NATIONAL GRAIN LEGUME PROGRAMME

PUSH - PULL
SEEDER UNIT
EQUIPMENT FOR THE SMALL FARMER

SIMON BOLIVAR FUND
GEORGETOWN, GUYANA
JANUARY, 1978

INTER – AMERICAN INSTITUTE OF AGRICULTURAL SCIENCIES – OAS

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PUSH - PULL SEEDER UNIT EQUIPMENT FOR THE SMALL FARMER

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INTRODUCTION

Single row manually propelled planting machines are capable of planting a wide range of vegetable seeds in continuous rows. They are designed to meet the needs of the small farmer and can be used for the establishment of most direct-seeded crops. However, these machines of which the Planet Jr. 300A Seeder is an example, are designed for use by one operator.

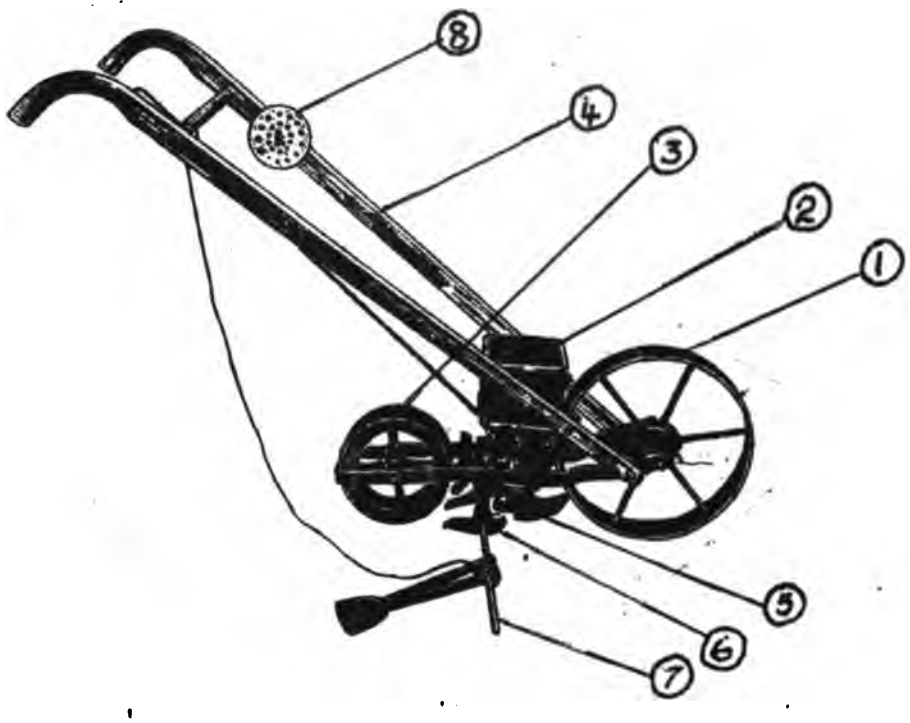
In Guyana use of such a machine by a single operator particularly in heavy coastal clay soils, causes extreme operator fatigue and makes it difficult for the operator to maintain straight rows. This is possibly the main reason why such machines are not used with greater frequency by small farmers.

In an effort to make the Planet Jr. 300A Seeder unit more effective under conditions which exist in Guyana, a simple modification was made to permit its use by two operators.

This paper reports on the modification and its effectiveness.

/Fig. 1 .....

FIG. 1 - PLANET JR. NO. 300A SEEDER.



(1) Drive Wheel

(2) Seed Hopper

(3) Press Wheel

(4) Handle

(5) Plough

(6) Coverer

(7) Row Marker

(8) Extra Seed Plate

/Description .....

DESCRIPTION OF SEEDER UNIT BEFORE MODIFICATION

The seeder unit (Fig. 1) is made up of a light frame-work with a centrally mounted seed hopper. In the forward position there is a drive-wheel and at the rear is a smaller press-wheel. A horizontal drive shaft geared to the front drive wheel operates an agitator inside the seed hopper permitting a controlled flow of seed to pass through the seed plate and into the shallow furrow formed by the plough.

Adjustments can be made to the seed rate by selection of the appropriate seed plate and the hole position of the plate based on the size of the seed to be planted. Depth of planting and seed coverage also can be regulated by vertical movement of the plough. Propulsion is manual and designed to be operated by one person pushing the machine.

Other features include seed shut-off mechanism and row marker.

/Modification .....

MODIFICATION

The modification of the seeder unit simply meant the addition of a pair of handles or shafts secured to the frame of the seeder and hinged to maintain an even pull. These handles were fitted in such a way that they can easily be removed if necessary (Fig. 2).

The modification can be applied to either a push-type seeder unit, combined fertilizer-seeder unit or similar row crop equipment. It is intended to reduce operator fatigue. In addition, it reduces the amount of concentration required by one operator to maintain a good seed-rate, correct spacing and the neatness of row normally associated with good agricultural practices.

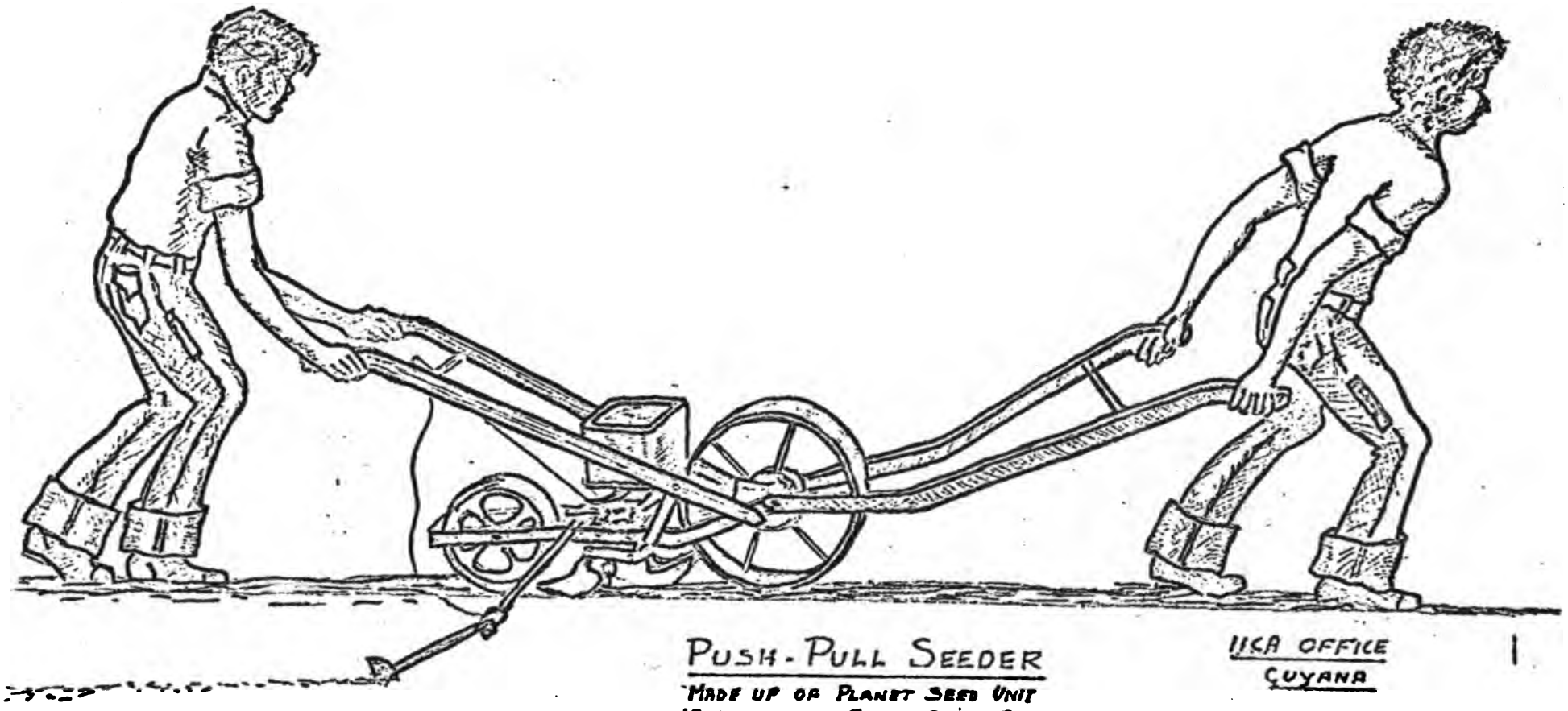
The addition of the front handles is relatively simple and inexpensive and can be carried out by a blacksmith or small engineering workshop.

It involves welding two lugs onto the frame-work

/of the seed .....

of the seed unit on either side and as near as possible to the axle of the drive-wheel. A hole about 3/8" (1 cm) diameter is needed in each lug to receive the handles which will pivot at this point. The length of the handles will vary depending on the size and construction of the seed unit but should not be longer than five feet. The handles can be made either of wood or steel but must be as light as possible and braced together for strength and ease of use.

/Fig. 2 .....



PUSH-PULL SEEDER

IICA OFFICE
GUYANA

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MADE UP OF PLANET SEED UNIT
FITTED WITH FRONT TOWING ARMS

RESULT :-

1 - REDUCED OPERATOR FATIGUE
2 - INCREASED OUTPUT
3 - IMPROVED PRECISION PLANTING

FIELD TESTS

Preliminary field tests were carried out at Yakusari, Black Bush Polder, on a clay soil. The field which was laid out in cambered beds approximately 566 yards (518 m) long and 15 yards (13.7 m) wide, had been previously prepared as follows:

Ploughing by 35 H.P. Tractor and Disc Plough - 1 cut

Chipping by 35 H.P. Tractor and Disc Harrows - 2 cuts

Rotovating by 35 H.P. Tractor and Howard Rotovator - 1 cut

The seed bed was reasonably good but could have been improved so far as levelling was concerned. The tilth ranged from lumps about 2 inches (5 cm) in diameter to fine soil and conditions for planting at the time were considered good.

Using cowpea (blackeye) planted in 2 feet (61 cm) rows with seed spacing along the row of about 4 inches (10cm), four men working in pairs and alternating were able to plant a total of 7.5 acres (3 ha) in 16 hours.

/Inspection .....

Inspection of the planted area some two weeks later revealed that the planting made with the machine was quite successful. Evenness of germination and row spacings indicated very good control by the operators. It should be noted also that the machine has since been used by young school children and at least two farmers in the Black Bush Polder area with good results.

It is proposed to conduct a number of tests during 1978 to compare hand planting with both the modified and unmodified versions of this machine.

/Operating Procedures .....

OPERATING PROCEDURES

As is the case with all seeder units, reasonable care must be taken in the preparation of the seed-bed. Time must also be taken to mark out the first row and this is normally accomplished by aligning stakes spaced at regular intervals in the field. For the initial runs, set the seeder unit in accordance with the chart provided by the manufacturers. Check that the unit is sowing at the desired depth and seed-rate and adjust as necessary.

The Push-Pull Seeder unit can be operated at good walking pace (2 MPH) with the leading operator concentrating on good spacing and straight rows, as well as sharing the task of propelling the seed-unit along. The row marker is pivotted centrally and can be operated from either side as need be. The operator at the rear end can concentrate on keeping the unit firmly on the ground and observing the seed-flow to detect any blockage that may occur. In order that both operators can appreciate the requirements of each other and the unit, it is advisable to change positions from time to time.

/Advantages .....

ADVANTAGES

The main advantages which accrue from use of the unit are:

(1) Reduced operator fatigue.

(2) Increased output per man hour.

(3) Improved precision in planting.

/Summary of test .....

SUMMARY OF TEST PERFORMANCE

Date	28/10/77 - 1/12/77
Location	Yakusari Demonstration Plot, Black Bush Polder.
Soil Type	Clay
Field Conditions	Suitable for planting
Crop Planted	Black eye peas
Power	Human traction (2 persons)
Test Performance	
Field area	566 yds (518 m) x 63 yds (58 m) = 7.5 acres (3 ha)
Length of Row	566 yds. (518 m)
Planting Time	16 hours (7.5 acres (3 ha)
No. of Operators	4 (2 + 2 alternating)
Man Hours	16 x 4 = 64
Man Hours/Acre	64/7.5 = 8.5
Labour Cost/Acre	8.5 at $8.40/day ..... $ 8.925
Depreciation Costs	Cost of Seeder ..... G$482.00
	Cost of Modification .. 78.00
	Total 560.00
	Dep. over 10 years - $\frac{560}{10}$ = $56.00
	Cost/acre @ 14 acres/year (a)-$\frac{56}{14}$ = 4.00
	Total expenses per acre (labour and machinery) $12.925

(a) Fourteen acres chosen as it approximates the average family farm size in the Black Bush Polder area