

Drudgery Reduction Tools for Women at Farms

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Abstract

Agriculture has important place in Indian economy and main work force in it is human power. The women work force in agriculture and allied sectors is estimated to be around 91 million which amounts to about 39% of the total rural workers in the country. The tools/equipment available for different farming operations are earlier designed for men workers keeping in mind male dominance in Indian agriculture environment and same was given to women despite their suitability to work. However, women face different technological difficulties in operating these tools, thereby causing serious occupational health problems and ultimately reducing work efficiency. Most of the activity where women are involved include sowing, transplanting, weeding, harvesting, threshing, and winnowing which are very drudgery prone. The traditional tools used by women workers involves operating in bending or squatting posture which cause drudgery and lead to serious health issues such as back pain, knee pain and sometime also causes injury to women operating it. Therefore, there is need to develop tools/equipment considering women suitability to work.

Introduction

A number of farm-tools and implements have been designed and developed by research organisations and state agriculture universities and some of which are listed below with brief description.

1. Hand Ridger

It is used for making ridges/furrows. It consists of ridger and pulling beam with T-type handle. The equipment is operated by two women workers, one for pulling and another for pushing and guiding. The capacity of this machine is about 330 m²/hr.

2. Seed Treatment Drum

It is used for uniform mixing of chemicals in seeds for its treatment before sowing. It consists of frame, handle and cylindrical drum. The cylindrical drum is mounted on a tri-pod angle iron frame. After adding chemicals in drum, add little water, close the lid of drum tightly and rotate the drum for 20 to 25 revolutions. Due care should be taken while mixing the chemicals. After 1-2 minutes of mixing, open the lid and take the treated seed in a separate container. A batch of 20 kg seeds takes about 5-6 minutes for complete operation. The capacity of this machine is about 200 kg/hr.

3. Seed Drill

It is used for row sowing seeds of wheat, soybean, maize, gram, pigeon pea etc. It consists of a handle, hopper for seed and fertilizer, peg type ground wheel, a roller with cells and a hook for pulling the drill. The metering roller is directly mounted on the ground wheel shaft. The seed drill is operated by two workers, i.e. one for pulling and another for pushing and guiding. A rope is tied to hook provided in front of the seed drill for pulling. The capacity of this machine is about 430 m²/hr.

4. Naveen Dibbler

It is used for dibbling bold (like maize, soybean) or costly/scarce seeds in less area and for gap filling purpose. It consists of jaw type seed placement device, cell type metering mechanism, lever type power transmission system for roller and jaws and seed box with delivery system. After filling the desired seed to be sown in field, the worker should keep the dibbler at desired place and gently push the lever (front of dibbler) for opening the jaw so that seed may drop. The capacity of this machine is about 150 m²/hr.

5. Grubber Weeder

It is used for weeding and intercultural operations in row crops like soybean, pigeon pea, rapeseed, chickpea etc. It is a simple and light weight, manually operated equipment for weeding and interculture in upland row crops. It consists of long handle, ferrule, three tyres and sweep type blades. The operator uses pull force to break the soil crust and uproot the weeds. The output of the equipment is 70 m²/h.

6. Fertilizer Broadcaster

It is used for uniform application of granular fertilizer in field. It consists of a hopper with agitator, spreading disk, gear, crank with handle, rear cushioning pad and straps with shoulder pad for mounting. The broadcaster needs to be cross-mounted, as it is belly-mounted equipment. A woman worker should start the broadcasting work keeping 2.5 m away from bund of field and maintaining 5 m spacing during the operation in subsequent passes. The capacity of this machine is about 1.15 ha/hr.

7. Four-Row Paddy Drum Seeder

It is used for line sowing of sprouted paddy seeds in puddled field. It consists of drive wheels with lugs, drive shaft, hyperboloid shaped drums and swinging type pulling beam. The hyperboloid shaped drum enables free flow of seed towards the metering holes. In between two holes a baffle is provided for filling the drum with seeds. A swinging handle is provided with the unit for pulling the seeder. The drum may be filled with pre-germinated/sprouted paddy seeds to its half of capacity. The equipment is operated at a walking speed of 1-1.5 km/h in the puddled field. The capacity of this machine is about 920 m² /hr.

8. Two-Row Rice Transplanter

It is used for transplanting of 20–25 days old mat type rice seedlings at 3-4 leaf stage in four rows simultaneously under puddled conditions. It consists of frame, floats, seedling tray, operating handle, fingers (pickers), tray drive unit and depth control mechanism. Capacity of this machine is about 245 m²/hr.

9. Cono-weeder

It is used for uprooting and burying of weeds in between standing rows of rice crop in wetlands. The two truncated rollers one behind other are fitted at the bottom of a long handle. The conical rollers have serrated blades on the periphery. A float provided in front portion prevents the unit from sinking into the soil. It disturbs the top soil and increases aeration also. The equipment is operated in standing posture thus avoiding bending involved during uprooting of weeds by hands in traditional practice. The capacity of this machine is about 120 m²/ hr.

10. Twin Wheel Hoe

It is used for weeding and intercultural in upland row crops in black soil region. It consists of

two wheels, frame, V-blade fixed on a tyne, U-clamp and a handle. The cutting and uprooting of weeds in field is done through push and pull type action of the equipment. The equipment is operated at optimum soil moisture condition and preferably after 20-25 days of sowing i.e. when the weeds are about 1 to 3 cm height for better weeding performance. The capacity of this machine is about 150 m²/ hr.

11. Improved Sickle

It is used for harvesting of wheat, rice, soybean, chickpea, grasses and thin stalked crops. It consists of serrated blade, ferrule and wooden handle. The cutting of crop stalk is being done with the improved (serrated) sickle by sawing action as against by impact or pulling action in case of local (plain) sickle. The capacity of this machine is about 150 m²/hr.

AGRI GOLD SWARNA SEDYAM

12. Sugarcane Stripper

It is used for stripping of leaves and detopping of cane after harvest of sugarcane. The stripper works by separating and pushing the leaf sheaths away from stalk. A knife is welded on the stem of the stripper for detopping of canes and for cleaning roots. The capacity of this machine is about 46 kg/hr.

13. Bhindi Plucker

It is used to protect worker from thorny/chemical materials during bhindi harvesting. It is a tool which helps on plucking of Bhindi (Lady's finger) without causing any itching or discomfort to skin. It fits into the hand properly, with the help of two rings - one in thumb and another in little finger. Force to cut the pedicel is exerted by pressing these two fingers together.

14. Tea Plucker Scissors-type

It is used for plucking tea leaves. While plucking tea leaves skin of fingers and hands get injuries due to chemicals. In scissors type tea plucker hand/finger contact is avoided thereby eliminating skin problem. The capacity of this plucker is 8.6 kg/h.

15. Fruit Harvester

It is used for plucking of fruits from orchard trees. It consists of main body of PVC having cylindrical shape. The upper end of the body is closed and fixed with two fingers cut in V-shape and with sharp blades. An opening is provided on the body for entry of the fruits to be harvested. The length of the cutting blade was increased from 30 mm to 70 mm to increase the comfort of the worker. The capacity of this machine is about 420 fruits /hr.

16. Senna leaves stripper

It is used for stripping of senna leaves. It consists of an openable metallic tube with a circular cutter mechanism at center. The device is easy to operate and protects hands of operator from Senna thorns.

17. Cotton Picker (Battery operated)

It is a hand operated cotton picking machine and is operated by a light weight 12V battery. Output capacity of cotton picker varied from 17.0-22.6 kg/day.

18. Groundnut Stripper

It is used for stripping on groundnut pods. It consists of a square frame of vertical legs and a horizontal strip of expanded metal fixed on each side of the frame in the form of comb. The stripping of the pods is accomplished by drawing a handful of vines across the comb with a slight force. The structure facilitates its use by four women simultaneously. A small adjustable stool was fabricated for the operator to sit and perform the stripping operation. The capacity of this machine is about 11 kg/hr/women.

19. Groundnut Decorticator (Sitting & Standing type)

It is used for separating kernels from groundnut pods. A groundnut decorticator is an oscillatory type device having cast iron shoes with projections for decortication of groundnut pods. It consists of frame, handle, oscillating arm and sieve with oblong hole. It is operated by a woman worker in sitting and standing posture. A stool is provided on a wooden platform for sitting type. The pods are fed in batches of nearly 1.5 kg i.e. up to half of its hopper capacity so that oscillating arm can easily be operated. For proper decortication, the shoes, which are mounted on oscillating arm need to be adjusted. The capacity of this machine is about 30 kg/hr.

20. Tubular Maize Sheller

It is used for shelling maize from dehusked cob. It is made of mild steel sheet and is octagonal in shape. Four tapered fins are provided in the maize sheller, which helps in shelling the maize grain from dehusked cobs. A cob is inserted into it and by twisting action shelling is achieved. The capacity of this machine is about 27 kg/hr.

21. Rotary Maize Sheller

It is used for shelling maize from dehusked cob by hand cranking. It consists of a frame, a flywheel, a hopper and three shelling gears. With one hand a person operates the equipment whereas cobs are fed by the other hand one by one. The shelled cobs come out through the port on other side. The capacity of this machine is about 73 kg/hr.

22. Pedal Operated Paddy Thresher

It is used for threshing of paddy. This thresher consists of a cylinder with wooden/aluminum strips. The wire loops are embedded/ welded on these strips. The cylinder is given a rotary motion from the foot pedal through a power transmission system. The paddy bundles are threshed with hold method. The capacity of this machine is about 35 kg/hr.

23. Hanging Type Grain Cleaner With Sack Holder

It is used for separating impurities like stubbles, chaff, dirt and broken pieces received with grain after threshing. It consists of main frame, grading screen, draper rod, rubber grip over handle and shutter. The unit is hung on any elevated point or hooks attached to the ceiling with ropes. It is operated in oscillating mode. The handle height of cleaner from ground should be at waist height of operator. The capacity of this machine is about 225 kg/hr.

24. Cotton Stalk Puller (Wheel Type)

It is used to uproot cotton plant stalks from soil. It consists of long handle designed in such a way that when the handle is moved downwards, the front jaws firmly hold the stalk due to press plate hinged at the bottom of the main frame. On further downward movement the press plate acts as a pivot and the front jaw portion gets lifted up along the stalk. Once the operation is over the press plate comes to its original position with help of a tension spring fitted between press

plate and mainframe. The unit can easily be moved to next plant with the help of ground wheel. The capacity of this machine is about 280 m²/hr.

25. Cotton Stalk Puller (Jaw Type)

It is used to uproot cotton plant stalks from soil. The cotton stalk puller consists of long handle designed in such a way that when the handle is moved downwards, the front jaws firmly hold the stalk due to press plate hinged at the bottom of the main frame. On further downward movement the press plate acts as a pivot and the front jaw portion gets lifted up along the stalk. Once the operation is over the press plate comes to its original position with help of a tension spring fitted between press plate and mainframe. The unit can easily be moved to next plant with the help of ground wheel. The capacity of this machine is about 46 m²/hr.

26. Diaphragm Pedal Pump

It is used for lifting water from low head for irrigation purpose. It is a foot operated diaphragm pump where diaphragm is used for pumping action. The pump is mounted on a frame and it has two long pedal levers. With the help of a bamboo stand erected near the pump, a person puts her feet on two pedals alternatively, thus operating the pump. It is a simple walking in standing posture where body weight is used for pumping operation. The capacity of this machine is about 3291 l/hr.

27. Paddy Winnower

It is used for cleaning grain after harvesting. It consists of main frame, handle, gear mechanism, volute case, fan, hopper, outlets for clean grain.

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