh Kumar, IAS
at Rayinpeta Village, Kothakota Mandal, Wanaparthy District on 19-01-2019.

8.3 Regional Agricultural Research Station, Polasa, Jagtial district

Three demonstrations on modified mat nursery and machine transplanting were organized to farmers and DOA staff at Jagtial.

Pegadapally Village of Jagtial District on 07.08.2018

RARS, Polasa, Jagtial on 29.08.2018

Hon'ble Minister for Agriculture, Sri Pocharam Srinivas Reddy, Hon'ble Member of Parliament, Smt. Kalvakuntla Kavitha, Nizamabad constituency, Hon'ble Vice-Chancellor, Dr. V. Praveen Rao, PJTSAU and Dr. R. Jagadeeshwar, Director of Research, PJTSAU gracing machine transplanting demonstration with DOA staff and farmers at Jagtial on 04.09.2018.

9. ON-FARM DEMONSTRATIONS

A total of 81 frontline demonstrations were conducted by DAÁTTC 's, KVK's and Research center's in farmers' fields in an area of 192 ha over seven years from 2012 to 2019 in Telangana state. The results clearly showed the superiority of machine transplanting over conventional manual transplanting of rice (Fig.3) by recording an yield advantage of 8.5 %. The grain yield levels of rice with machine planting varied from 5.45 to 7.40 t ha^{-1} compared to that of conventional manual transplanting (4.63 to 6.90 t ha^{-1}). In addition to a saving of around Rs 3000 per hectare in cost of cultivation of rice, machine transplanting ensures timely planting in the season and relieves women labor from drudgery with an additional net returns of Rs 11000 per ha (Table 4).

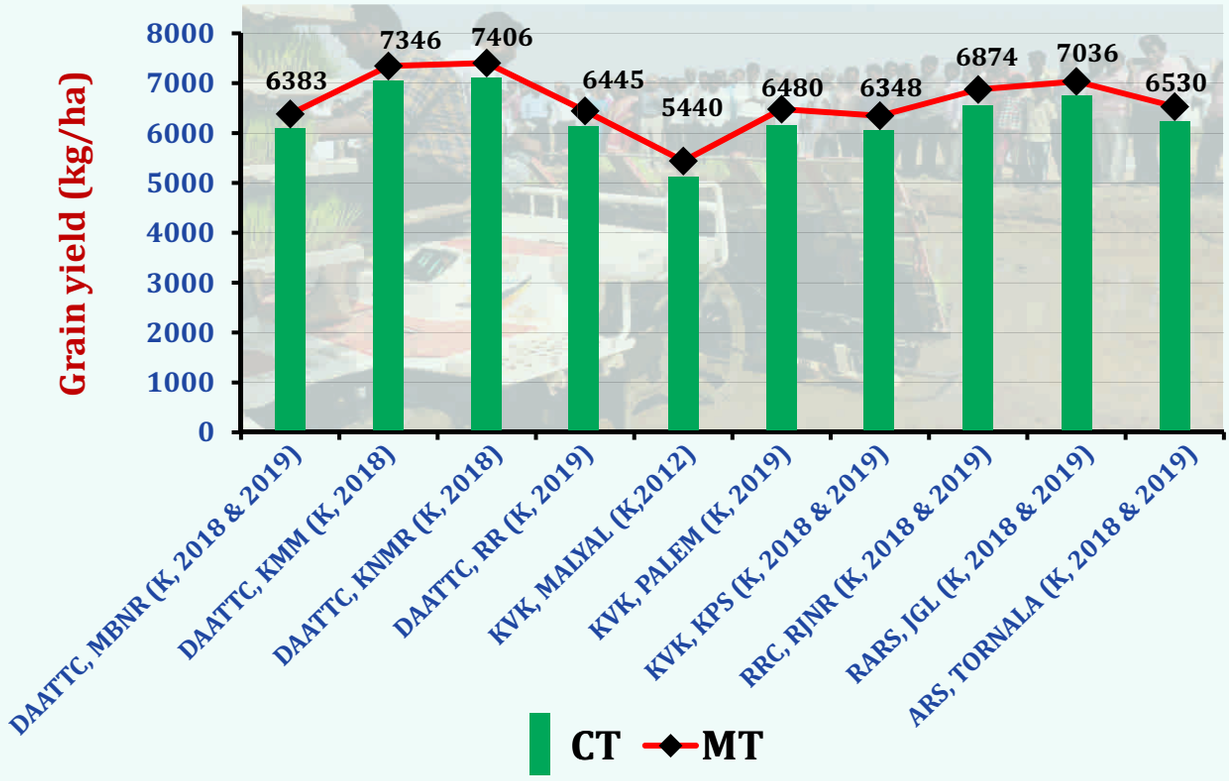


Fig.3 : Grain yield of rice in Machine Transplanting (MT) *Vs.* Conventional Transplanting (CT) under on-farm demonstrations

Table 4. Yield and Economics of Machine Transplanting (MT) in Rice *Vs* Conventional Transplanting (CT) in farmer's fields

S. No.	Year of Demonstration	Area covered (ha)	No. of FLD's	Yield (kg/ha)		% increase in Yield of MT over CT	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
DAATTC, Mahabubnagar												
1	Mean of 2 years (2018 & 2019)	14.8	6	6383	5876	8.60	39209	43609	69279	56241	2.80	2.32
DAATTC, Khammam												
2	Kharif, 2018	13.0	3	7346	6552	11.10	51861	59310	65674	45522	1.26	0.76
DAATTC, Karimnagar												
3	Kharif, 2018	2.0	5	7406	6894	7.25	33723	33762	97776	88540	3.82	3.59
DAATTC, Ranga Reddy												
4	Kharif, 2019	0.8	2	6445	5725		33650	36580	63025	49295		
KVK, Malyal, Mahabubabad												
5	Kharif, 2012	1.0	1	5440	4630	17.40	35100	34200	30000	26800	1.80	1.46
KVK, Palem, Nagarkurnool												
6	Kharif, 2019	4.0	10	6480	5900	8.90	48580	50560	68149	55597	2.40	2.10
Rice Research centre, Rajendranagar, Ranga Reddy												
7	Mean of two years (2018 & 2019)		18	6874	6530	5.31	49474	54138	81435	70391	2.65	2.30

S. No.	Year of Demonstra-tion	Area cov-ered (ha)	No. of FLD's	Yield (kg/ha)		% increase in Yield of MT over CT	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
RARS, Polasa, Jagtial												
8	Kharif, 2018	13.4	20	7036	6708	5.00	55421	57616	64474	55353	2.17	1.96
ARS, Tornala												
9	Mean of two years (2018 & 2019)	11.6	10	6530	6220	5.10	57913	66248	58156	44530	2.01	1.67
KVK, Kampasagar												
10	Mean of two years (2018 & 2019)	114	17	6348	6090	4.31	56496	57981	60946	54687	2.09	1.92
	Mean	**192**	**81**	**5976**	**5491**	**8.56**	**46143**	**49400**	**65891**	**54696**	**2.38**	**2.04**

10. MACHINE TRANSPLANTING ON CUSTOM HIRING BASIS THROUGH MSRI CENTRES

The university has been extending custom hiring service to farmers to showcase and popularize machine transplanting technology through five MSRI centres established during 2012-13.

The Palem centre has been involved in conducting skill-oriented trainings and extending services to farmers since 2012-13 and a total area of 659.35 acres was planted with transplanting machines in farmers' fields of united Mahbubnagar district and popularised the technology. Similarly, the custom hiring service was extended by RARS, Warangal (305.36 ac), AICRP on FIM, Rajendranagar (598.33 ac) and APT, Kampasagar (892.0 ac). A total area of 2455.0 acres was transplanted by machines on custom hiring basis (Fig. 4).

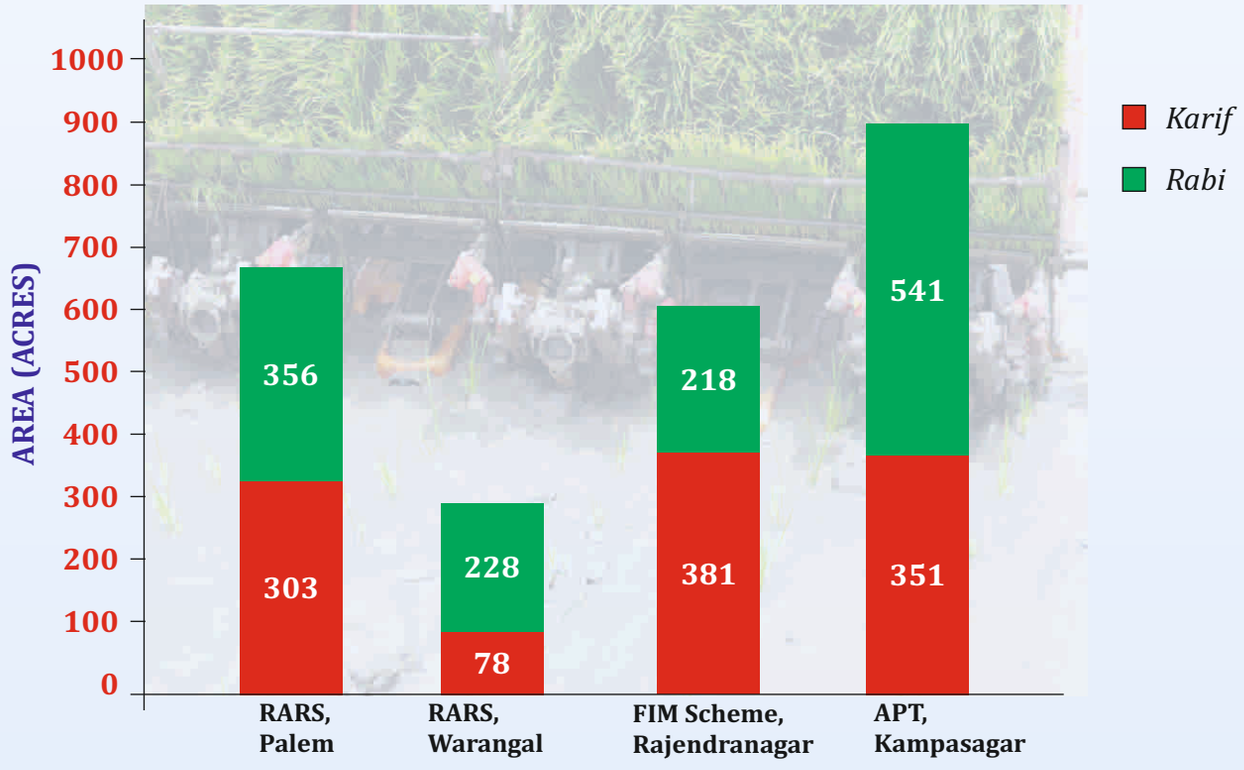


Fig.4 : Area covered (acres) under Machine Transplanting in farmers fields through MSRI Centres

11. FARMERS FEEDBACK

As per the feedback of farmers the following advantages with machine transplanting over farmers practice of manual random transplanting were recorded.

Advantages:

- Ensures timely and cost-effective planting under labour scarce situations.
- This practice relieves drudgery to farm women.
- Uniform plant stand could be established with an yield advantage of 0.55 t ha^{-1}.

Constraints:

- Lack of proper awareness and skill in nursery raising
- The technology is unsuitable in problematic (saline, alkaline or ill drained) soils, as young seedlings are planted with machine.
- Maintaining perfect levelling is difficult under farmers conditions.

12. WAY FORWARD

- The machine transplanting technology needs to be upscaled in large areas in view of farmers needs and increasing rice area in the state.
- The government should give policy incentives to encourage machine transplanting either by custom hiring centres or by farmer himself.
- In view of sensitivity of these machines, service centres may be opened in rural areas for any kind of repairs for the success of machine transplanting.
- As better land preparation and levelling is required for machine transplanting laser guided levellers and rotovators may be promoted through FPO's
- Rural youth may be trained on nursery raising techniques and create small scale nursery raising units.

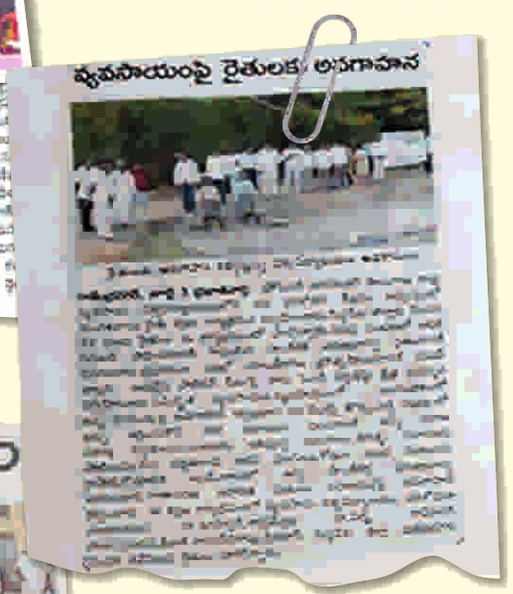
13. PRESS COVERAGE IN PRINT MEDIA ON MACHINE TRANSPLANTING


రాజేంద్రనగర్ వరి పరిశోధనా సంస్థలో రైతు సదస్సు

Sakshi 03.07.2018


వ్యవసాయ యాంత్రీకరణపై అవగాహన

Sakshi 20.01.2019


వ్యవసాయంపై రైతులకు అవగాహన

Sakshi 03.07.2018


యాంత్రీకరణతో వ్యవసాయం సులభం

Sakshi 07.07.2018


క్షేత్రస్థాయిలో వ్యవసాయాన్ని పరిశీలించిన రైతులు

Sakshi 03.07.2018


వరి సాగులో యాంత్రీకరణ

Sakshi paper on 20-12-2017


యాంత్రీకరణ సాగు చేయండి

Andhra Jyothi on 14-06-2018


వరి సాగుపై అవగాహన

వరి సాగులో యంత్రాల వినియోగంపై అవగాహన కల్పిస్తున్న అధికారులు

Eenadu paper on 14-06-2018


'యాంత్రీకరణతో అధిక ఫలసాయం'

Sakshi on 28-07-2018


పాలిథిన్ షీట్లపై వరి నారు పెంపకం

Andhra Jyothi on 28-07-2018


యాంత్రీకరణతో అధిక దిగుబడులు

Namaste Telangana 07-09-2018


సులభతరంగా వరి సాగు

Sakshi 08.09.2018


వ్యవసాయంలో యాంత్రీకరణ అనివార్యం

Andhra Jyothi 07.09.2018


వ్యవసాయ వర్సిటీలో
బైతు శిక్షణ

Sakshi 03.07.2018


యాంత్రీకరణతో భర్ర ఆదా

ANNEXURES

ON FARM DATA ON MACHINE TRANSPLANTING IN RICE *VS* CONVENTIONAL TRANSPLANTING

1. Name of the centre : ARS, Tornala, Siddipet

S. No.	Year of Demonstration	Area covered (ha)	No. of FLD's	Yield (t/ha)		% increase in yield over FP	Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT	MT	CT
	Kharif 2018													
1	Sri. V. Durga Reddy	Rangadhampally(V) Siddipet Rural (M)	2.0	7.2	6.6	9.1	59430	67796	126000	115500	66570	47704	2.12	1.70
2	Sri.Madhusudan Reddy	Rangadhampally (V) Siddipet Rural (M)	1.2	7.3	6.8	7.4	59430	67796	127750	119000	68320	51204	2.15	1.76
3	Smt.Ch.Nagalakshmi	Rangadhampally(V) Siddipet Rural (M)	0.8	7.4	6.9	7.2	59430	67796	129500	120750	70070	52954	2.18	1.78
4	Sri.Sudhakar Reddy	Rangadhampally(V) Siddipet Rural(M)	0.8	7.4	6.9	7.2	59430	67796	129500	120750	70070	52954	2.18	1.78
5	Sri.Srikanth reddy	Rangadhampally(V) Siddipet Rural (M)	0.8	7.5	7.3	2.7	59430	67796	131250	127750	71820	59954	2.21	1.88
6	Sri.Ram Reddy	Rangadhampally(V) Siddipet Rural (M)	1.0	6.5	6.0	8.3	59430	67796	113750	105000	54320	37204	1.91	1.55
7	Sri.Anji Reddy	Rangadhampally(V) Siddipet Rural (M)	1.0	6.1	5.6	8.9	59230	67546	106750	98000	47520	30454	1.80	1.45
8	Sri.Thirumal Reddy	Rangadhampally(V) Siddipet Rural (M)	0.8	5.9	5.4	9.3	59230	67546	103250	94500	44020	26954	1.74	1.40
	Mean		**8.4**	**6.91**	**6.44**	**7.51**	**59380**	**67734**	**120969**	**112656**	**61589**	**44923**	**2.04**	**1.66**
	Kharif 2019													
1	Sri.Janardhan Reddy	Khanapur(V) Nangunur(M)	2.0	6.0	5.9	2.1	56446	64762	108900	106631	52454	42323	1.93	1.65
2	Sri.Linga Reddy	Khanapur(V) Nangunur(M)	1.2	6.3	6.1	3.3	56446	64762	113438	109808	56992	45953	2.03	1.71
	Mean		**3.2**	**6.15**	**6.0**	**2.7**	**56446**	**64762**	**111169**	**108219**	**54723**	**44138**	**1.98**	**1.68**
	Two years mean		11.6	6.53	6.22	5.105	57913	66248	116069	110437	58156	44530	2.01	1.67

· MT-Machine Transplanting, CT-Conventional Transplanting

2. Name of the centre : Rice Research Centre, Rajendranagar, Ranga Reddy

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT	MT	CT
	Kharif 2018													
1	Sri. G. Janardan	Choutkur(V) M.Pulkal(M)	1	7500	6500	15.38	50000	54000	132750	115050	82750	61050	2.66	2.13
2	Sri. P. Mallikarjuna Goud	Choutkur(V) M.Pulkal(M)	1	7250	6750	7.41	48000	57000	128325	119475	80325	62475	2.67	2.10
3	Sri. P. Narayan Reddy	Choutkur(V) M.Pulkal(M)	1	5960	5630	5.86	48500	52500	105492	99651	56992	47151	2.18	1.90
4	Sri. B. Laxma Reddy	Choutkur(V) M.Pulkal(M)	1	6390	6080	5.10	49000	56500	113103	107616	64103	51116	2.31	1.90
5	Sri. G. Vidurudu	Choutkur(V) M.Pulkal(M)	1	7260	6930	4.76	51500	57500	128502	122661	77002	65161	2.50	2.13
6	Sri. S. Chandrappa	Choutkur(V) M.Pulkal(M)	1	7550	7250	4.14	49500	52300	133635	128325	84135	76025	2.70	2.45
7	Sri. P. Channa Reddy	Choutkur(V) M.Pulkal(M)	1	6660	6450	3.26	50200	53800	117882	114165	67682	60365	2.35	2.12
8	Sri. K. Ramagoud	Choutkur(V) Pulkal(M)	1	7120	6860	3.79	49800	51200	126024	121422	76224	70222	2.53	2.37
9	Sri. K. Chandra Shekar	Choutkur(V) Pulkal(M)	1	6980	6710	4.02	51000	54000	123546	118767	72546	64767	2.42	2.20
10	Sri. B. Manikya Reddy	Choutkur(V) Pulkal(M)	1	7040	6420	9.66	48700	52300	124608	113634	75908	61334	2.56	2.17
11	Sri. Md. Jaffar	Choutkur(V) Pulkal(M)	1	6990	6570	6.28	50900	54000	126732	118767	75832	64767	2.49	2.20
	Mean		**11**	**6973**	**6559**	**6.33**	**49736**	**54100**	**123691**	**116321**	**73954**	**62221**	**2.49**	**2.15**
	Kharif 2019													
1	Sri. Korapala Srinivas	Thundukurthy(V) Nagarkurnool (M)	1	7000	6900	1.4	49850	54650	147700	145300	97850	90650	2.96	2.66

Contd.,

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT	MT	CT
2	Sri. Shetty Vireshalingam	Nandiwaddeman (V) Nagarkurnool(M)	1	6500	6100	6.55	48050	55250	141700	132980	93650	77730	2.95	2.41
3	Sri. Kongari Laxmaiah	Yendabetla(V) Nagarkurnool (M)	1	8000	7800	2.56	45050	52250	156800	149480	111750	97230	3.48	2.86
4	Sri. Busireddy Sudharshan	Nallavalli(V) Nagarkurnool (M)	1	6250	6200	0.8	47650	55250	124150	124920	76500	69670	2.61	2.26
5	Sri.M. Dhakuram	V: Kotha thanda (V) Jadcherla(M)	1	6750	6200	8.8	51050	53250	137850	126520	86800	73270	2.70	2.38
6	Smt.R. Jyothi	Kotha thanda(V) Jadcherla(M)	1	6800	6500	4.6	52550	55250	136880	132900	84330	77650	2.60	2.41
7	Sri.Bandaru Srinu	Kotha thanda(V) Jadcherla(M)	1	6200	6100	1.6	50050	55250	122920	121260	72870	66010	2.46	2.19
8	Sri.M. Shankar	Nallavalli(V) Nagarkurnool(M)	1	6700	6200	8.06	49450	52250	137020	128520	87570	76270	2.77	2.46
	Mean		**8**	**6775**	**6500**	**4.30**	**49213**	**54175**	**138128**	**132735**	**88915**	**78560**	**2.82**	**2.45**
	Two years mean		**18**	**6874**	**6530**	**5.31**	**49474**	**54138**	**130909**	**124528**	**81435**	**70391**	**2.65**	**2.30**

3. Name of the centre : DAATTC, Ranga Reddy

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
	Kharif 2019											
1	Sri.Nanda Reddy	Anthvelly (V) Medchal(M)	0.4	6552	5826	12.5	33650	36580	64630	50810	2.9	2.3
2	Sri. Uma Reddy	Anthvelly(V) Medchal (M)	0.4	6338	5624	12.7	33650	36580	61420	47780	2.8	2.3
	Mean		**0.8**	**6445**	**5725**	**12.6**	**33650**	**36580**	**63025**	**49295**	**2.8**	**2.3**

4. Name of the centre : RARS, Jagtial

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
	Kharif 2019											
1	Sri. Satish	Pudur, (V) Kodimyal (M)	1.6	7820	7525	3.92	55310	57810	83886	76135	2.52	2.32
2	Sri. Sattaiah	Polasa, (V) Jagtial(M)	1.2	7456	7050	5.76	55310	57810	77406	67680	2.40	2.17
3	Sri. Yugender Rao	Polasa, (V) Jagtial(M)	0.8	7000	6745	3.78	55060	57560	69540	50130	2.26	1.87
4	Sri. Nagendra	Polasa, (V) Jagtial(M)	0.8	6250	6050	3.31	54910	57410	41340	35760	1.75	1.62
5	Sri. Gangadhar	Polasa, (V) Jagtial(M)	0.8	6500	6250	4.00	54910	57410	52340	45715	1.95	1.80
6	Sri. Sheker	Ayodya, (V) Raikal(M)	1.6	7500	7250	3.45	54060	56560	79440	72490	2.47	2.28
7	Sri. Chandranna	Ayodya, (V) Raikal(M)	1	7300	7000	4.29	54860	57360	75080	67240	2.37	2.17
8	Sri. Govardhan	Polasa, (V) Jagtial(M)	3.6	7000	6500	7.69	56035	57160	59465	50090	2.06	1.88
9	Sri. Janardhan Rao	Ayodya, (V) Raikal(M)	2	6500	6000	8.33	58335	59460	41765	32940	1.72	1.55
	Mean		**13.4**	**7036**	**6708**	**4.95**	**55421**	**57616**	**64474**	**55353**	**2.17**	**1.96**

5. Name of the centre: DAATTC, Khammam

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
	Kharif 2018											
1	Sri. P. Srihari	Rudrakshapalli(V) Sathupalli (M)	5.0	7574	6548	13.5	53590	61410	67594	43358	1.26	0.70
2	Sri. Sheshagiri	Kothur (V) Nelakondapalli (M)	4.0	7324	6676	10.0	51140	58707	66044	48109	1.29	0.81
3	Sri. B. RajeswarRao	Gangaram(V) Sathupalli (M)	4.0	7140	6432	9.9	50855	57812	63385	45100	1.24	0.78
	Mean		**13.0**	**7346**	**6552**	**11.1**	**51861**	**59310**	**65674**	**45522**	**1:1.26**	**1:0.76**

6. Name of the centre : DAATTC, Mahabubnagar

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
	Kharif 2018											
1	Sri.G.RamMohan Reddy	Rangapur(V) Pebbair (M) Wanaparthy(D)	3.2	6213	5600	10.94	33750	39650	76220	59470	3.25	2.49
2	Sri. J.Ravinder Reddy	Rayanipet (V) Kothakota (M) Wanaparthy(D)	2.4	5535	5320	4.04	37750	36500	60220	57664	2.59	2.57
3	Sri. B.Narsimha Rao	Nijalapuram (V) Addakal(M) Mahabubnagar(D)	8.0	6420	5775	11.16	35000	38000	78634	64218	3.24	2.68
	Mean		**13.6**	**6056**	**5565**	**8.82**	**35500**	**38050**	**71691**	**60451**	**3.03**	**2.58**
	Kharif 2019											
1	Sri. K.Laxminarayana	Munagala, (V) Itikyal (M) Jogulamba Gadwal (D)	0.4	6875	6018	14.24	45000	51250	68438	48047	2.52	1.93
2	Sri A.Vishnuvardhan Reddy	Munagala, (V) Itikyal (M) Jogulamba Gadwal (D)	0.4	6438	5988	7.51	42500	48750	64371	50651	2.51	2.03
3	Sri. S.Laxman Reddy	Munagala(V) Itikyal (M) Jogulamba Gadwal (D)	0.4	6815	6556	3.95	41250	47500	67790	57396	2.64	2.20
	Mean		**1.2**	**6709**	**6187**	**8.38**	**42917**	**49167**	**66866**	**52031**	**2.56**	**2.05**
	Two years mean		**14.8**	**6383**	**5876**	**8.60**	**39209**	**43609**	**69279**	**56241**	**2.80**	**2.32**

7. Name of the centre : KVK, Malyal, Mahabubabad

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
	Kharif 2012											
1	Sri. S. Jaipal Reddy	Tallapus(V) palli(M)	0.4	5440	4630	17.4	35100	34200	30000	26800	1.80	1.46

8. Name of the centre : KVK, Palem, Nagarkurnool

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
	Kharif 2019											
1	Sri. Chetamoni Shekar	Yendabatla (V) Nagarkurnool (M)	0.4	6110	5720	6.4	46585	48310	63431	54704	2.4	2.1
2	Sri. Police Balraj	Yendabatla (V) Nagarkurnool (M)	0.4	6160	5880	4.7	48035	49760	62881	55990	2.3	2.1
3	Sri. Mekala Buchanna	Yendabatla (V) Nagarkurnool (M)	0.4	6310	5580	11.6	46885	48810	66731	51630	2.4	2.1
4	Sri. Boddupally Ravi	Yendabatla (V) Nagarkurnool (M)	0.4	6790	6230	8.2	51010	53035	71246	59141	2.4	2.1
5	Sri. Marepally Venkataswami	Yendabatla (V) Nagarkurnool (M)	0.4	5950	5890	1.0	48560	50285	58576	55789	2.2	2.1
6	Sri. Srikanth Reddy	Yendabatla (V) Nagarkurnool (M)	0.4	6710	6390	4.7	49610	51335	71206	63757	2.4	2.2
7	Sri. Chinthalapally Kotaiah	Thudukurthy (V) Nagarkurnool(M)	0.4	6830	5370	21.3	47185	48910	75791	47822	2.6	2.0
8	Sri. Korapala Ramulu	Thudukurthy(V) Nagarkurnool(M)	0.4	6990	6200	11.4	50110	51835	75746	59675	2.5	2.2
9	Sri. Md Johur	Thudukurthy(V) Nagarkurnool(M)	0.4	6480	6190	4.5	48498	50285	68201	61117	2.4	2.2
10	Sri. Bandaru Srinivasulu	Thudukurthy(V) Nagarkurnool(M)	0.4	6500	5520	15.1	49320	53035	67680	46343	2.4	1.9
	Mean		**4**	**6483**	**5897**	**8.89**	**48580**	**50560**	**68149**	**55597**	**2.40**	**2.10**

9. Name of the centre : KVK, Kampasagar, Nalgonda

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
	Kharif 2018											
1	Sri. P. Ramesh	Kamareddy gudem(V) Tripuraram(M)	1	6330	6045	4.50	55500	57900	61605	53933	2.11	1.93
2	Sri. G. Venkatreddy	Garkuntapalem(V) Tripuraram(V)	2	6450	6250	3.10	54900	56200	64425	59425	2.17	2.06
3	Sri. D. Lingaiah	Duggepally(V) Tripuraram(M)		6297	5898	6.34	56500	57800	59995	51313	2.06	1.89
4	Sri. V. Edukondalu	Kampasagar(V) Tripuraram(M)	20	6460	6065	6.11	57600	58500	61910	53703	2.07	1.92
5	Sri. Y. Veerbhadra Rao	Bankapuram(V)Tripuraram(M)		6370	6125	3.85	56200	57400	61645	55913	2.10	1.97
6	Sri. Mohan Reddy	Nandhipad (V) Tripuraram(M)	10	6290	6150	2.23	54800	56900	61565	56875	2.12	2.00
7	Sri. B. Rambabu	Duggepally(V) Tripuraram(M)	2	6350	5950	6.30	56100	57600	61375	52475	2.09	1.91
8	Sri. B. Nagaraju	Duggepally(V) Tripuraram(M)	2	6250	6015	3.76	55300	56800	60325	54478	2.09	1.96
9	Sri. B. Venkanna	Duggepally(V) Tripuraram(M)	2	6120	5850	4.4	56500	57800	56720	50425	2.00	1.87
10	Sri. B. Dhanunjay	Duggepally(V) Tripuraram(M)	1	6240	5960	4.5	57600	58500	57840	51760	2.00	1.88
	Mean		**40**	**6316**	**6031**	**5**	**56100**	**57540**	**60741**	**54030**	**2.1**	**1.9**
	Kharif 2019											
1	Sri. Y. Veerabhadra Rao	Bankapuram(V) Nedamanoor(M)	25	6210	6120	1.45	56700	59100	58185	54120	2.03	1.92
2	Sri. Saidi Reddy	Thungaphad(V) Tripuraram(M)	20	6350	6280	1.10	55800	57100	61675	59080	2.11	2.03
3	Sri. Srinivas Reddy	Buggabaigudem(V)	10	6325	5986	5.36	57200	58500	59813	52241	2.05	1.89
4	Sri. Srinu	Tripuraram(V) Nalgonda (M)	7	6540	6240	4.59	58450	59350	62540	56090	2.07	1.95
5	Sri. Rambabu	Tripuraram(V) Nalgonda (M)	5	6450	6220	3.57	57150	58350	62175	56720	2.09	1.97
6	Sri. Koti Reddy	Nandhiphad(V)	4	6410	6150	4.06	55800	57900	62785	55875	2.13	1.97
7	Sri. Saida Nayak	Rallavagu Thanda(V) M:Damarcharla(M)	3	6380	6050	5.17	57150	58650	60880	53275	2.07	1.91
	Mean		**74**	**6381**	**6149**	**3.61**	**56893**	**58421**	**61150**	**55343**	**2.08**	**1.95**
	Two years mean		**114**	**6348**	**6090**	**4.31**	**56496**	**57981**	**60946**	**54687**	**2.09**	**1.92**

10. Name of the centre : DAATTC, Karimnagar

S. No.	Name of the farmer	Location	Area covered (ha)	Yield (Kg/ha)		Percent increase in yield over FP	Cost of cultivation (Rs/ha)		Net returns (Rs/ha)		B:C ratio	
				MT	CT		MT	CT	MT	CT	MT	CT
	Kharif 2018											
1	Sri. Reddi Sripathy Reddy	Gangipally (V) Manakondur (M) Karimnagar(D)	0.40	7412	6920	7.10	32180	31140	94565	87192	3.9	3.8
2	Sri. Kolluri Rajamallu	Kolnoor(V) Odela(M) Peddapalli(D)	0.40	7211	6700	7.6	32200	30500	91108	84070	3.8	3.7
3	Sri. V. Prabhakar	Ramadugu (M) Karimnagar(D)	0.40	7010	6510	7.68	31050	29510	88821	81811	3.8	3.7
	Mean		**1.2**	**7211**	**6710**	**7.5**	**31810**	**30383**	**91498**	**84357**	**3.83**	**3.73**
	Kharif 2019											
1	Sri.Kolluri Rajamallu	Kolnoor(V) Odela(M) Ped-dapalli(D)	0.4	7350	6814	7.30	34150	36100	100723	88936	3.8	3.4
2	Sri.Reddy Sripathy	Gangipally(V) M.Kondur(M) Karimnagar(D)	0.4	7875	7340	6.80	37120	38180	107386	96509	3.8	3.5
	Mean		**0.8**	**7600**	**7077**	**7.0**	**35635**	**37140**	**104054**	**92722**	**3.80**	**3.45**
	Two Years Mean		**2.0**	**7406**	**6894**	**7.25**	**33723**	**33762**	**97776**	**88540**	**3.82**	**3.59**

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