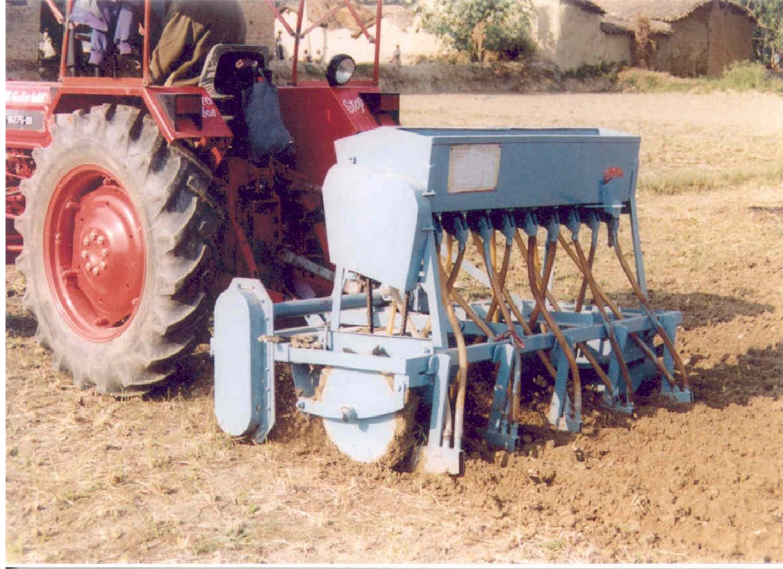


**CUSTOM HIRING OF TRACTOR DRAWN ZERO TILL
SEED-CUM-FERTILIZER DRILL IN HARYANA STATE**



All India Coordinated Research Project on
FARM IMPLEMENTS AND MACHINERY
Central Institute of Agricultural Engineering
Nabi Bagh, Berasia Road, Bhopal - 462 038 India

**CUSTOM HIRING OF TRACTOR DRAWN ZERO TILL SEED-CUM-FERTILIZER DRILL IN
HARYANA STATE**

- Year : **2006**
- Published by : **Coordinating Cell
AICRP ON FARM IMPLEMENTS AND
MACHINERY
CENTRAL INSTITUTE OF AGRICULTURAL
ENGINEERING
Nabi Bagh, Berasia Road
Bhopal-462 038, India**
- Compilation and editing : **N.K.Bansal,
V.P.Behl,
CCS HAU, Hisar**
- MM Pandey
CR Mehta
RK Tiwari
CIAE, Bhopal**
- Art, Cartography & Proof Reading : **RK Tiwari
Yashwant Bhokardankar
CIAE, Bhopal**
- Word Processing : **Zackaria V John
CIAE, Bhopal**
- Reprography : **Radheyshyam Kushwaha
CIAE, BHOPAL**

CUSTOM HIRING OF TRACTOR DRAWN ZERO TILL SEED- CUM -FERTILIZER DRILL IN HARYANA STATE

Introduction

Haryana is one of the important rice- wheat growing State. This has been made possible through increase in area under the crop and through the adoption of new crop production technology, and the area under wheat crop is 2.3 million ha.

The feasibility trials undertaken in CCS Haryana Agricultural University, Hisar have indicated that the no-tillage system of planting of wheat crop is very cost effective and the crop yields obtained are quite comparable.

Traditional Practices for Wheat Sowing

Wheat sowing by conventional methods requires large number of tillage operations to prepare a fine seed bed after paddy harvesting. Moreover shortage of time from paddy harvest to wheat sowing creates uncertainty and delay in sowing, which results in poor crop yields.

Necessity for promotion

Keeping in view the limitations of time and high expense of energy required in the conventional tillage system for wheat sowing, the feasibility of no-till sowing of wheat crop assumes significance.

Salient features

The machine is used to sow the crop directly into the uncultivated field just after the harvest of previous crop (rice). It is a nine/eleven-row unit consisting of fluted rollers for metering of seeds and vertical rotors over adjustable openings/variable hole-mesh type for metering of fertilizer. The ground drive wheel supply power through sprocket and chain for metering of seed and fertilizer. The furrow openers are of inverted 'T' type spaced at 200 mm row spacings. The machine is operated by a 26 kW tractor. The salient features are described in Fig. 1

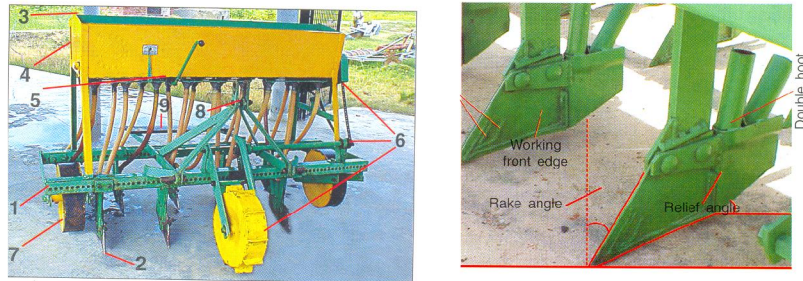


Fig.1. Zero-Till Seed-cum-Fertilizer Drill and its major components.

- 1 Main frame
- 2 Diamond tip of furrow / slit opener
- 3 Seed and fertilizer boxes
- 4 Seed metering device
- 5 Fertilizer metering device
- 6 Power transmission unit
- 7 Depth control side wheels
- 8 Hitch points
- 9 Iron / wooden platform or stand

Status and adoption level of Custom Hiring of Zero Till Seed-cum-Fertilizer Drill

The studies conducted in CCS, Haryana Agricultural University, Hisar revealed that the machine is quite effective for sowing wheat crop after paddy without any tillage operation. Tractor drawn zero till drill was propagated in Rice wheat system and rural youth and farmers were encouraged & motivated to adopt this machine on custom hiring basis as an income generation activity.

The farmers and young unemployed rural youths have already purchased 8480 zero till seed cum fertilizer drills till 2005-06 (Table 1).

Table 1 Number of zero till seed cum fertilizer drills in Haryana

Year	Number of zero till seed cum fertilizer drills
2001-02	1038
2002-03	1952
2003-04	2464
2004-05	1526
2005-06	1500
Total	8480

Source: Office of Additional Director of Agricultural Engineering, Panchkula, Haryana.

Success of Zero till Seed-cum-Fertilizer Drill on Custom Hiring

CCS Haryana Agricultural University has undertaken intensive research and large scale demonstrations at farmer's fields in the use of no-till seed-cum-fertilizer drill which can accomplish sowing of wheat crop without any tillage operation. Thus, the machine not only saves on tillage costs and energy but eliminates time on seed bed preparation. The crop yields obtained are at par with farmer's practice or even sometimes higher. Weed management of fields planted by no-till drill is much more effective.

The economics of Zero Till Seed cum Fertilizer Drill for the year 2004-05 for custom hiring is given in Table 2. The entrepreneurs/farmers are charging on custom hiring an average of Rs. 900 per hectare. Total Earning is estimated to be Rs. 10000-12000 per year and the pay back period of the machine is two years. There is about 70% -80% saving in fuel. The capacity of machine is 0.4ha/h. The price of machine is Rs. 16000/-. The average area covered by an entrepreneur was 50 hectares per year. The total area covered by zero till drill in Haryana was about 1.0 lac hectares in 2004 and about four lacs hectares in 2005. It saved Rs. 2500-3000/- per hectare in the cost of wheat production. There are about 25 manufacturers engaged in the Production of No-till seed-cum-fertilizer drill.

Table 2 Economics of Zero till Seed cum Fertilizer Drill year 2004-05 on custom hiring

Particulars	Wheat sowing
Field capacity (ha/h)	0.4
Fuel consumed (l/hr)	3.5
Rate of hiring (Rs/ha)	900
Area covered on hiring (ha)	50
Returns (Rs/year)	37,500- 45,000
Expenditure (Rs/ha) (Rs/year)	675 33750
Net saving (Rs/year)	11250
Cost of machine (Rs)	16,000
Pay back period	Two years



Fig.1 Zero Till Seed cum Fertilizer Drill in operation for sowing wheat crop



Fig.2 Wheat crop sown with Zero Till Seed cum Fertilizer Drill



Fig. 3 Field emergence of wheat crop sown with Zero till Seed cum Fertilizer Drill



Fig. 4 Wheat crop sown by zero till drill



Fig. 5. Plants establishment of wheat crop sown by zero till drill

Feedback from Farmers

1. Timeliness in sowing 7-8 days earlier than traditional
2. Saves 60-75 liters HSD per hectare which resulted in saving of natural resources and environment
3. 30-40% less infestation of weeds
4. Saves irrigation water up to 10-15% during first irrigation
5. Two days early and uniform germination and better plant stand than traditional
6. No crust formation after rains. Hence, no effect of rains on germination
7. Improvement in crop yield
8. Improvement in soil structure and fertility
9. No lodging of crops at the time of maturity in case of heavy rains and winds
10. Machine is simple and easy to operate

Specifications

Type of drive	Ground wheel through sprocket chain arrangement
Side drive	Single
type of furrow opener	Inverted T-Type
Cutting portion of furrow opener	8mm thick high carbon steel bit welded
Rake angle , degrees	20.0
Relief / clearance angle, degrees	5.0
Width of machine	9 to 13 tines
Tractor hp required	35-45
Machine size (LxWxH), mm	1800x600x1100
Size of frame (LxWxT), mm	65x65x5
Seed metering device	Fluted feed roller of die casted aluminum. No. of flutes=10
Fertilizer metering device	forced feed gravity type with adjustable hole and vertical rotor agitator
Ground wheel:	Front mounted – floating type with lugs on wheel periphery. size: Diameter = 380mm Width = 105mm No.of lugs = 10 height of lug = 30mm Lug angle = 90 ⁰
Over all weight, kg	250-260
Field capacity (ha/hr)	0.4
Cost of machine, Rs.	16,000/-

Appendix-II

List of manufacturers

1. National Agro Industries, Link Road, Industrial area, Ludhiana-141 003 (Punjab)
2. ASS foundry & Agril. Works, G.T.Road, Jandiala Guru, Amritsar-143 115, Punjab
3. Kamla Engineering Works, Ismailabad, Distt. Kurukshetra (Haryana) Phone:252164
- 3 Ashoka Farming and Engineering Works, Shabad Markanda, Kurukeshtra, Haryana
- 4 Narwal Engineering Works, Shabad Markanda, Kurukeshtra, Haryana
- 5 Guru Nanak Krishi Udyog, Pehowa, Kurukeshtra, Haryana
- 6 Guru Nanak Khalsa Engineering Works, Pehowa, Kurukeshtra, Haryana
- 7 Kadian Engineering Works, Kaithal, Haryana
- 8 Guru Nanak Foundry and Engineering Works, Kaithal,, Haryana
- 9 Jhandu Engineering Works, Ambala, Haryana
- 10 Super Agricultural Industries, Karnal, Haryana
- 11 Beri krishi udyog, Karnal, Haryana
- 12 Darshan Singh Agril. Works, Karnal, Haryana
- 13 Pyra Singh, Agril. Works Karnal, Haryana
- 14 Bharat Agril. Industries, Karnal, Haryana
- 15 Sarswati krishi Udyog Assandh, Karnal, Haryana
- 16 Punni Agricultural Works, Tohana, Haryana
- 17 Punjab Engineering Works. Talwandi Bhai, Ferojpur, Punjab
- 18 Panishar Agricultural Works, Amargarh, Punjab
- 19 Malwa Agro Industries, Ludhiana, Punjab
- 20 Doaba Agricultural Works, Sitarganj, U.S. Magar, Uttaranchal
- 21 Tyagi Agro Industries, Kitcha, U.S. Nagar, Uttaranchal
- 22 Hans Engineering Works, Suraj Kund Road, Phool Bagh colony, Meerut, U.P
- 23 The Oriental Science Apparatus Workshop(OSAW), Jawahar Lal Nehru Marg, Ambala cantt.-133 001, Haryana
- 24 Amar Agricultural Implements works, Amar Street, Janta nagar Gill Road, Ludhiana-141 003, Punjab
- 25 The Principal Investigator, Revolving Fund Scheme, Prototype Production Centre, CIAE, Nabi Bagh, Bersia Road, Bhopal 462 038, MP
- 26 The Principal Investigator, Revolving fund scheme, Department of Farm Power & Machinery, College of Technology, G.B. Pant University of Agric. & Technology, Pantnagar-263 145.