



# Use of Composites in Agriculture Sector

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## Scope to use

- Fabrication of Agricultural Machinery  
Bullock carts, seed cum ferti. Drills, Sprayers,  
Preservations, Food processing equipment etc
- Pump-sets
- Micro irrigation  
Drip, sprinkler etc  
Farm pond linings  
Soil Mulch

# Need for development of Bullock cart

- Need for development:
  1. Animal draught power is coming down
  2. Lack of raw material for conventional type cart
  3. No skilled artisans available
  4. Durability
  5. New roads for the villages demands speed increase

# Development

- Animal Drawn Vehicle ( Bullock Cart)
- First Bullock Cart Made of Composites during 1993-95
- This was trial tested and used in Mandya Dist. Karnataka.
- Cart-man from Bangalore also extensively worked on reduction of draught on the animals.

# Animal Drawn Vehicle (ADV)

- Developed by GFTC
  - Manufactured by  
Paru Engineers Pvt Ltd.  
Hyderabad
- Carrying Capacity : 3.5 MT  
Tare Weight : 350 Kg only



# Animal Drawn Vehicle (ADV)

Model II with low ht



First Fibre Glass Bullock Cart In India.

# Orchard Sprayer

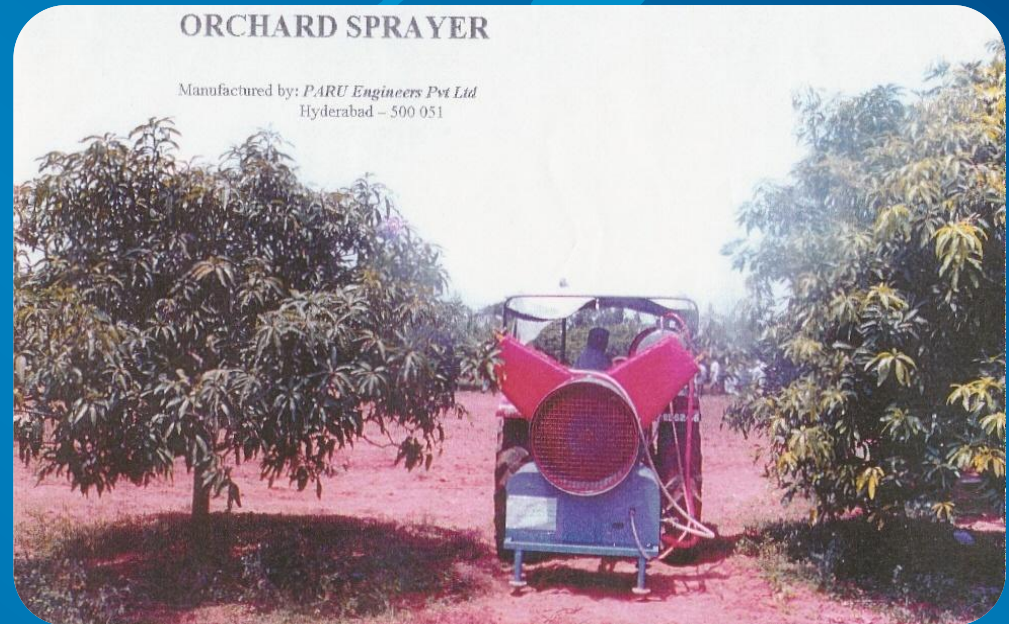
- Designed by CRIDA  
Paru Engineers Pvt Ltd.  
Hyderabad

Capacity : 2-2.5 acres/ hour

Tare Weight : 190 Kg only  
with spray tank

40 % reduction in wt  
compared to the  
conventional sprayer

Non corrosive and durable



# Salient features

- It is operated by PTO Shaft
- Pesticide solution is air carried in aerosol form by a blower which rotates at 1500-288 rpm
- It has two adjustable wings which guides the flow



# Solar Powered Low Volume Boom Sprayer

- Developed by NIPHM
- Manufactured by  
Sonic Air India.  
Hyderabad

Tare Weight : 35 Kg only

50 % REDUCTION IN WT



COURTESY: **niphm**

# CRIDA vegetable Preservator

It is developed to fill the gap of primary preservation at Farmer's level



## New model with in built tank



# Salient features

- It is available in 5, 15, 50 kg capacities
- It works on evaporative cooling principle
- It keeps 18 degree C temperature inside the chamber
- It is operated at 65-80 % humidity
- It increases the shelf life of the vegetables by 7 days

# CRIDA 4-row Planter with FRP box

- It reduced wt by
- 30 %
- Easy to transport
- Durable



# Precision planter cum herbicide applicator



It is specially designed for sowing with fertilizer and herbicide application at one time in any type of soil with high precision and also with minimum disturbance of top soil. It can do three operations at a time viz., Seed sowing, fertilizer application and herbicide spraying. It can work well in two way sloppy lands because of individually operated spring loaded tines. Separate seed metering mechanism is available for each row for high precision. Separate seed metering plates are available for different crops. Pre-germination herbicides can be sprayed as per the recommended dose during the sowing itself . The field coverage of the planter is about 1.25 acre in an hour.  
Cost: 55000/-

Yet to be commercialized

# Composites in Pump sets

- Main aim is to reduce the wt. of the pump
- To reduce the wt. of the impeller
- To reduce the wearing and corrosion due to silt in the farm ponds

# Specifications of portable pump

set

1. Engine Model : HSMF, MK-12
2. Make : Greaves Cotton Ltd
3. Rated RPM : 3000 rpm
4. Rated Power : 1.5 hp
5. Fuel : Petrol start & Diesel
6. Pump : 2" X 2" Monoblock
7. Pressure Head : 12 meter
8. Discharge : 5 lps
9. Pumpset weight : 34 kg



- In 2010-11, 387 m<sup>3</sup> of water was delivered for irrigation in 1800 m<sup>2</sup> area for crops viz., tomato, bitter gourd, cluster bean, chillies, redgram.
- Out of 377 m<sup>3</sup> of total delivered water, 272 m<sup>3</sup> was used by furrow irrigation and 105 m<sup>3</sup> was by sprinkler irrigation
- Cumulative running of the pumpset was 32 h and fuel consumption was 19 liters (Rs. 950)
- Minor maintenance of the cost Rs 225/- was done in last year.  
(sparkplug, key, & packing material)



# Development of Nylon Pump

1. Housing
2. Impeller
3. Shaft
4. Coupler



Particulars	Dimensions
Central shaft, □ mm	32
Impeller, □ mm	110
Impeller width, mm	10
Vanes, No.	05
Impeller hub, □ mm	160
Hub section, mm	25
Hub thickness (outer),	65
Coupler length, mm	115
Coupler front, □ mm	165
Coupler front, □ mm	155

1. The weight of the nylon pump along with F against 14 kg with existing cast iron pump
2. With this overall weight of the new pumpset is 24 kg as against 34 kg with existing one (HSMF MK12)
3. Literature (Hasting and Awadwal,1992; BIS 3906 1982) suggested that overall wt. of the object that carried by operator should not exceed 22 kg.

# Plastic mulching machine

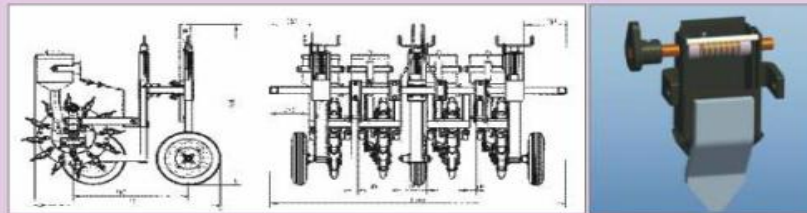


Fig. 3 CAD representation of modified punch planter

Table 3 : Results of planting of kharif ground nut with refined machines

Parameters	CIAE, Bhopal
Row to row distance, cm	30
Plant to plant distance, cm	12
Top width of raised beds, cm	40-42
Height of raised beds, cm	15-20
Capacity of plastic laying machine, ha/h	0.34
Capacity of punch planter, ha/h	0.21

## Equipment for cultivation of groundnut in plastic mulch conditions

Trials were conducted for planting of summer groundnut on raised beds at NRCG, Junagarh and MPKV, Rahuri (Table 4) using tractor operated plastic mulch laying machine (Fig. 4) and tractor operated four row punch planter with modular planting unit (Fig. 5). At both the places, the crop was raised on 0.1 ha area each on raised beds with and without plastic mulch (Fig. 6).



Fig. 4 Laying of plastic mulch on raised beds

In the trials, 10-micron transparent plastic film of 1 m width was used. Planting of summer groundnut on raised beds under plastic mulch resulted in savings of irrigation water and labour for weeding besides higher yields. Benefit cost ratio was 1.51 and 2.18 in case of raised beds with plastic mulch and 1.27 and 1.70 in case of raised beds without plastic mulch at NRCG, Junagarh and MPKV, Rahuri, respectively.

# Ploy sheet lining for farm ponds

Issues:

Less durability

Easy to damage



- Thank you

