Indian Farming **70**(04): 27–28; April 2020

Customised tools for farm women

for rice cultivation

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Most of the tools available for agriculture operations are designed for male workers and are not suitable for women workers as their design is not streamlined to the ergonomical characteristics of the women. This article describes improved tools and equipment that have been developed especially for women workers involved in rice cultivation.

Keywords: Ergonomical, Farm women, Rice cultivation, Seeder, Transplanter, Thresher, Weeder, Winnower

AGRICULTURE is the mainstay of Indian economy. The women work force in agriculture and allied sectors is estimated to be around 97 million, which is 37% of the total agricultural workers in the country. Generally, the tools/equipment available for different farming operations are mainly designed for male workers and the same are given to women without giving any consideration about suitability of these tools to them. As a result, output is lower and many occupational health problems crop up. Women have different ergonomical characteristics than men and therefore, it is necessary that while developing tools/equipment for women workers, their capabilities and limitations are given due consideration so as to have more output, higher work efficiency and better safety.

Rice is a major food crop in India covering about 44 million ha and its production is about 105 million tonnes per year. Operations included in rice cultivation are sowing, transplanting, weeding, harvesting, threshing and winnowing, and involves a lot of drudgery. Women are extensively involved in all these operations. In rice farming, a woman has to bend over 2.5 lakh times for transplanting rice seedling in one hectare area which causes a lot of drudgery as well as occupational health problems. Similar is the case with other operations namely weeding, threshing, winnowing etc. Realizing the importance of women workers in rice cultivation, improved tools and equipment suitable for women workers have been developed. Brief information about these tools and equipment is given in this article.

Four-row direct paddy seeder

Function: For line sowing of sprouted paddy seeds in puddled field.

Description: It is developed by TNAU, Coimbatore center of AICRP on ESA. It consists of drive wheels with lugs, drive shaft, hyperboloid shaped drums and swinging type pulling beam. The drum has 18 holes of 10 mm dia. each for dropping the sprouted seeds in puddled field. About 40-50 kg/ha of seeds are required for sowing. The seeds are dipped in salt solution (1-2 teaspoon salt/litre of water) so that damaged seeds floating on water surface are removed. The seeds are then washed with normal water and soaked for 24 hours. The seeds are then taken out in a jute bag and kept in a dark and warm place with frequent sprinkling of water on the jute bag. The jute bag is opened on next morning and these sprouted seeds are used for sowing with the seeder.

The drum is filled with sprouted paddy seeds to half of its capacity. Then the lid of the drum is closed and locked. The seeder is operated at a walking speed of 1-1.5 km/h in the puddled field. During the operation, the seeds get dropped through the holes. Here, 20 cm row-to-row spacing is maintained. The capacity

Four-row direct paddy seeder

Three-row rice transplanter

Cono weeder

Improved sickle

Pedal operated paddy thresher

of the equipment is 0.06 ha/h. The weight of equipment is about 8 kg and its cost is about ₹ 3,800.

Benefits over traditional method: More than 50% seed saving is achieved with this rice seeder as compared to traditional method of broadcasting. Also, as line sowing is done, it promotes use of mechanical weeder thereby reducing drudgery and cost involved in weeding operation.

Three-row rice transplanter

Function: For transplanting of 20–25 days old mat type rice seedlings at 3-4 leaf stage in three rows simultaneously.

Description: It is developed by OUAT, Bhubaneswar center of AICRP on ESA. It consists of frame, floats, seedling tray, operating handle, fingers (pickers), tray drive unit and depth control mechanism. The dimension of the transplanter is about 60 cm × 60 cm × 94 cm. A mat type nursery of about 22 cm in width, 60 cm in length and thickness of soil of 1.5 cm is required to operate the equipment. After puddling, excess water is drained and from next morning the equipment can be operated. For smooth sliding of mat, little quantity of water is needed to be sprinkled on the machine tray before loading the mat on it. After lifting the operating handle, it may be pushed down gently to push the seedlings kept in tray for transplanting. A worker has to walk backward for operating the rice transplanter and pulls it after every stroke. The seedlings mats may reloaded on the tray of equipment when seedlings are about to exhaust. After completion of each day of work, the transplanter may be washed with water. The field capacity is about 0.015 ha/h. The weight of equipment is about 18 kg and its cost is about ₹ 8,500.

Benefits over traditional method: There is 70% saving in cardiac cost of worker per unit area with paddy transplanter. So, the productivity of workers is increased by 282% compared to traditional way of transplanting. It also avoids bending posture which is usually adopted in traditional method.

Cono weeder

Function: For uprooting and burying of weeds in between standing rows of rice crop in wetlands.

Description: It is developed by TNAU, Coimbatore center of AICRP on ESA. The two truncated rollers one behind other are fitted at the bottom of a long T type handle. To prevent the unit from sinking into the soil a float is provided in front portion of unit. It disturbs the top soil and increases aeration also. The equipment is operated in standing posture thus avoiding bending posture involved in uprooting of weeds by hands in traditional practice. The field capacity of the equipment is 0.012 ha/h. The weight of the equipment is about 8 kg and it costs is ₹ 1,200.

Benefits over traditional method: As the equipment is operated in standing posture, it helps avoid the bending posture as in case of traditional way of weeding thus drudgery of worker is reduced and ultimately output is also increased.

Improved sickle

Function: For harvesting rice crop.

Description: It is developed by CIAE, Bhopal center of AICRP on ESA. It consists of serrated blade, ferrule and wooden handle. With this sickle (serrated) cutting of crop stalk is being done by sawing action as against the impact or pulling action in case of local (plain) sickle. This improved sickle is light in weight i.e., 180 g as compared to local one having weight of 350 g, thus reduces the drudgery during harvesting operation. The field capacity is about 0.015 ha/h and its cost is about ₹ 60.

Benefits over traditional method: With the use of improved sickle there is about 15% saving in cardiac cost of workers per unit of output as compared to local sickle. It provides safety to the worker due to its better construction. Also, serrated sickle does not require sharpening of the cutting edge.

Paddy winnower

Pedal operated paddy thresher

Function: For threshing of paddy.

Brief Description: It is developed by OUAT, Bhubaneswar center of AICRP on ESA. It consists of a cylinder with 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 by holding it on rotating drum. It gives the output of about 35 kg/h. The cost of equipment is ₹ 5,500.

Benefits over traditional method: It reduces the drudgery involved in paddy threshing operation as bending posture is avoided and arms are not to be raised above shoulder height as in case of traditional method i.e., beating on a platform/stone.

Paddy winnower

Function: For cleaning grain from impurities after harvesting.

Description: It is developed by CIAE, Bhopal center of AICRP on ESA. It consists of main frame, handle, gear mechanism, volute case, fan, hopper, outlets for clean grain and for chaff. This machine is operated by women worker in standing posture. Two women workers are required for operating machine, one woman operates the machine and other woman feeds the hopper and separates the cleaned grain. The machine can be easily operated by women while sitting on chair or stool. The capacity of this machine is about 242 kg/h and its cost is about ₹ 6,000.

Benefits over traditional method: This machine can be easily operated as there is no need of waiting for air flow as in case of traditional method. This machine can be operated under shade so that grain cannot get damaged due to rain etc.

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