Mechanization

1. Name of the technology: Colour sorter and grader for spherical fruits and vegetables

Source of technology: TNAU

Year of notification: 2022

Detail description about the technology: Colour sorter and grading machine is very useful in grading size of the fruits/nuts mango, coconut, tomato etc. and also simultaneously sorting with the colour. The capacity of machine is 40 kg/hour. It can be used for sorting either for colour / size or combing both. It enhancing the market value of commodity.

2. Name of the technology: Compound Parabolic Solar Dryer

Source of technology: TNAU

Year of notification: 2022

Detail description about the technology: Parbolic solar dryer is an excellent approach to dry the farm produce utilizing non-conventional energy. It reduces 50% reduction of drying time, retention of quality and nutritional characteristic of dried product. The product is solar dryer fetches higher value in the market.

3. Name of the technology: Domestic Solar Dryer

Source of technology: TNAU

Year of notification: 2022

Detail description about the technology: Domestic solar dryer is a small-scale household unit to dry green produce like leaves/vegetables / grains utilizing non-conventional energy. This unit facilitates reduction of half of the drying time compared to sun drying.

4. **Name of the technology:** Multi row weeder attachment to riding type rice transplanter

Source of technology: TNAU

Year of notification: 2022

Detail description about the technology: Multi-row weeder is an attachable mechanized unit to the rice transplanter. It can be used for weeding operation once or twice during vegetative stage of the paddy crop. It is an alternative to manually operated cono weeding unit. This mechanized operation will facilitate easy adoption of SRI technology. It can cover 2.5 to 3.0 hec/day.

5. **Name of the technology:** Mini Tractor operated bush cutting machine

Source of technology: TNAU

Year of notification: 2022

Detail description about the technology: Mini tractor mounted bush cutter is useful for campus cleaning and lawn maintenance. It can cut the grasses and clearing bushes in the grounds / lawns / roads etc. It can cover 0.12 hec/hour. It saves 17% of the cost than compared to manual cutting.

6. **Name of the technology:** VL Paddy Thresher use for threshing of paddy in all rice growing hill districts of Uttarakhand

Source of technology: ICAR-VPKS, Almora, Uttarakhand

Description of the technology: It is a manual-cum-power operated paddy threshing machine. The light weight pedal operated paddy thresher (VL Paddy Thresher) has been developed for hill region where the drudgery caused by the weight of the machine is a major concern. Polycarbonate sheet is used to reduce its weight to 45-50 kg, is rust proof thereby reduces the maintenance cost. The frame of the machine is made of 32 x 32 x 5 mm angle and 38/40 mm MS pipe.

Drum of the thresher is made of MS flat (25 x 3 mm), MS Sheet (1 mm) and MS angle (25 x 25 x 3 mm). The machine is manually operated by single man. The design specifications of the machine are: Length x Width x Height = 1030 x 630 x 975 mm, Weight of the machine : 35 kg, Threshing drum speed : 350 rpm

7. Name of the technology: Millet Thresher-cum-Pearler used for pearling and threshing of finger millet and barnyard millet and dehusking of barnyard millet.

Source of technology: ICAR-VPKS, Almora, Uttarakhand

Description of the technology: It works on the principal of impact and shear on the grains. The threshing drum is provided with six leather flats fitted on the six MS flats to generate mild impact, shear and abrasive action for threshing, de-husking, pearling and polishing of the grains. A sieve assembly is attached with the threshing housing to enable easy placement of sieves of different sizes for different operations. Optimum threshing and pealing efficiency is obtained at threshing drum speed of 900 rpm with crop ear heads at moisture content below 12% at the time of threshing. The specifications are:

Length x Width x Height = 1000 x 590 x 1331 mm (electric motor) Length x Width x Height = 1000 x 800 x 1331 mm (engine operated) Weight : 45 kg (without electric motor) & 55 kg (without engine).

8. Name of the technology: VL Syahi Hal used for Ploughing and planking

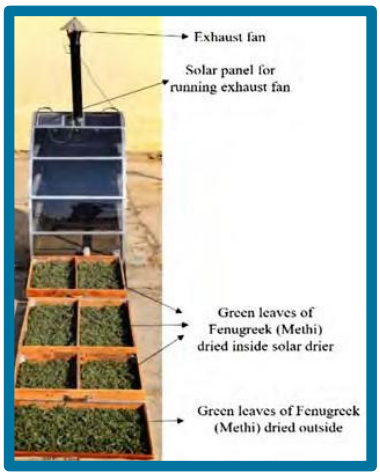
Source of technology: ICAR-VPKS, Almora, Uttarakhand

Description of the technology: An environment friendly, complete metallic plough of 11-13 kg weight (2600 mm x 1070 mm x 195 mm) with more working efficiency (150 per cent higher in

comparison to the traditionally used wooden hal). It can be used for ploughing as well as planking with arrangements to adjust the depth of ploughing as per the height of the farmer and the bullocks with safety device for wear and tear of share assembly and beam.

9. **Name of the technology:** VL Solar Dryer used for Drying of different perishable, semi-perishable and non-perishable agricultural commodities/produce/food and wet processed food material

Source of technology: ICAR-VPKS, Almora, Uttarakhand



Description of the technology: Conventionally produce/food is dried in open in hilly areas due to non- availability of domestic type solar dryer. A solar dryer, being an enclosed unit, helps to keep the agricultural commodity/produce/food safe from damage, birds, insects, and unexpected rainfall. The agricultural commodity/produce/food can be dried using solar thermal energy in a cleaner and healthier way. It can help marginalized and poor farmers who can't afford hi-tech facilities and equipments to preserve their agricultural products and to eliminate the unwanted and unpredictable food spoilage due to lack of facilities in the region. The solar dried products can be stored for longer time in less volume. A successful enterprise can be run based on this principle which can easily utilize the surplus produce facing the seasonal glut. In off seasons, the farmer can sell the dried products at higher price. There are three trays in Vivek Solar Drier. It has wheels and can easily be transported from one place to other. Since this is solar operated, the operational cost is nil.

10. **Name of the technology:** VL Seed-cum-Ferti Drill used for used for direct sowing of seeds and drilling the fertilizers

Source of technology: ICAR-VPKS, Almora, Uttarakhand

Description of the technology: VL seed-cum-ferti drill has been designed and developed for hill farmers to facilitate line sowing in hills. Crops like wheat, lentil, green gram, blackgram, paddy etc. can be sown in lines along with fertilizer

application using this machine. The machine can be operated by 2 persons in a prepared seedbed and by a pair of bullocks in case of no-tillage. The specifications of the tool is as follows: Length: 640 mm, Width: 500 mm, Weight : 23 kg. Number of furrow opener: Two; Furrow to furrow spacing: Adjustable (175 to 250 mm); Furrow open: Inverted T-type; Share: Mild steel hardened by arc; Volume of seed box : 5600 cc; Volume of fertilizer box: 5600 cc.

11. **Name of the technology:** VL Mulch-cum-Inline Drip Laying Machine used for laying of plastic mulch and inline drip simultaneously and marks (punching) small holes on the laid plastic mulch for transplanting/planting of seedlings/ crops

Source of technology: ICAR-VPKS, Almora, Uttarakhand

Description of the technology: In hills, mulching is done manually which is time and labour consuming. The mechanized way of mulching available is only suitable for plains and large scale mulching. Due to small size land holding, manual operated Mulch-cum- Inline Drip Laying Mulch useful to farmers in hills has been developed. Only two labours (draft of 32.2 kg) are required for operating the machine and the machine performs multiple operations in a single run. The effective area of standard width (1.2 m) plastic mulch after laying varied from 0.90 to 0.95 m. Plastic mulch of less than 1.2 m width can also be laid with its the adjustable nature of frame as per the need of farmer. It also marks (punching) small holes on the laid plastic mulch and the marking can be done as per spacing (row to row and plant to plant) required for a crop. Facility of laying inline drip pipe/ tape beneath the plastic mulch has also been provided in the machine.

12. **Name of the technology:** Vivek Solar Vermi-compost Sieving Drum used for sieving of vermi-compost

Source of technology: ICAR-VPKS, Almora, Uttarakhand

Year of notification notification:

Description of the technology: Vermi-composting is very feasible and eco-friendly technique for the bio waste resource conversion of agricultural wastes into a useful and high quality vermi-compost. Since organic production is need of the hour, little awareness and capital investment in vermin-compost production can be done very easily. The whole material is not converted into vermi-compost and the earth worm are also needs to be re-used, the Vivek Vermi-compost Sieving Drum can be very helpful in sieving the decomposed vermi-compost and separating the un-decomposed material along with earth worm without any mortality. This is a solar-cum-manual operated continuous vermicompost strainer. The length of the cylinder of the machine is 90 cm with 50 cm diameter and sieve of 3 mm mess sized has been used.

13. **Name of the technology:** VL Pedal Operated Chaff Cutter used for Chaff cutting of green and dry fodder

Source of technology: ICAR-VPKS, Almora, Uttarakhand

Year of notification notification:

Description of the technology: Keeping in view the acute shortage of quality green fodder during winter months, wastage of fodder and straw resulting from direct feeding and erratic electricity supply, a pedal operated chaff cutter suitable for hills has been developed. In this machine, it is easy to feed the straw/fodder in the hopper by the same person who is running the machine while in conventional chaff cutter two persons are required. The output capacity of the machine is about 170 kg/hr for green fodder and 29.4 kg/hr for dry fodder. The machine has 39.2% higher RPM than conventional manual hand operated chaff cutter with 18.1% higher

output capacity. However, in pedal operated chaff cutter the heart rate was slightly higher (9.1%) than conventional manual hand operated, which is mainly due to the fact that the test subjects were not habitual cycle riders.

14. **Name of the technology:** VL Feed Block Machine used to make feed blocks of fodder

Source of technology: ICAR-VPKS, Almora, Uttarakhand

Description of the technology: In hills, there is acute shortage of fodder specialy that of green fodder during winter months. Two types of animal feed are required in hills. One, for milking (dudharu) animals and other, for relief (rahat) animal. The available feed block machines are too much costly and heavy to be adopted in hilly region. Feed blocks can be made when fodder is available in plenty. The Vivek Feed Block Machine developed by the Institute is light in weight and very easy to operate. Screw pressing is done manually to make blocks of 300 mm x 300 mm x 150 mm size. Weight of the feed blocks is about 2.0 kg depending on its composition. The feed remained compress until the screw is reversed back.

15. **Name of the technology:** Vivek Smokeless Chulha (Stove) used for burning of pine needle briquettes

Source of technology: ICAR-VPKS, Almora, Uttarakhand

Description of the technology: Forest fire under pine forest is very spontaneous, massive and devastative. This occurs due to the presence of carpet of pine needle which has high lignin content. The forest fire causes loss to human, animals and environment. Once the pine forest catches fire, it burns crop fields, houses and domestic animals. It is very difficult to control the fire and sometimes it persists even for weeks. VL Smokeless Chulha developed by the Institute for burning of pine needle briquette can reduce forest fire problems, as it is related to the public interest and daily house hold activities. The briquette is prepared from pine-char and mud in the ratio of 3:1 (technology developed by GB Pant National Institute of Himalayan Environment and Sustainable Development, Almora). Once the dried briquette caches fire, it lasts upto 45 minute to an hour. The burning heat may be used for multiple uses like heating room, water and cooking food without any smoke while burning.

16. Name of the technology/new breed: Pony driven cart for agricultural farm

Source of the technology: COA (CAU, Imphal), Iroisemba, Manipur

Year of adoption/development: 2019

Description of technology with salient features: Manipuri Pony breed has been well known as Polo Pony. The main background concept of this technology is to conserve the seriously endangered Manipuri Pony breed by utilizing those animals of the breed which are not suitable for Polo game in other

Fig. 1 Cart with the Pony

Fig. 2 Pony Driven Cart

Fig. 3 Side of Pony Driven Cart

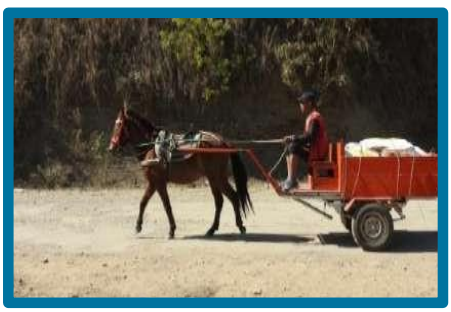


Fig. 4 Pony Driven Cart on the road

suitable activities. Being an agricultural state, one relevant option is to utilize the animals in farm activities of the state. However, in many places where the horses and ponies are utilized, the various farm activities carried out without any consideration to the load bearing capacity, work duration and drudgery these animals face, thereby compromising ethics and welfare issues of these animals. In view of this, avoidance of overloading the animal while utilizing them, is the main objective of this technology. Hence, a "Pony Cart" has been developed with the dual objective of taming the ponies and also to harness them to carry loads as per the load carrying capacity of the animal. The latter was tested from the studies of various physiological and biochemical parameters of the ponies, which are good indicators of stress/metabolic crisis.

17. **Name of the technology:** Makhana harvester

Source of the technology: COA (CAU, Imphal), Iroisemba, Imphal**,** Manipur

Year of adoption/development: 2019

Description of technology with salient features: A manually operated *Makhana* (*Euryale ferox* Salisb.) harvesting technology under the water surface consists of a high- resolution camera fixed near to the cutting blade and telescopic aluminum pipe of variable length. The makhana harvester is provided with a water proof borescope camera fixed close to the cutting blade. The android camera having external diameter of 5.5-7.0 mm built-in with 6 adjustable white LED lights and photo control switch having a focal distance of 4 cm to infinite and water proof level of IP67, resolution of HD: 640*480 is connected to android mobile through OTG cable of 1500 mm long. The camera takes the image of the fruits or any objects inside the water (clear to semi muddy water condition) and is displayed on the display screen of android mobile. Hence, the operator can easily locate the object (makhana fruits) inside the water up to 0.3 to 0.5 m depth and cut the fruit stalk and then lift out of water. In this way the operator is saved from the thorny leaves and spiky skin fruits, thereby reducing his drudgery.

43. **Name of the Technology**: Arka Raised bed onion bulblet planter

Source of the technology: ICAR-IIHR, Bengaluru

Year of the technology: 2023

Description of the Technology: Tractor drawn implement with the minimum power of 35 hp. Forms raised bed and planting (by self-covering with soil) the bulblets with fixed row spacing of 15 cm and acceptable plant spacing of 15 cm under fine tilth condition. Field capacity of the machine is 0.12 ha/h. Precision index is 28 which is close for any precision planting. Labour saving to the tune of 35 % due to the twin operation of bed farming and planting simultaneously.Can be easily manufactured by an agricultural implements/machinery manufacturer. Reduces the drudgery involved in manual operation and ensures timely planting.