

Improved Implements and Agricultural Practices for Inclusive Growth of Farmers in Dryland: Opportunities and Challenges

By

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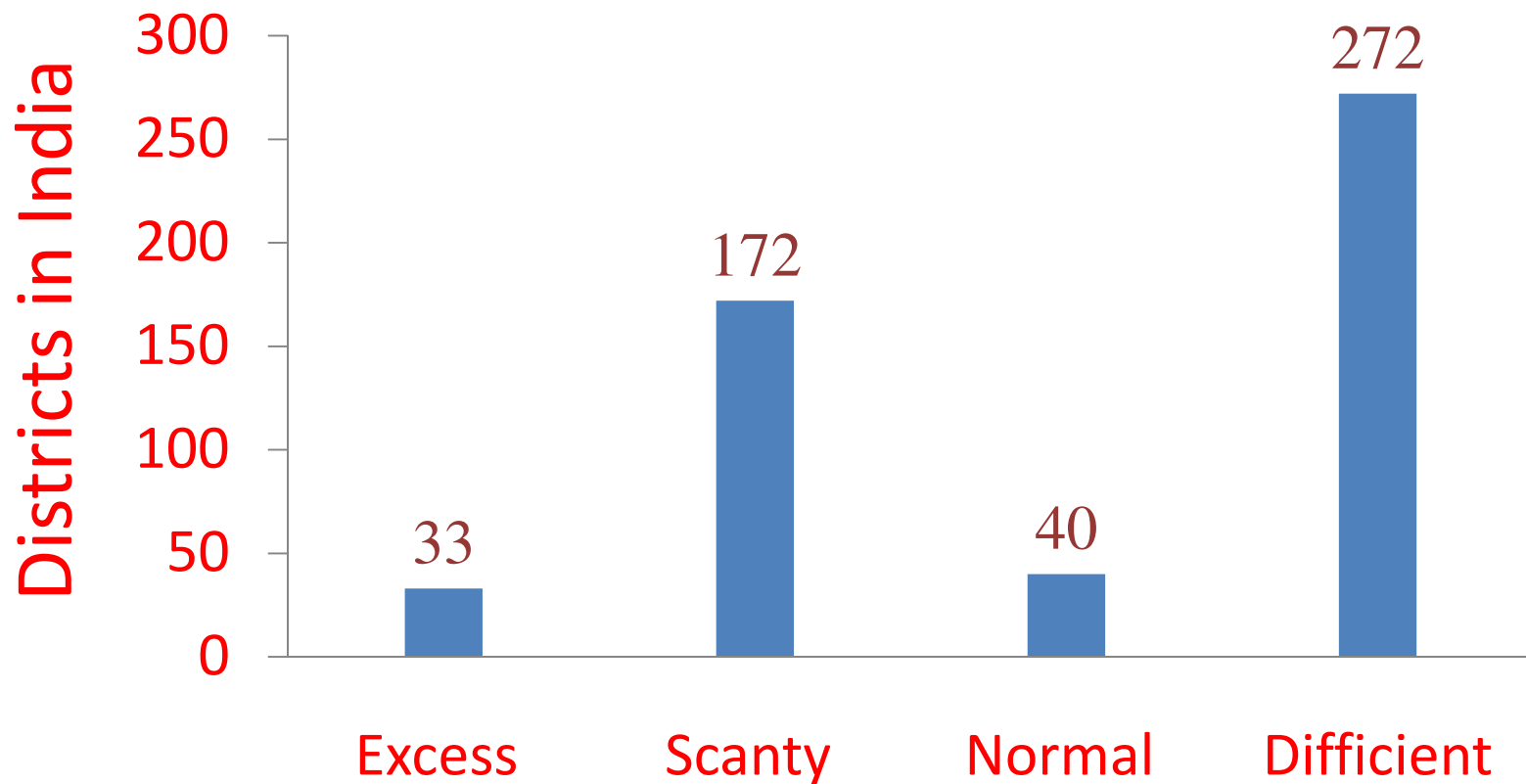


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Present Issues in Dryland Agriculture



- Difficulty in managing the small farms
- Reduction in Bullock Power and increase in tractor hiring costs
- Non Availability of labour for precision operations like sowing and harvesting etc
- Poor soil conditions because of lack of interest from the farmers on soil improvement activities
- Uneven rainfall



Rainfall Distribution Pattern

Soil crusting is major problem
under dryland



Challenges



- Though much emphasis is given for small farm mechanization, the results are not up to the mark due to non profitability.
- Small land holdings and high initial/rental cost of large machinery discourages the small and medium farmers to opt for it.
- Timely availability of the machinery is a big question mark

Challenges



- No industry support for Precision and quality machinery for small farms
- More number of fabricating industries with least standards
- Maintenance Problems with self propelled machinery
- Drastic reduction in Bullock population year by year
- Missing link-Training on supplied machinery to the farmers

Opportunities for Dryland Mechanization



- Enhanced farm power supply
Increased farm power availability from 0.25 kW/ha (1951) to 1.68 kW/ha (2011)
- Increased growth of tractors
from 2.47 lakh (2004-05) to 6.07 lakh (2011-12)
- Increased growth of power tillers
From 175000 (2004-05) to 60000 (2011-12)

CRIDA experience on farm mechanization



- Methodology adopted:
 1. Designing the location specific Farm machinery at Research workshop.
 2. Testing in the farmer's field and refinement on farmer's feed back
 3. Publicity through Kisan mela and participation in exhibitions
 4. Finding industry partner for production and sale

CRIDA experience on farm mechanization



Number of Improved Machinery Developed
By CRIDA: 23

MoU Signed with Industries for Mass
Production: 22

Conventional methods of Sowing



- ❖ Uneven distribution of seeds and fertilizer
- ❖ Higher wages
- ❖ Poor efficiency
- ❖ Bullock power dependent



CRIDA Bullock Drawn Planters

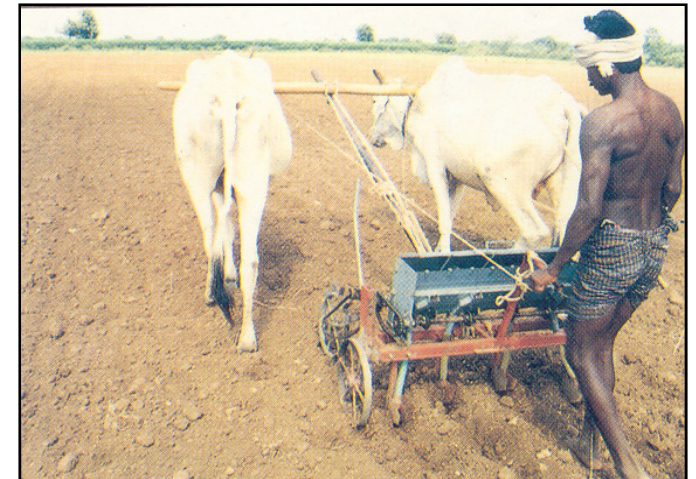


2 row planter

- ✓ Useful for small and medium holding farmers
- ✓ Savings in seed and fertilizer
- ✓ Saving in wages



3 row planter



4 row planter

CRIDA Tractor Drawn Planters for timely sowing



6- row planter



9-row planter

- Useful for different cropping system
- Large area coverage (10-15 ha/day) for timely sowing
- Maintains plant spacing

Metering Plates for Different Crops



Sr. No	Crops	Spare part No	No of cells on metering Plate	plant to plant distance , cm
1	Soybean	SP1	23	5
2	Redgram	SP2	12	10
3	Bengal gram (N) Bengal gram	SP3	12	10
4	(Kabuli)	SP4	16	8
5	Jawar, Bajra, Green gram, Blackgram	SP5	12	10
6	Maize Groundnut	SP6	4,5,6,7,8	15-30
7	(Medium)	SP7	12	10
8	Ground nut (Bold)	SP8	16	7.5
9	Onion	SP9	24	5

Tractor drawn BBF Planter



Major Components:

- Planter with seed and fertilizer box
- Furrow openers (2)
- Tynes (4)
- Supporting wheels (2)
- Drive Wheel
- Transmission Mechanism
- Tractor required 35 hp

Overall Dimension mm: L-2250, W-1133mm, H- 868 mm

Frame Dimensions mm: L-2250mm, W-480mm

Weight, Kg: 285

BBF Planter in Operation



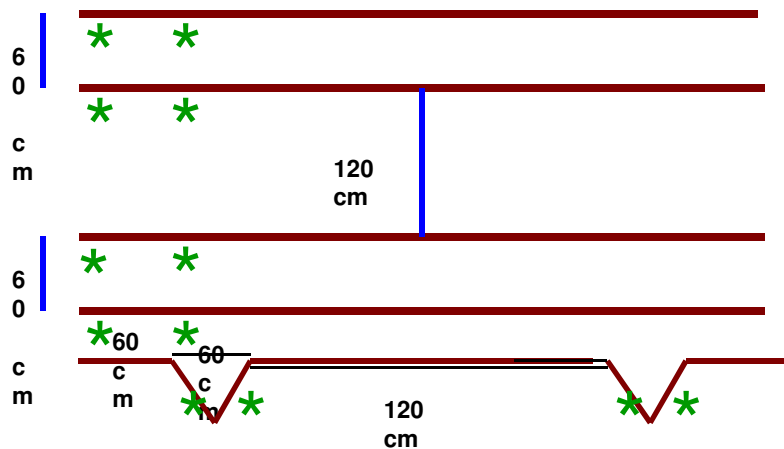
BBF Planter Utility:

- To conserve rain water and minimize effect of drought
- To drain the water in case of excess rainfall
- Useful for all dryland crops
- Area coverage, 6-8 ha/day



Double furrow multicrop planter developed for Redgram-soybean Cropping system (Developed based on farmer's request-location specific) cum BBF planter for improved water conservation

CRIDA Paired Row cum BBF Planter



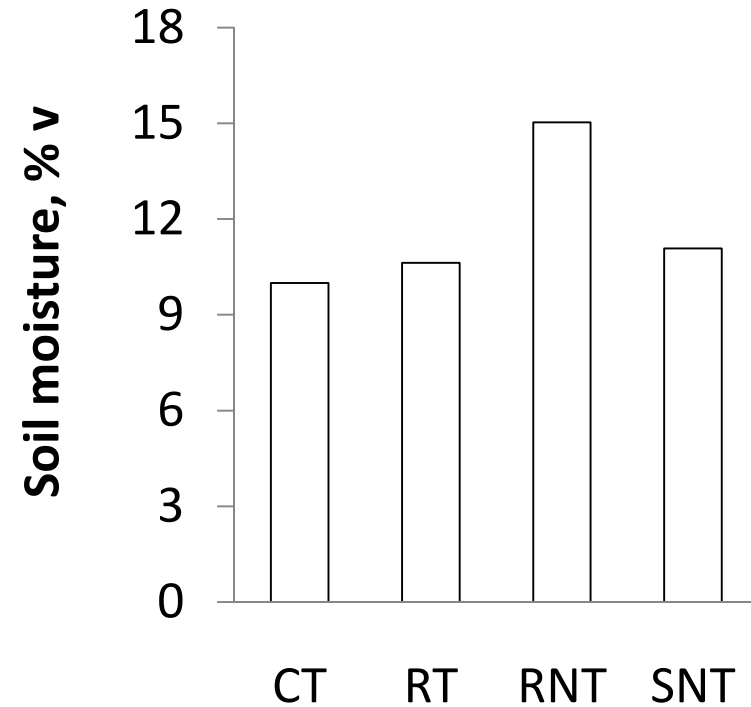
In situ water conservation



Pigeon pea	Runoff ,mm
Conventional	64
Conventional+ Intercrop	52
Paired row with furrow	6.2
Paired row with furrow+ Intercrop	4.4

Pigeon pea system	Pigeon pea Equi. yields Kg/ha
Conventional	1900
Conventional+ Intercrop	1700
Paired row with furrow	2200
Paired row with furrow+ Intercrop	2270

Improved Machinery for Crop Residue Management



Improved Machinery for Crop Residue Management



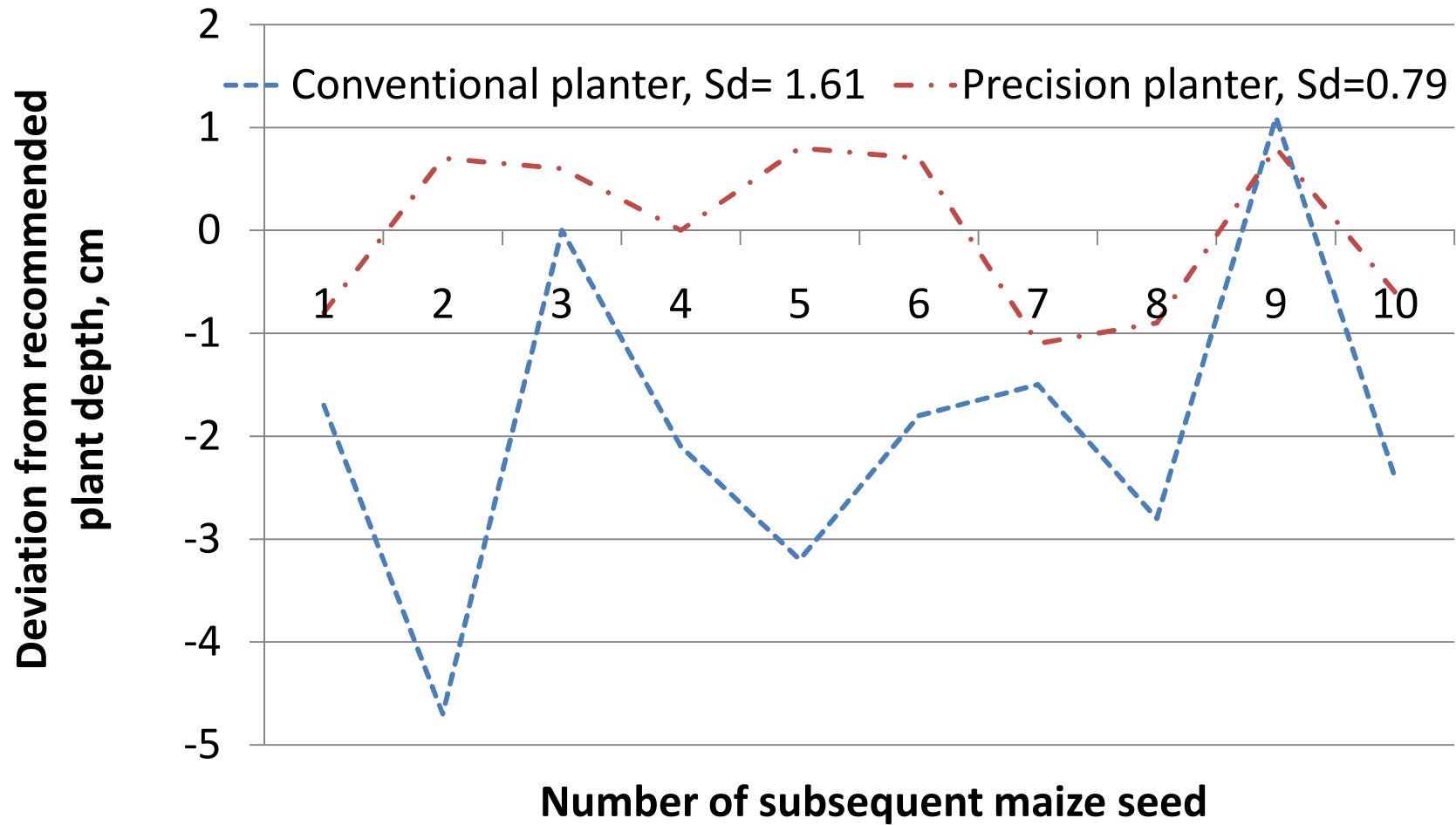
Incorporation efficiency: 78%
Chopping efficiency: 70%
Rotor speed: 3.6 m/s

CRIDA Precision planter cum herbicide applicator for conservation agriculture

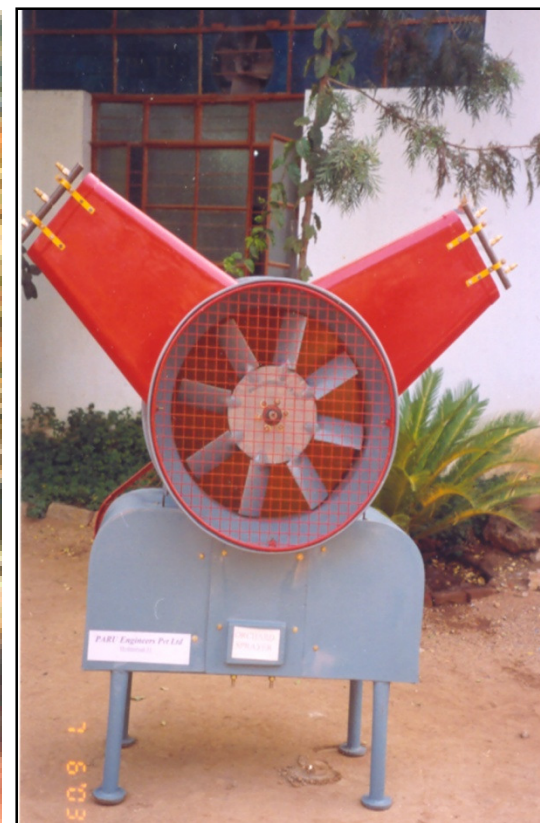


- It can do three operations at a time viz., seed sowing, fertilizer application and herbicide spraying.
- It can work well in two way sloppy lands because of individually operated spring loaded tines.
- Separate seed and fertilizer boxes are available for inter-cropping.
- Separate seed metering plates are available for different crops.
- Field coverage about 0.48 hectare/ hour.
- The cost of operation Rs.1250/- per hectare.

Performance of Precision planter



Improved Orchard Sprayer



Air carries the atomized fine spray deep in canopy,
Saving in chemical spray (48%), cost of operation (55%) timely
spray,

Development of small harvesters for dryland crops



- ✓ Newly designed single row self propelled Harvester in action
- ✓ 6.5 h.p. petrol engine with 45 cm cutting Row space with horizontal disc blade

Newly developed mini tractor mounted harvester



Prototype is
Ready for
commercialization

Custom Hiring Center: A strategy for promotion of Improved Implements



- Established in 100 KVK villages under National Initiative on Climate Resilient Agriculture
- Operated by Village Climate Risk Management Committee
- There are 27 different types of farm machinery stocked in 100 CHC
- Each Centre was established at a capital cost of Rs 6.25 Lakh funded by NICRA Project

Monitoring and Technical Back-up



Revenue generated from CHC



Zone	KVKs (Number)	Revenue (Rs)
I	12	164540
II	15	284822
III	17	341955
IV	13	94158
V	13	332124
VI	7	519605
VII	14	437986
VIII	9	422648
Total	100	2597838

Impact of CHC



- ❖ Demonstration of In-situ conservation of soil and water sowing across the slop in 10 ha area covering 25 farmers resulted in 11-13% in soybean yield (Nandurbar, MS)
- ❖ Use of BBF planter for soybean crop avoided damage to the crop due to excess rainfall in kharif, 2013 and realized about 40% more yield compared conventional sowing (Datia, MP)
- ❖ Demonstration of zero till after harvest of rice in 25 ha covering 105 farmers, zero tillage saved cost of field preparation and increased 15% grain yield (Aurangabad, Bihar)
- ❖ Furrow irrigated raised bed system for wheat cultivation was promoted to enhance crop yield (10-15%) in 40 farmers field. It saved 25% seed, and 30% irrigation water (Kota, Rajasthan)

Way Forward

Use of improved farm implements and agricultural practices can enhance inclusive growth of farmers in dryland through increased crop yield and reduced cost of operation and custom hiring service makes the implements accessible to the farmers at affordable rental price

Thank you