

RICE

Varieties Recommended for *Kharif*

Situation	Varieties for North Coastal Zone
Early <i>Kharif</i> Plantings	Pushkala (RGL 2624), Cotton Dora Sannalu (MTU 1010), Tarangini (MTU 1156)
<i>Kharif</i> Normal Plantings	Srikakulam Sannalu (RGL 2537), Swarna (MTU 7029), Vasundhara (RGL 2538), Sona Mahsuri (BPT 3291), Srikurma (RGL 2332), Vamsadhara (RGL 11414), Vijetha, Sri Druthi (MTU 1121), Pushyami (MTU 1075), Varam (MTU 1190)
<i>Kharif</i> Aged Nursery (Aged seedlings)	Srikakulam Sannlau (RGL 2537), Swarna (MTU 7029), Vasundhara (RGL 2538)
Low land submerged areas	Srikakulam Sannalu (RGL 2537), Badava Mahsuri (PLA 1100), Bheema (MTU 1140), Amara (MTU 1064), Ksheera (MTU 1172)
Saline soils	Indra (MTU 1061), Nellore sona, Panduranga
Late <i>kharif</i> plantings	Vasundhara (RGL 2538), Cotton Dora Sannalu (MTU 1010), Sri Druthi (MTU 1121), Pushyami (MTU 1075), Tarangini (MTU 1156), Chandra (MTU 1153)
Rainfed areas	Sri Satya, Pushkala, Maruteru Sannalu (MTU 1006), Tarangini
Irrigated dry situation	Swarna (MTU 7029), Sona Mahsuri (BPT 3291), Cotton Dora Sannalu (MTU 1010), Vijetha (MTU 1001), Chandra (MTU 1153)
BPH prone areas	Vijetha (MTU 1001), Sri Druthi (MTU 1121), Indra (MTU 1061), Amara (MTU 1064)

Varieties Recommended for *Rabi*

Situation	Varieties for North Coastal Zone
Rabi Normal Plantings	Pushkala(RGL 2624), Cottondora sannalu (MTU 1010), Sri satya (RGL 1880), Sri Druthi (MTU 1121), Tarangini (MTU 1156), Chandra (MTU 1153), IR 64
Saline soils	Somasila (NLR 33358), Nellore mahsuri, Nellore sona
Late Rabi plantings	Pushkala, Cottondora Sannalu (MTU 1010), Tarangini (MTU 1156), Chandra (MTU 1153)
BPH prone areas	Cottondora Sannalu (MTU 1010) , Sri Druthi (MTU 1121), Tarangini (MTU 1156), Chandra (MTU 1153)

Brief Description of Varieties

Variety	Duration (days)	Yield (T/ac)	Pest/ Disease Resistance	Special Features
Pushkala (RGL 624)	105	2.0	-	Fine grain
Cottondora Sannalu (MTU 1010)	125	3.0	BPH, Blast (T)	Super fine grain



Tarangini (MTU1156)	120	3.0	Blast, BPH	Long slender, suitable for export
Srikakulam Sannalu (RGL 2537)	165	3.0	Gall midge	Superfine grain, non lodging
Swarna (MTU 7029)	150	3.0	BLB	Fine grain, high yield with low N
Vasundhara (RGL 538)	135	2.5	Gall midge	Suitable for late sowing
Sona Mahsuri (BPT 3291)	145	2.5	Blast	Fine grain
Vijetha (MTU 1001)	140	2.5	BPH, Blast	Fine grain
Srikurma (RGL 2332)	150-155	2.1	Gall midge, Blast	Fine grain
Vamsadhar a (RGL1141 4)	150	2.5	Gall midge, Blast	Medium slender, non lodging
Sri Druthi (MTU 1121)	125	3.0	BPH, Blast	Medium slender grain with good cooking quality
Pushyami (MTU 1075)	135	3.0	BLB	Long slender, export quality
Deepti (MTU 4870)	150	2.5	BPH, BLB (T)	Non lodging, fine grain
Maruteru sannalu (MTU 1006)	115	1.2	-	Suitable for rainfed conditions
Badava mahsuri (PLA 1100)	160	2.5	-	Suitable for submergence conditions, fine grain
Bheema (MTU 1140)	145	2.5	BPH	Medium grain. Tolerates submergence for 10 days during vegetative phase
Amara (MTU 1064)	150	3.0	BPH, BLB	Medium slender grain. Tolerates submergence in vegetative phase



Indra (MTU 1061)	150	3.0	BPH, BLB	Medium slender grain. Suitable for raw rice
IR 64	120	2.5	Blast	Super fine grain
Somasila	105-110	2.5	Blast	Super fine grain
Sri Satya	110	2.0	Gallmidge	Coarse grain, suitable for rainfed situation
Nellore Mahsuri (NLR 34449)	120	3.0	Blast	Fine grain, non lodging suitable for irrigated ecosystem
Tarangini (MTU 1156)	120	3.0	Blast, BPH	Long slender, suitable for export
Chandra (MTU 1153)	115	3.0	Blast, BPH	Long bold, high head rice
Ksheera (MTU 1172)	150	2.4	Moderately tolerant to blast, BLB	Medium slender brown glume, flood tolerant culture released through CVRC for Andhra Pradesh and Odisha. Possess 2 weeks dormancy
Varam (MTU 1190)	140	2.6	Moderately tolerant to leaf blast, neck blast, BLB	Medium slender straw glume fine grain variety released for 5 states (Chattisgarh, Maharastra, Andhra Pradesh, Tamilnadu) through CVRC. High head rice recovery with good cooking quality, low input variety, Non lodging with 2 weeks dormancy
Panduranga (MCM 100)	145	2.4	Moderately tolerant o blast, brown spot	Tolerant to salinity. Non lodging, low grain shattering, medium slender straw glume grain. Suitable for transplanting of aged seedlings

Newly released varieties:

Variety	Duration (Days)	Yield (t/acre)
Maruteru Samba (MTU 1224)	Kharif-135	2.5
Maruteru Masuri (MTU 1262)	Kharif-150-155	2.6
Sujata (MTU 1210)	Kharif-135 Rabi-125	Kharif-2.5 Rabi-3.5
Teja (BPT 2595)	Kharif-150	2.6
Nellore Dhanyalakshmi (NLR 3354)	Kharif-120-125	2.8
Varsha (MTU 1223)	Kharif-145-150	2.3
Shravani (MTU 1239)	Kharif-140	2.5

Sowing Nurseries and Seed Rate

- Early *Kharif* – April first fortnight
- Sowing up to August 15th during *Kharif* and from November first fortnight in Rabi
- For Nursery transplanting 20-25 Kg, for dry seed nurseries 25-30 Kg, For Direct seeding 10- 12 Kg, for Direct Seeding with Gorru 16 Kg.

Nursery Management (Wet)

- Select an area of nursery, which has good irrigation and drainage facility.
- Prepare the nursery field one month before sowing
- Prepare nursery field by ploughing twice in the summer subsequently by puddling 3-4 times at an interval of 5-6 days.
- Level the field after final puddling and prepare raised beds of one-meter width and of convenient length duly forming channels for irrigation and proper drainage.
- Apply Well-decomposed FYM/ compost @ 200 kg/ 5cents nursery to improve soil condition.
- Soak the paddy seed for 16-24 hours and incubate for 24-36 hours before sowing of sprouted seed.
- Apply 2 kg Nitrogen (4.4 kg of Urea), 1 kg of 'P2O5' (6.25 kg of SSP) and 1kg of 'K2O' (1.6 kg of MOP) for a nursery bed of 5 cents (200 m^2).
- Apply total 'P' & 'K' fertilizers and $\frac{1}{2}$ 'N' as basal (before final leveling and thoroughly mixed in the soil).
- Apply the remaining $\frac{1}{2}$ 'N' at 10-15 days after sowing depending up on seedling growth.
- Sow the sprouted seed @ 5 kg/cent (40 m^2) of nursery bed and 20 kg seed is sufficient for one acre of main field.

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- Broadcast sprouted seed uniformly in seedbeds by keeping thin film of water and drain the water next day morning for proper aeration.
 - Maintain alternate wet and dry during first week, after that beds can be flooded 2-3 cm depth depending up on height of seedlings.
 - Apply @ 75 ml Benthiocarb or Pretilachlor with safener @ 40 ml or Butachlor @ 50 ml or Pyrazosulfuron ethyl @ 5 g in 10 litres of water as pre emergence application for five cents nursery to overcome weed problem
 - Apply *Cyhalo fop P butyl* @ 20 ml/ 10 litres of water at 12-15 DAS to control *Echinochloa spp.* effectively.
 - At the time of uprooting, the nursery should be flooded two days before to avoid root damage

Main Field

- Plough the soil once or twice in midsummer prior to main field preparation; it will help in checking the weed growth by exposing the root system of weeds. It also exposes egg masses and hibernated stages of different pests and disease to the hot Sun and helps soil to retain moisture received during summer.
- Under canal irrigation green manuring is very much suggested
- Initiate puddling at least 15 days before transplanting
- Tractor / power tiller puddling to a depth of 15 cm is enough.
- Level the field perfectly after final puddling and allow it to settle for 2-3 days before transplanting in heavy soils which helps in better water and weed control.
- Transplant 30 days old rice seedlings during *Kharif* and 20-25 days old seedlings for *Rabi*.
- Avoid usage of over aged seedlings for transplanting in rice as use of 60 or more days for long duration while more than 40 days for medium duration and more than 30 days for short duration varieties reduce the yield drastically.
- Transplant 33 hills/m² during *Kharif* and 44 hills/m² during *Rabi* at 2-3 cm depth @ 2-3 seedlings /hill
- In less fertile soils and in the case of over aged seedlings, transplant 44 hills / m² to reduce the yield loss to some extent.
- Make 20 cm alleyways at every 2 meters apart to facilitate free aeration and for uniform application of fertilizers, Weedicides and pest management practices.

Water Management

- Proper water management facilitates good tillering, increased nutrient use and reduce weed infestation.
- Maintain shallow depth of water (1-2 cm) at the time of transplanting.
- Increase the water level up to 5 cm depth after transplanting till crop establishment
- Maintain shallow depth of water (2-3 cm) during tillering phase of crop.
- Maintain 5 cm of water during panicle initiation to physiological maturity (10 Days before harvest) of the crop.
- Crop should not face water stress at panicle initiation, flowering and milk stages.

NUTRIENT MANAGEMENT RECOMMENDED FERTILIZERS (Kg/acre)

Zone	<i>Kharif</i>			<i>Rabi</i>		
	NITROGEN (N)	PHOSPHOROUS (P)	POTASSIU M (K)	NITROGEN (N)	PHOSPHOROUS (P)	POTASSIUM (K)
Godavari Zone	36	24	24	72	36	24
Krishna delta zone cum light soils	32-36	24	16-24	72	36	24
North Coastal Zone	32	24	16-20	48	24	20
Southern Zone	32	24	16	48	24	16
Scarce Rainfall Zone	96	32	32	96	32	32
Hill Areas HAT Zone	32	24	20	48	24	20
Note:		N x 2.17 = UREA			P x 6.25 = SSP	
					K x 1.67 = MOP	

- Soil fertility and productivity of rice can be improved and maintained through integrated use of organic, inorganic and bio fertilizers in a balanced manner.
- 25-50% of recommended N through Green manures/compost /FYM/ poultry manures results sustainable yields.
- Green manuring insitu with Sesbania / Crotalaria / Pillipesara or grain legume crop residues like black gram/ green gram can sustain the soil fertility and productivity.
- Bio fertilizers like blue green algae, Azolla, Azospirillum Phosphobacteria can save about 10 – 20 % 'N' & 'P' requirement of rice crop.
- Apply N, P2O5 and K2O @ 80: 60: 40 kg /ha during *kharif* and @ 120: 60:40 kg /ha during *rabi*. Apply entire 'P2O5' & 'K2O' as basal while 'N' in three equal splits (Basal + Active tillering + Panicle initiation stage). In light textured soils apply 'K2O' in two splits half at basal and half at panicle initiation along with 2nd top dressing of 'N'.
- Drain out the field before N topdressing and irrigate the field after 2 days only.
- Avoid top dressing of Phosphorus or Phosphorus containing complex fertilizers after 15 days of planting.
- Apply Zinc Sulphate @ 50 Kg / ha to avoid the Zn deficiency. Deficiency in the standing crop can be corrected by spraying zinc sulphate @ 0.2% (2 g /L of water). The spraying should be repeated at 5 days interval depending on the severity of the problem.
- If Iron deficiency noticed Spray of ferrous sulphate @ 20-25 g and citric acid @ 2-2.5 g/L is suggested. 2-3 sprays at 5-day interval are needed.

Weed Management

- The crop should be maintained weed free especially till 45 DAT.
- Hand weeding at 20 and 40 days after transplanting in areas where sufficient manual labour is available
- To overcome weed problem apply any one of the following herbicides keeping thin film of water. Butachlor @ 1.25 litres /acre (or) Anilophos @ 500 ml/acre (or) Pretilachlor @ 600 ml /acre (or) Oxadiargyl @ 40 grams (mixed with one litre of water) or with in 3 to 5 days of transplanting or spray Pyrazosulfuran ethyl @ 80-100 g/ acre at 8-12 DAT or Bensulfuron methyl @ 35 g /acre as pre to post emergence (3-25 DAT) or Bensulfuron methyl+ Pitalachlor granules 4 kg per acres along with 20 kg sand per acre at 5 to 7 DAT. 2,4- D SS @400 g / acre at 20-25 DAT to control broadleaved weeds .

Insect Pests and Diseases

Cultural Practices Recommended for Reducing the Build up of Insect Pests

- Summer ploughing
- Grow suitable resistant varieties
- Use recommended doses of fertilizers
- Clipping of the leaf tips of seedlings while planting
- Adopt normal spacing
- Formation of alleyways.
- Alternate wetting and drying
- Weed management

Economic Threshold Levels of Insect Pests

S. No.	Insect Pest	Stage of the Crop	Economic threshold level
1	Stem borer	Nursery and Tillering	One adult or one egg mass per one sqm or 5% of dead hearts per sqm.
2	Gall midge	Nursery Tillering	One silver shoot per sq.m One silver shoot per hill or 5% galls per sqm.
3	BPH/WBPH	Tillering	10-15 insects per hill
		After Flowering	20-25 insects per hill
4	Leaf folder	All stages	One to two damaged leaves per hill
5	Hispa	Tillering stage	Two adults per hill or two damaged leaves per hill
6	Green leaf hopper	Nursery	One or two insects per sqm
		Tillering	10 insects per hill
		Flowering	20 insects per hill
7	Gundhi bug	Flowering	One to two adults per hill

Chemical Control Tillering Stage

Stemborer, Thrips and Hispa

- Spray monocrotophos @ 36 SL 1.6 ml or chlorpyriphos 20 EC @ 2.5 ml or



phosphamidon 40 SL @ 2.0 ml, or Acephate 1.5g or cartap hydro chloride 2.0g or Chlorantriniliprole 0.4ml or /litre of water.

Gallmidge

- Apply phorate 10G @ 12.5 kg/ha or carbofuran 3 G @ 25 kg/ha at 15 DAT in 1–2 inches of standing water.

Leaf folder

- Spray profenophos @ 2.0 ml or chlorpyriphos @ 2.5 ml or monocrotophos 36 SL @ 1.6 ml, Chlorantriniliprole 0.4ml or cartap hydro chloride 2.0g, Phlubendamide 20 WDG 0.25g or 48SC 0.4 ml/litre of water.

Hispa

- Spray profenophos @ 2.0 ml or chlorpyriphos @ 2.5 ml or monocrotophos @ 1.6 ml/litre of water

Leaf mite

- Dicofol @ 5.0 ml or wettable sulphur @ 3 g /l of water.

Panicle Initiation to Booting Stage

BPH/WBPH

- Spray acephate @ 1.5 g or monocrotophos @ 2.2 ml or ethofenprox @ 2.0 ml or fenobucarb @ 2.0 ml or imidacloprid @ 0.25 ml or thiamethoxam @ 0.2 g or Buprofuzin 1.6ml or Imidaclorid + Ethiprol 80WG 0.25g or Pymetrogen 0.6g or Dynotefuran 20SG 2g per litre of water.
- Spray fluid (200 litres/acre) should be directed towards the base of the plant.
- Avoid spraying of combination of insecticides and synthetic pyrethroids.
- If second spray is warranted alternate the previous chemical preferably belonging to another group.

Stemborer

- Cartap hydrochloride 50 WP 2.0 g or acephate 1.5 g or profenophos 2.0 ml Chlorantriniprole 0.4 ml/litre of water (or) apply cartaphydrochloride 4G @ 8 kg/acre when the adult moths/egg masses @ one/ sq.m are noticed in the field.

Leaf folder

- Spray cartaphydrochloride 2.0 g or acephate 1.5 g or profenophos 2.0 ml /litre of water.

Panicle mite

- Spray profenophos 2.0 ml or dicofol 5.0 ml/litre of water

Post Flowering

BPH/WBPH

- The insecticides as recommended at boot stage should be used.

Cutworm

Irrigate the field and spray in the evening hours with any of the following

combinations of dichlorovos 1.0 ml + chlorpyriphos 2.5 ml/litre of water.

Rice Diseases

Disease	Time of application	Fungicide	Dose	No. of applications & time interval
Sheath blight	At the initiation of the disease. Normally around 45 days after transplanting in <i>kharif</i> and 30 days after transplanting in <i>rabi</i>	Hexaconazole 5EC/ Validamycin 3L/ Propiconazole 25 EC/ Triflaxistrobin + Tebuconazole 75WG/ Azaxydostrobin 11% + Tebuconazole 18.3% Azaxydostrobin Azaxydostrobin 18.2%+defenoconazole 11.4%	2ml/l 1 2ml/l 1 1ml/l 1 0.4 g/l 1.5ml/l 1 ml/l 1.2ml/l	2 sprays at 15-day interval
Blast a) Leaf blast	At the initiation of the disease under favourable weather conditions	Tricyclazole 75 WP/ Isoprothiolane 40 EC/ Kasugamycin 3L	0.6g/ml 1.5 ml/l 2.5ml/l	2 to 3 sprays depending on the severity & spread of the disease at 15 days interval
b) Neck blast	i) Under disease favourable weather conditions just before panicle emergence stage	Tricyclazole 75 WP / Isoprothiolane 40 EC/	0.6g/ml 1.5 ml/l 2.5ml/l	One spray
	ii) On appearance of the disease	Tricyclazole 75WP/ Isoprothiolane 40 EC Kasugamycin 3L	0.6g/ml 1.5 ml/l 2.5ml/l	One spray
BLB	No chemical available. Management is mainly through rationalization of nitrogenous fertilizer application	---	---	---
Stem rot	At the appearance of the disease (Normally from maximum tillering to crop maturity stage)	Validamycin 3L / Hexaconazole 5EC / Propiconazole 25 EC /Carbendazim 50 WP/ Tebuconazole 25EC	2ml/l 1 1ml 2ml/l 1 1g/l	2 to 4 sprays at 10-15 days interval 1 depending how much early the disease has been



			1 g/l 2 ml/l	noticed
Red stripe	At the appearance of the disease from advanced boot leaf to crop maturity stage	Carbendazim 50 WP/ Carbendizim+Mancozeb 75 WP	1g/l 2g/l	One spray
Sheath rot	At the appearance of the disease or at panicle emergence stage	Carbendazim 50WP/ Propiconazole / Carbendizim+Mancozeb 75 WP	1g/l 1ml/ 1 2g/l	One spray
False smut	At flowering stage	Propiconazole 25 EC/ Carbendazim 50WP	1.0ml/ 1 2.0g/l 1.0g/l	One spray during evening hours

Rodent Control

For Endemic Areas

- Destruction of rodent harborage and observe rat moment.
- Reducing the number and size of field bunds
- Complete the sowing and planting uniformly in one area.
- From puddling to one month after planting, setup local traps @ 20 /acre.
- Installation of permanent bait stations from planting to flowering stage @ 5 /ha Four at corners of the field one meter inside the cropped area from the field bund and one at the centre, Bromadiolone bait @ 30 g per bait station should be replenished twice in a week.
- During crop period baiting with bromadiolone 0.005% in baits prior to primordial initiation stage of the crop.
- From primordial initiation to crop harvest smoking of burrows with “burrow fumigator“developed by RARS, Maruteru.

Management of Rodents with Bromadiolone 0.005%

- Identify live burrows and simultaneously place 15 gm freshly prepared bromadiolone (2% poison) loose bait in packets inside the burrow when LBC is 50/ha.
- Repeat bromadiolone (2% poison) loose baiting in the active /live burrows as and when the incidence is above ETL.

Note: Control schedules should be executed on community basis to check cross infestation through migration.



Harvesting and Storage

- Harvesting should be done when at least 80 % of the grains are matured. If the crop is harvested without proper maturity it leads to loss of viability of grains and breakens in milling.
- The harvested material should be dried in the field for 2-3 days.
- The grain should be free from inert material after threshing and winnowing.
- The winnowed grains should be sun dried until the moisture content reaches < 13%.
- Both over drying and under drying will lead to breakage of the grain during processing.
- High moister content during storage leads to loss of viability due to increased grain respiration and attack of storage insects and pests.

Management for planting with overaged seedlings

- Plant 3-4 seedlings /hill at 15×10 cm spacing (66 hills /m²) when the nursery is 45 to 60 days old.
- Plant 5-6 seedlings /hill at 10×10 cm spacing (100 hills /m²) when the nursery is 60 to 75 days old.
- Increase the nitrogen dose by 25% and apply in two splits i.e., 2/3rd as basal and remaining 1/3rd at panicle initiation stage.
- Timely plant protection duly monitoring the pest & disease incidence especially leaf folder, BPH, blast etc.
- Discard nurseries which are more than 75 days old in case of long duration varieties.
- Wherever Sonamahsuri and Sambamahsuri are grown use 45 days old nursery only as yield will be reduced drastically with increase in age of the nursery beyond 45 days.

Management practices under heavy cyclonic rains

1. Application of Urea 25 kgs + MOP 10- 15 kg per acre as booster dose / foliar spray of 2% Urea/Multi K @ 1 kg per acre if the crop is at tillering stage in rice.
2. Spraying of propiconazole @ 1 ml /l or Hexaconazole @ 2 ml /l after draining of flood water under inundation situation as prophylactic spray to avoid sheath blight disease in rice.
3. If the crop is in harvesting stage, drain out excess water. Spread sheaves loosely in field or field bounds where there is no water stagnation.
4. Spray common salt at 5% on panicles to prevent germination and spoilage of straw from moulds.
5. Thresh after drying the sheaves properly.
6. Ensure proper grain moisture before storing.

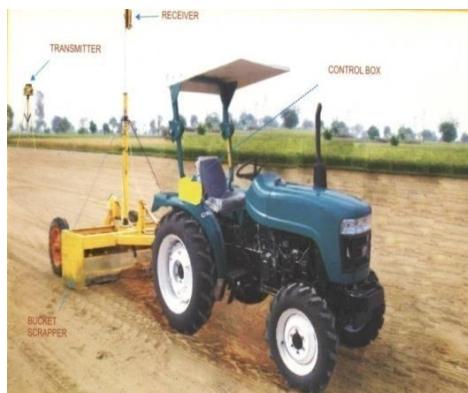


The total cultivated area of rice in Andhra Pradesh is 25.83 lakh hectares. The productivity of the rice can be increased by using proper improved implements. Puddling is the most important operation for cultivation. Puddling prepare the seed bed for transplanting by mixing soil particles with water beside reducing leaching loss and destroying of weeds. At present farmers are using tractors with cage wheels (single double) for puddling operation. Puddling could be done more effectively by using 4WD tractor with rotavator / rotary tiller.

LAND PREPARATION: Laser Guided Leveler

Laser guided leveler is trailed type equipment used for achieving precise fine leveling with desired grade. This two meter wide automatic leveling operations can be successfully operated with 50 or above horse powered tractor. It has four basic units viz. laser emitter/transmitting unit, laser-receiving unit with soil bucket having double actuating hydraulic value and level control box. The laser emitter unit sends continuous self-leveled laser beam signal with laser reference up to a command radius of 300-400 m for auto-guidance of the receiving unit. This unit actuates the hydraulic control for moving up/down the leveling bucket for the desired cut/fill operation. Prior to operation the machine the area requiring fine leveling has to be surveyed using a grade rod. Then based in the survey observations a mean grade should be found. The bucket blade is then placed at the average grade and synchronized with the control unit. After this the operator operates the machine and the necessary cuts and fills are automatically controlled by the machine to achieve the desired grade in the field. The capacity of the machine depends upon the amount of soil cut and fill required in the field and field geometry. It has been observed that the field efficiency of the machine is more for regular sized fields. It generally takes 1.5-2.5 h/acre if the mean cut and fill is with-in 8 to 10 cms. At present the machine cost is around 4-5 lakhs. The operator can be easily trained for machine operation and laser leveling in 2-3 days by imparting on job field training. Since the initial cost of the Laser leveler is quite high so this type of service should be available on custom hiring to the farmers.

Tractor with Rotary tiller:



The 4 wheel drive tractor consists of vertical 4 cycle liquid cooled 35 hp diesel engine

with a fuel tank capacity of 34 lit. The total length, width and height of the tractor is 2,925mm, 1430mm and 1715mm respectively. The wheel base is 1610mm and the minimum ground clearance is 350mm. The front and rear treads are 1.070mm and 1,120mm respectively. The total weight of the tractor is 1115 kg. The minimum traveling speed is 0.7 kmph and maximum is 22 kmph. The rpm of PTO shaft is 540 rpm. The tiller consists of 32 tilling blades mounted on 9 flanges. The total length, width and height of the tiller are 870 mm, 1805 mm and 945 mm respectively. The effective width of tilling is 1584mm and the weight of the rotary tiller is 245 kg.



MANUAL 8 ROW PADDY DRUM SEEDER (Fibre Body)

Paddy drum seeder is used for sowing pre-germinated paddy seeds directly on puddle fields. The seeder consists of a seed drum, main shaft, ground wheel, floats, and handle. Joining smaller ends of frustum of cones makes the seed drum. Nine numbers of seed metering holes of 10 mm diameter are provided along the circumference of the drum at both the ends with a row-to-row spacing of 200 mm. Flat spikes 12 mm wide and 25 mm long are joined to the ground wheel parallel to its axis of rotation. The slopes of the cone facilities the free flow of seeds towards the metering holes. Two floats are provided on either side to prevent restrict the sinkage and to facilitate easy pulling of the seeder.



NURSERY RAISING MACHINE:

Manual Nursery Raising Machine

It consists of seed box provided with 4 wheel drive system, seed platform with plastic trays and handle. The seed box is moved over the seed platform manually with the help of a handle. As a result the seeds are dropped in the trays uniformly,in which plastic trays are placed. The overall length, width and height of the machine are 770 mm, 340 mm and 270 mm respectively. The capacity of the machine is 10 acres/day.



Manual nursery raising machine

In this machine spreading of soil, seed and sprinkling of water on the seed will be done automatically. The output of the machine is 600 to 700 trays per hour.

Automatic seed filling machine

SOWING:

Self Propelled Paddy Transplanters:

Paddy Transplanter (8 Rows): The mechanically transplanted rice compared to manual transplantation gives higher grain yield with low cost of production. The self-propelled rice transplanter is single wheel driven (lugged steel wheel for field and pneumatic wheel for transport) and fitted with 2.94 kw (4.0 hp) diesel engine. The machine transplants seedlings in 8 rows with 238 mm row spacing in single pass. Distance between hills being adjustable from 120 to 140 mm. The drive wheel receives power from the engine through V-belt, cone clutch and gear box. A propeller shaft from the gearbox gives drive to the transplanting device mounted over the float. The float facilitates the transplanter to slide over the puddle surface. The tray carrying mat type nursery for 8 rows is moved sideways by a mechanism, which converts rotary motion received from the engine through belt-pulley, gear and universal joint shaft into linear motion of a rod connected to the seedling tray having provision to reverse the direction of movement of tray after it reaches the extreme position at one end. Fixed fork with knock out lever type planting fingers (Cranking type) are moved by a four bar linkage to give the designed location to the tip on the planting finger.

The machine is operated in high/low gear at about half to three fourth throttle

depending upon the field condition. For operating the machine in the field, tire ring from front drive wheel and two rear wheels from the float are removed and the field after puddling is left for settlement up to 3 days depending upon the type of soil. Machine uses mat type seedlings and it can transplant 1.2 – 1.5 ha/day with the help of 5 persons by working at a speed of 1.1 – 1.5 km/h. It saves about 65% labour and 40% cost of operation as compared to manual transplanting. The cost of machine is Rs. 70,000/-. The cost of operation is Rs. 2,000/ha as compared to Rs. 3,000/ha by traditional methods.



Row Paddy Transplanters

Row Paddy Transplanters: Rice transplanting is commonly carried out manually and it is labour intensive and time consuming. An average of 60 women days is needed for pulling nursery and transplanting paddy/ha. In manual hand transplanting, the cost of operations is around Rs.6,000/- ha which includes 60% towards labour wages. Delayed transplanting results in poor yield. Severe labour scarcity compelled the farmers to leave paddy fields fallow. Therefore, timeliness of transplanting is essential for higher yield of rice with the use of self- propelled mechanical rice transplanters. The mechanically transplanted rice gives higher yield, reduces human drudgery, saves time and labour cost over conventional transplanting. The 6 row self propelled paddy transplanter consists of 4 wheel drive water cooled 4 cycle petrol engine with 17hp. The length, width and height of the machine are 3000mm, 2210mm and 1495 mm respectively. It transplants the paddy with row to row spacing of 30cm and hill spacing varies from 12,14,16,18,21 cms at a depth of 2-5cms. The transplanting speed is 1.62 m/sec and the total weight of the machine is 590 kg. The capacity of the transplanter is 6 to 8 acres/day. The cost of the machine is 18 lakhs. The mechanical transplantation could save 90% of labour charges, there by the cost of operation is reduced to 40% as compared to farmers practice..



POWER WEEDER

The power weeder for paddy was developed by ANGRAU, FIM scheme, ARI, R’Nagar, Hyderabad, consists of 1.5 HP Loona engine, 2liters plastic petrol tank, handles power transmission system and rotary wheels with cutting blades. The rotating wheel has 140 mm dia and 8 cutting blades of 4 teeth of 30 mm height and 50mm width. The power transmission system consists of worm and worm gear arrangement. The rotary wheels rotated by the power transmission system of the engine. The working width of the weeder in the field is 200mm. The weeder is provided with two floats of 190 mm length 75 mm front width and 25 mm x 25 mm 3mm M.S. angular to avoid sinkage in the field. The depth of operation can be adjusted by float height. The total length of the machine is 1500 mm and the weight (including float) is 18.5kg.



HARVESTING:

Conventional paddy harvesting, threshing, cleaning and bagging operations by human labour involves drudgery, time consuming and more cost of operation over self propelled combine harvesters.

SELF PROPELLED REAPER

It is an engine operated, walk behind type harvester suitable for harvesting and windrowing cereals and oilseed crops. The reaper consists of engine, power transmission box, lugged wheels, cutter bar, crop row dividers, conveyor belts with lugs, star wheels, operating controls and a sturdy frame. The engine power is transmitted to cutter bar and conveyor belts through belt-pulleys. During forward motion of the reaper, shearing of crop stems takes place by cutter bar. The cut crop is conveyed to one side of the machine by the conveyor belt fitted with lugs and is windrowed in the field. The crop is bundled

manually and transported to threshing yard.



SELF PROPELLED REAPER BINDER

Reaper Binder is a unique harvesting machine that reaps the standing crops as well as it binds it in a single operation. This innovation mechanical machine ensures 100% recovery of straw with negligible grains losses at a surprisingly low cost of operations. This machine is mainly used in wheat, paddy, oats, barely and other crops like soyabean. The same machine can be converted into a sprayer unit for spraying of pesticides, weedicides, and fertilizers in various field crops like wheat, paddy, cotton, soyabeen, sugarcane, vegetables and orchards.



TRACK TYPE COMBINES:

The three row self propelled combine is fitted with 18.5 H.P air cooled diesel engine consists of crop lifting mechanism with retractable fingers, reciprocating cutter bar of 1000 mm length, crop conveying system, ear head thresher and cleaning and bagging unit the length, breadth and height of the machine are 3950 mm, 1650 mm and 1680 mm respectively. The crop is held between two chain conveyors, threshed and the remaining straw is released in the field in the form of windrows. It has also a provision to chop the straw and spread it uniformly in the field for subsequent sun drying and incorporation into the soil. The weight of the machine is 1150 kg. The field capacity of the machine is one acre/hr and fuel consumption was 5-6 lit/hr. The cost of operation is Rs.950/ha and the saving of labour cost over manual harvesting and threshing is Rs. 1150-1300 per acre.

