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Animal Drawn Stubble Collector



Salient features

- Stubble collector consists of a frame, collecting rake, handle, hitch and beam.
 - It is used for collecting stubbles, weed residue and crop residues in harvested fields.
 - The main component is the rake which consists of curved mild steel rods.
- The bars are sharpened and curved up to a height of 75 mm from bottom.
 - During stubble collection, the implement also breaks soil clods.
 - Overall dimensions (w×h) : 1,650×360 mm
 - Weight : 33 kg

Performance

- Depth of operation : 55-60 mm
- Forward speed : 2.95 km/h
- Field capacity : 0.42 ha/h
- Draft : 500-600 N

Cost

- Unit cost : ₹ 2,500
- Cost of operation : ₹ 350 /ha

Impact and benefits

- There is 80% saving in cost of operation using this implement.

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Engine Operated Portable Post-Hole Digger



Salient features

- Helix : Partially double, Diameter : 150 mm-Thickness: 5 mm
- Cutting edge length :70 mm, Width : 4 mm, Thickness: 10 mm
- Power transmission system: Gear system with 11:1 speed ratio (110-160 rev/min)
- It consists of 3.73 kW diesel engine, mounted on 4 wheel trolley.

Performance

- This machine makes about 25 to 35 pits of 150 mm diameter and 450 mm depth per hour.

Cost

- Unit cost : ₹ 60,000
- Cost of operation : ₹ 10/pit

Impact and benefits

- This machine is useful for creating pits on uneven field or forest area users.
- Socio-economic conditions of farmers can be strengthened by portable post-hole digger.

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Power Operated Nursery Media Filling Machine



Salient features

- The unit consists of 2.2 kW motor, feed hopper, paddles, sieving tray and electronic vending.
- Electronic vending is the novel system adopted in this machine, which is used for filling the nursery media mixture at set quantity (250 g, 500 g, 1,000 g, etc.).
- Accuracy of the system is more than 90%, which is the acceptable level in nursery practices.
- Two women operators are required, and both the operators can safely and comfortably work with the machine in standing and sitting position.

Performance

- Capacity : 100 kg /h

Cost

- Unit cost : ₹ 1,00,000

Impact and benefits

- Saving in cost and time over conventional method are 71.4% and 80.2% respectively.
- Reduction in drudgery of operation as compared to manual method.

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Tractor Operated Plastic Mulch Laying Machine



Salient features

- The equipment consists of concave discs of 400 mm diameter for making bunds or raised beds.
- Pneumatic press wheels of 350 mm diameter for pressing the edges of plastic film to the ground.

- Overall dimensions (l×w×h) : 1,850×2,600×1,550 mm
- Weight : 400 kg
- Length of roll holder : 1,950 mm
- Diameter of roll holders : 75 mm
- Diameter of concave disc : 400 mm
- Speed of operation : 0.39-0.49 m/s

Performance

- Field efficiency : 55.4-62.5 %
- Field capacity : 0.12 – 0.18 ha/h

Cost

- Unit cost : ₹ 55,000
- Cost of operation : ₹ 2,000-2,200/ha
- Labour requirement : 15 man-h/ha

Impact and benefits

- Saves 41% water and 71% labour in weeding over raised beds.
- About 30 % higher yield in raised beds with plastic mulch over bare raised beds.
- User can earn benefit of ₹ 21,000/ha.

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Animal Drawn Zero Till Seed-cum-Fertilizer Drill



Salient features

- It is available in 3 sizes (1/2/3 rows) and may be selected depending on pulling capacity of work animals.
- It consists of inverted 'T' type furrow openers.
- Weight of the machine is 40-60 kg and draft requirements vary between 400 and 600 N.

Performance

- Field capacity : 0.02-0.06 ha/h

Cost

- Unit cost : ₹ 3,000- 4,000
- Cost of operation : ₹ 700-1,800/ha

Impact and benefits

- Saving in cost of operation by ₹ 1,200-2,300/ha.
- Saving of time 60-85 h/ha.
- Increased yield by 4-5% because of timeliness in seeding.
- Owing to minimum disturbance of soil in zero tillage, this implement will be able to prevent soil erosion, a major problem in hill region.

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Animal Drawn Potato Planter



Salient features

- Type : Single row, animal drawn, automatic metering
- Dimension (l×w×h) : 1,550×1,100×1,150 mm
- Weight : 110 kg
- Tuber to tuber spacing : Adjustable (160 to 300 mm)
- Metering mechanism : Picker wheel

Performance

- Field capacity : 0.9 ha/day
- Tuber missing : Negligible
- Tuber damage : Less than 0.5%
- Power requirement : A pair of bullocks
- Labour requirement : One person

Cost

- Unit cost : ₹ 9,000

Impact and benefits

- Increased work output.
- Uniform row to row and plant to plant spacing.
- Saving in time and labour.
- The developed prototype shall promote the use of animals in potato cultivation for small and marginal farmers.

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Animal drawn Single-row Inclined Plate Planter



Salient features

- Suitable for sowing of crops like groundnut, maize, pigeonpea, mustard, gram and soybean.
- The planter is provided with a seed box with inclined plate type seed metering mechanism.
- Shoe type furrow opener ensures low draft requirement of the machine.
- Seed plates can easily be changed for sowing different crops.

Performance

- Field efficiency : 80-85%
- Field capacity : 0.05-0.1 ha/h

Cost

- Cost : ₹ 2,500
- Cost of operation : ₹ 800-1,000/ha

Impact and benefits

- Use of planter would result in saving of seed up to 20%.
- Use of planter would also result in increase in productivity up to 20% due to uniform and accurate placement of seeds.
- Reduced time of operation and drudgery.

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Pneumatic Operated Sugarcane Bud Chipper



Salient features

- It consists of frame, bud chipper to chip the buds and an air compressor with a pneumatic cylinder.
- The blade is attached to a stainless steel cylindrical shaft, which is operated by pneumatic cylinder.
- The pressure required to chip the buds varies from 0.60 to 0.70 MPa.

Performance

- Capacity : 1,000 bud chips/h

Cost

- Unit cost : ₹ 30,000

Impact and benefits

- Removing of sugarcane bud chip from sugarcane for planting in nursery.
- The excess sugarcane can be taken to factory for juice extraction.
- Easy storage and transportation of sugarcane bud chips.

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Power Operated Seed Pelletizing Machine



Salient features

- Overall dimensions (l×w×h) : 1,400×1,000×600 mm
- Electric power : 3 kW, single phase motor
- Manpower : 1 person
- It consists of hemispherical coating pan rotated in an inclined plane with the help of motor and gear box.
- Cleaned and graded seed fed to the pan, rotation on inside surface of the pan and coating slurry is sprayed intermittently on to the seed by hand pump, drying them simultaneously by hot air supplied through a blower.

Performance

- Capacity : 250-500 g/batch/three hour
- Size of pellets : 3 to 5 mm diameter (as per requirement)

Cost

- Unit cost : ₹ 85,000

Impact and benefits

- Maintains the quality of seeds.
- Various treatments to seeds can be done.
- It may be helpful in reducing the germination period of seeds and increase germination percentage.

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Tractor Operated Seed Drill for Sowing on Furrow Slants



Salient features

- A tractor operated three furrows, multi-crop seed-cum-fertilizer drill with a seed pressing device.
- Specifically designed for seeds to be sown on the slant surfaces of the furrow.

Cost

- Unit cost : ₹ 35,000-40,000

Impact and benefits

- Prevents crust formation.
- Increase in crop production (30-70%).
- Deep and wide furrows created help in moisture retention and check soil erosion.
- Facilitates application of drip irrigation system more conveniently and effectively.

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Tractor Operated Two-row Vegetable Transplanter



Salient features

- The machine consists of seedling tray, seat for the operator, furrow opener, compaction wheels, finger guide tunnel and picker wheel type metering mechanism.
 - Picking forks have spring mounted rubber flappers, which open before passing through the tunnel and close during its passage.
- These flappers open again at the bottom end of the tunnel to release the seedlings in a furrow. The inclined wheels compact the soil around the seedlings.
 - Two persons, one for each row sitting on the machine places the seedlings in the flappers, when these open at the top position.
 - Dimensions (l×w×h) : 1,850×1,520×1,160 mm
 - Power source : 26 kW tractor
 - Number of seedling trays : 2
 - Nursery type : Bare root type
 - Metering mechanism : Picker wheel type
 - Number of picking fingers : 10
 - Type of pickers : Rubber flappers
 - Row spacing : 600 mm
 - Furrow openers : Shoe type
 - Machine weight : 225 kg

Performance

- Field capacity : 0.08-0.12 ha/h
- Lying down seedlings : 7-13%
- Missing seedlings : 3-9%

Cost

- Unit Cost : ₹ 48,000
- Cost of operation : ₹ 3,000-3,500/ha

Impact and benefits

- Timely transplanting and cost saving.
- Reduced drudgery and saving in human labour.

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Tractor Operated Sugarcane Bud-chip Settling Planter



Salient features

- The equipment consists of mainframe, attached to standard three-point hitch of a 26 kW tractor.
 - The metering mechanism, operator's seat, furrow openers, soil opener and soil closure are mounted on the main frame with necessary supports.
-
- The bud chip settlings from the nursery can be dropped by two operators through the indexing tray rotated by metering mechanism.
 - A shoe type furrow opener opens up the soil in which the seedlings with soil are dropped.

Performance

- Capacity : 0.15 ha/h

Cost

- Unit cost : ₹ 75,000

Impact and benefits

The formation of irrigation channel along with planting of sugarcane bud-chip settling can be performed simultaneously.

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Tractor-Operated Berseem Seed Drill



Salient features

- A flexible soil-opening tyne which is able to overcome the hindrance of hidden stones in the field without breakage.
- Spring loaded, short height (30 cm) tyne holders attached with the main frame to maintain flexibility.
- Suitable for sowing small fodder seed crops like berseem as well as for crops like wheat and gram after changing the metering mechanism.
- Power: 26 kW tractor.
- Improved fluted roll mechanism was adopted for metering the berseem seed.

Performance

- Field efficiency : 58-60%
- Field capacity : 0.25 ha/h

Cost

- Unit cost : ₹ 40,000
- Cost of operation : ₹ 450/h

Impact and benefits

- Low seed requirement.
- Line sowing possible.
- Saving in labour and time.
- Weeding in between two rows of crop will eradicate the mixture of chicory seeds at initial stage.

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Tractor Operated Mixed Cropping Enabled Zero-Till Drill



Salient features

- Suitable for sowing forage crops in mixed cropping system, viz. cowpea and sorghum, as well as sow single type of seed.
- Seed rates for cowpea and sorghum are 60 and 45 kg/ha respectively.

Performance

- Field efficiency : 58-60%
- Field capacity : 0.25 ha/h

Cost

- Unit cost : ₹ 40,000
- Cost of operation : ₹ 450/h

Impact and benefits

- Able to drill forage and other crops in mixed cropping pattern to form paired rows.
- Provide higher fodder yield.

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Manually Operated Herbicide Applicator



Salient Features

- The implement applies non-selective herbicides for composite weed control in between crop rows.
- The tool reduces the drift hazard of chemical herbicides.
- Guarded herbicide applicator by wiping on to top of weeds.

Cost

- Unit cost : ₹ 4,000

Impact and benefits

- This applicator eliminates the risk of crop damage by herbicide application.
- Effective over other method without any drift hazard.
- It will reduce the weeding cost by 60-70% as compared to manual weeding.
- It will reduce the manpower requirement for weeding.

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Manually Operated Nail Weeder



Salient features

- This weed control tool is suitable for row crops to control weeds.
- It helps in soil moisture conservation by soil mulching under limited moisture situation.
- It is easy to operate and reduces the manpower requirement by 60-70% compared to manual weeding.

Cost

- Unit cost : ₹ 1,800

Impact and benefits

- Reduce the cost of weeding by 60-70%.
- It increases the net return.
- It is useful in soil mulching.
- Easy to operate.
- Less energy requirement.

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Women Friendly Cono Weeder



Salient features

The TNAU centre of AICRP on ESA has developed a women friendly cono-weeder for weeding of rice in wetlands.

Considering the anthropometric dimensions of Tamil Nadu women agricultural workers, the cono-weeder was designed with handle of adjustable height between 910-970 mm, cross handle bar length of 400 mm, telescopic

handle length adjustable between 1,170 and 1,270 mm and handle grip diameter of 26 - 43 mm. To overcome the problem of soil accumulation in the float, an improved box type float was provided. The unit weighs 5.4 kg. The improved weeder resulted in 45% reduction in push and pull forces required during operation.

Performance

- Field capacity : 0.028 ha/h

Cost

- Unit cost : ₹ 1,250
- Cost of operation : ₹ 15/h

Impact and benefits

- Lower push and pull forces are required in operation as compared to other cono-weeders.
- Less physiological cost of operation.
- Weeding efficiency 74% which is better than other cono-weeders.
- Women friendly technology.

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Bullock Drawn Plant Thinning Device



Salient features

- This machine is useful for removing extra plants (thinning) from the cropped field. The man-hour requirement can be reduced up to 90% as compared to manual thinning.

Performance

- Field capacity : 0.15 to 0.26 ha/h depending on crops
- Thinning efficiency : up to 85%

Cost

- Unit cost : ₹ 1,000

Impact and benefits

- Mechanized thinning operation minimizes the cost of crop production.
- The developed device can be attached to the existing bullock drawn multipurpose tool carrier.

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Bullock Drawn Engine Operated Sprayer for Cotton and Pigeonpea



Salient features

- A 2.2 kW engine operated sprayer was mounted on a frame modified from a commercial bullock operated sprayer so as to make it suitable for spraying in high clearance crops such as cotton and pigeonpea.
- Dimension (l×w×h) : 3,900×1,240×2,120 mm.

- Ground wheel diameter : 1,230 mm.
- Boom length : 5,200 mm
- Weight : 305 kg

Performance

- Field capacity : 1.20 ha/h
- Draught : 735-840 N
- Pressure developed : 21 kg/cm²
- Discharge : 600 l/h
- Forward speed : 2.85 km/h

Cost

- Unit cost : ₹ 70,000

Impact and benefits

- Decrease in cost of spraying up to 50%.

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Telescopic Sprayer for Palms



Salient Features

The developed sprayer comprises two co – axial pipes of ultra–light weight (0.5 kg/m), which can be used to spray up to a height of 12.5 m (40 ft) from the ground. The pipe height can be locked at any desired level above 6.25 m (20 ft). The spray lance can be directed in any direction up to 170° angle by pulling the rubber hose connected to the lance. A spring is connected to the lance so that it comes back to 90° angle when released from other angles. The sprayer can also be used to spray at 45° angle if the trees are smaller.

Performance

- Capacity : 15-20 coconut palms/h

Cost

- Unit cost : ₹ 20,000

Impact and benefits

- This device is very helpful for large scale spraying in a short period of time.

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Tractor Operated Aero-Blast Orchard Sprayer



Salient features

- The sprayer consists of 300 litres capacity plastic tanks, ASPEE triplex pump, and one centrifugal blower of 1 m³/s capacity.
- One main by pass valve and two flow rate control valves have been applied to regulate the flow rate of spray chemical in two spouts of the sprayer.
- Two pressure vessels, one pressure gauge fitted on the outlet of the pump, two funnel type nozzles fitted in two spouts and pipes and fittings.
- The sprayer has provision to change the orientation of the two spouts with the help of two ratchets and pawls to adjust the spouts for maximum coverage of plant canopy.
- The power to the blower and pump is transmitted by V-belts and pulleys from PTO shaft of the tractor.
- Power requirement : 33.8 kW tractor
- Weight : 250 kg
- Tank capacity : 300 l (two tank 150 l each)
- Spray coverage : 4.00-4.25 m (vertical plane)

Performance

- Field capacity : 1.89 ha/h at 4.4 km/h and 1.37 ha/h at 2.88 km/h
- Discharge : 354 l/ha at 4.4 km/h and 462 l/ha at 2.88 km/h

Cost

- Unit cost : ₹ 80,000

Impact and benefits

- Saving in cost of operation and chemical.
- Reduces drudgery and timely operation.

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Arecanut Tree Climber and Harvesting Knife



Salient features

- It is a climbing device that consists of an upper frame and a lower frame which are alternatively raised by the user to attain a desired elevation in arecanut tree.
- The upper frame is a tubular frame consisting of a rear rigid base section and a front adjustable tree gripping section.
- The rigid base section carries a seat, front support rail, concave rear rail and side rails.
- The harvesting tool is a curved knife of size 330×155 mm fitted at the tip of a 12 mm dia. 4 m long telescopic pipe.
- The weight of harvesting tool is 2.8 kg
- Dimension (l×w×h) : 1,240×900×700 mm
- Weight : 12.3 kg
- Labour requirement : One person

Performance

- Field capacity : 86 kg of arecanut/h

Cost

- Unit cost : ₹ 5,000
- Cost of operation : ₹ 0.50/kg

Impact and benefits

- The cardiac cost per unit output is minimum (29 beats/kg of arecanut harvested) when compared with conventional method (58 beats/kg of arecanut harvested).
- The use of arecanut harvester results in 34% saving in time and 20% saving in cost of harvesting as compared to conventional method.
- It also reduces the drudgery and is safer and easier than the conventional method of climbing and harvesting arecanuts.
- Even unskilled person can climb the arecanut tree and carry out the harvesting operation.
- Economic benefit : ₹ 5000 /unit per year

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Guava Fruit Harvesting Kit



Salient features

The harvesting kit includes a harvesting tool, a collecting bag and an adjustable platform with height adjustment of 1.5 m to 2.5 m. One person can handle the unit comfortably and carry out the fruit plucking.

- Dimension (l×w×h) :
2,500×950×800 mm
- Weight : 25 kg

Performance

- Capacity : 50 kg/h

Cost

- Unit cost : ₹ 1,600
- Cost of operation : ₹ 24/h, ₹ 50/q

Impact and benefits

- The developed kit (harvesting tool, adjustable platform and collection bag) is suitable for less fruit damage and less fatigue to operator during operation.
- The developed harvesting kit can also be used for other horticulture crops with the fruit bearing height up to 4.5 m such as goose berry, citrus fruits, mango, etc.

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Women Friendly Scissor Type Tea Plucker



Salient features

- This is a scissor type plucker and consists of a light weight collection tray, nylon net lid, a pair of mild steel blade and nylon handle grip.
- Dimension (l×w×h):580×240×90 mm
- Weight : 1.0 kg
- Labour requirement : One person

Performance

- Capacity : 8.6 kg of tea leaves/h

Cost

- Unit cost : ₹ 450
- Cost of operation : ₹ 5/kg of tea leaves

Impact and benefits

- The output is 40% higher as compared to traditional picking.
- Cardiac cost for tea plucking is 295 beats/kg of tea leaf as compared to traditional plucking (580 beats/ kg of tea leaves).
- Results in 32% saving in cost and 40% saving in time when compared with conventional hand picking method.
- Economic benefit: ₹ 1,000/unit/year

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Tractor Drawn Groundnut Digger-cum-Shaker



Salient features

- Machine consists of (i) Tractor drawn groundnut digger with blade and depth control wheels, (ii) Power transmission unit, (iii) Hitching assembly and (iv) Shaking attachment.
 - The developed machine can successfully be used for digging of groundnut.
- Provision of two depth control wheels facilitates controlled depth of digging under adverse soil conditions.
 - Harvested crop is shaken while being harvested, this results in less left-over pods on the ground.

Performance

- Field efficiency : 80%
- Field capacity : 0.38-0.42 ha/h

Cost

- Unit cost : ₹ 30,000 to 40,000

Impact and benefits

- Two persons are required for harvesting of groundnut, which resulted in reduced labour requirement, time and the cost of harvesting.
- The saving in terms of both man-hours requirement and cost of harvesting is quite substantial and justifies the use of developed machine.
- The groundnut harvested field by this machine does not need ploughing again for preparing the seedbed of the next crop.

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Tractor Drawn Groundnut Pod Exposer



Salient features

- Machine consists of (i) Tractor drawn groundnut digger with blade and depth control wheels, (ii) Power transmission unit, (iii) Hitching assembly, (iv) Pod exposing attachment.
- It can be attached with tractor mounted digger-cum-shaker.

- The groundnut pod exposer can be used for collecting the left-out pods during harvesting.

Performance

- Draft requirement : 650-700 kgf at a speed 4.3 km/h
- Field efficiency : 80%
- Field capacity : 0.39-0.43 ha/h
- Fuel consumption : 3.70-4.15 l/h
- Pod exposing efficiency : 90-92%.

Cost

- Unit cost : ₹ 30,000 to 40,000

Impact and benefits

- The saving in man-hours requirement and cost of harvesting.

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Tractor Mounted Root Crop Harvester-cum-Elevator



Salient features

- It consists of a digger blade made from high carbon wear resistant steel.
- The width and thickness of the blade is 1,144 mm and 16 mm.
- The blade is mounted on the machine at an angle of 20° with horizontal.
- Two coulter discs are provided in front of the blade at the outer ends which helps in easy cutting and lifting of soil by the blade.

Performance

- Field capacity : 0.25 ha/h

Cost

- Unit cost : ₹ 60,000
- Cost of operation : ₹ 12,000-15,000/ha

Impact and benefits

- Saving in cost of operation : 50-60%
- Labour saving : 60-70%

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Tractor Mounted Turmeric Harvester



Salient features

- It consists of four main functional parts, viz. gear box, digging blade, conveyor, and collection box.
- The machine digs the turmeric rhizomes, lifts up the rhizomes along with the soil over the conveyor and the rhizomes are collected in the oscillating box at the rear.

- Power required : 7.5 kW
- Manpower required : Five persons

Performance

- Field capacity : 0.16 ha/h
- Field efficiency : 98.5%

Cost

- Unit cost : ₹ 65,000

Impact and benefits

- Higher digging efficiency and less damage to the turmeric rhizomes compared to traditional method.

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Tractor-Operated Groundnut Digger Elevator



Salient features

- It comprises a blade, elevator-cum-pickup reel, fenders, gauge wheel, coulters and power transmission system.
- The front end of the pickup rod is so adjusted that the spikes comb about 30 mm of the top soil to lift vines gently from the loosened soil.

Performance

- Field capacity : 0.16-0.21 ha/h

Cost

- Unit cost : ₹ 80,000

Impact and benefits

- The machine saves 65% labour and 32% cost of operation.

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Tractor Operated Plant Puller for Cotton, Castor and Pigeonpea



Salient features

- It works satisfactorily with almost 100% pulling efficiency.
- It is triangular in shape and easily attached to the sub-soiler.

Performance

- Pulling efficiency : 96-97%
- Field capacity : 0.50 - 0.54 ha/h
- Draft required for pulling plant stalks : 325 to 475 kg

Impact and benefits

- The uprooting operation is economical.
- Socio-economic condition of farmers can be increased by plant puller for cotton, castor and pigeonpea crop.

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Tractor Operated Potato Digger



Salient features

- Dimension (l×w×h) : 1,250×1,340 ×1,070 mm
- Weight : 200 kg
- Oscillating motion : Eccentric cam drive system
- Source of power transmission : Tractor's PTO shaft

Performance

- Digging efficiency : 98%
- Field capacity : 1.75 ha/day
- Power requirement : 18 kW tractor
- Tuber exposure : 85-90%
- Speed of operation : 2.0-3.0 km/h

Cost

Unit cost : ₹ 20,000

Impact and benefits

- Saves manpower and reduces losses due to mechanical damage.

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Tractor Operated Potato Haulm Cutter



Salient features

- Type: Tractor mounted, two-row, flail type
- Dimension (l×w×h) : 1,500×1,310 ×1,100 mm
- Approximate weight : 135 kg
- Speed ratio : 5:1
- Transportability : Two pneumatic wheels

Performance

- Field capacity : 2 ha/day
- Optimum speed of operation : 1.75 to 2.5 km/h
- Power requirement : 18 kW tractor
- Uncut vine percentage : Less than 4
- Labour requirement : One person

Cost

- Unit cost : ₹ 18,000

Impact and benefits

- Mechanized haulm cutting will reduce the labour and time required for the operation.
- Easy in adoption among farmers.

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Women Friendly Arecanut Dehusker



Salient features

- It consists of a rasp type blade, seat for arecanut, a handle with grip, a spring loaded holding device with a handle and a frame to hold all the important movable parts.
- It is suitable for dehusking dry as well as green arecanuts.
- The worker can perform the dehusking operation in convenient posture.
- It eliminates the finger cut and bruise on the palm of the women workers.
- The spring loaded device ensures safe handling of arecanut.

- Dimension (l×w×h) : 370×180×470 mm
- Weight : 1.6 kg
- Labour requirement : One person

Performance

- Dehusking capacity : 76 kg of green arecanuts/day or 24 kg of dry arecanuts / day

Cost

- Unit cost : ₹ 850
- Cost of operation : ₹ 10/kg of dry arecanuts

Impact and benefits

- The cardiac cost for dehusking one kg of green and dry arecanut is less (69 and 201 beats) with this arecanut dehusker as compared with conventional system (236 and 771 beats) resulting in about 70% drudgery reduction.
- Use of this dehusker unit reduces drudgery, accidental injuries and skin problems which are common in traditional dehusking method.

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Women Friendly Groundnut Stripper



Salient features

- The equipment comprises a square frame of 600×600 mm made of 40× 6 mm mild steel angle section.
- The working height of the square frame can be adjusted from 400 to 620 mm by lowering or lifting the telescopic pipes.
- An adjustable stool is provided for the operator to sit and perform the stripping operation.
- The height of the stool can be adjusted from 280 to 400 mm to suit the sitting.
- The stripping of the pods is accomplished by drawing a handful of vines across the comb with a light force.
- Dimension (l×w×h) : 690×690×200 mm
- Weight : 13.5 kg

Performance

- Stripping efficiency : 97%
- Stripping capacity : 40 kg pods/h

Cost

- Unit cost : ₹ 5,000
- Cost of operation : ₹ 1.0/kg of pods

Impact and benefits

- Less than 1% damage to pods.
- Saving in cost and time 35 and 75%, respectively, as compared to manual hand stripping.
- Women friendly technology.
- Reduces drudgery of workers involved in groundnut stripping.

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Arecanut Stripper



Salient features

- This is a hold-on type arecanut stripper, consisting of a feeding chute, a peg tooth cylinder, a stripping mechanism and an oscillating sieve.
- The prime mover is a 2.2 kW, 3,600 rev/min, petrol start kerosene run engine.
- The arecanuts are separated from bunches due to the impact force of pegs

of rotating cylinder and the stripped arecanuts fall on the oscillating sieve.

- The unit is suitable for stripping both green and ripen arecanut bunches.
- Dimension (l×w×h) : 2,090×1,940×1,430 mm
- Weight : 320 kg
- Stripping drum width : 820 mm
- Stripping drum diameter : 330 mm
- Peripheral velocity of stripping drum : 5.8 m/s
- Labour requirement : Five persons

Performance

- Stripping efficiency : 99.5%
- Stripping capacity : 700 kg/h

Cost

- Unit cost : ₹ 25,000

Impact and benefits

- Economic benefit : ₹ 20,000/unit/ year
- Reduces the high work stress and back pain disorders caused due to lifting and forceful striking the arecanut bunch as followed in traditional method of stripping.

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Brinjal Seed Extractor



Salient features

- Suitable for separation of seed from brinjal.
- The seed and brinjal pieces are separated by use of water spray jet inside the separating chamber. Seed with water goes into settling tank, from where seeds are collected at the bottom outlet of the tank while brinjal pieces are collected at separate outlet.

Dimension (l×w×h) : 1,000×610×1,640 mm

Power required : 0.75 kW, 3 phase motor

Man power : Two persons

Performance

- Capacity : 200 kg (brinjal)/ h
- Seed recovery : 97%

Cost

Unit cost : ₹ 70,000

Impact and benefits

- Reduces the man-power and water requirement for seed extraction.

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Chilli Seed Extractor



Salient features

- Dry chillies are crushed in crushing assembly and go to the drum separator assembly where the seeds and powder are separated from crushed pulp material. The collected seeds and powder are fed to the cleaning unit where cleaned seed and powders are obtained separately.

Dimension (l×w×h) : 1,450×920×600 mm

Power required : 0.75 kW, 3 phase motor

Manpower requirement : 2 workers

Performance

- Capacity of machine : 60-70 kg dry chillies/h
- Seed Recovery : 98 %

Cost

- Unit cost : ₹ 65,000

Impact and benefits

- Reduces the man-power and water requirement for seed extraction compared to conventional method.

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Pusa Basmati Rice Thresher



Salient features

Basmati rice can be threshed with minimum internal and external injury. The cylinder diameter and length has been optimized for mechanizing threshing efficiency with minimum injury to kernel. It can be operated with tractor P.T.O. The output capacity is 1,000 kg/h. Axial flow mechanism with polylined spikes, to reduce internal and external injuries.

Performance

- Threshing efficiency : 99%
- Threshing capacity : 1,000-1,500 kg/h
- Recovery : 4% more than conventional threshing

Cost

- Unit cost : ₹ 1,00,000
- Cost of operation : ₹ 260/h

Impact and benefits

- It facilitates basmati rice threshing with the least internal and external injury and high head rice recovery.
- High capacity enables farmer to complete threshing in time and be safe from weather vagaries. It also reduces human drudgery.

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Thresher-cum-Ammonia Treatment Machine



Salient features

- Thresher-cum-ammonia treatment machine can be used simultaneously to thresh wheat crop as well as ammonia treatment of wheat straw that can save labour and time to get the production of superior quality wheat straw for animal feeding.

Performance

- About 60-80 quintals of wheat straw per day can be treated without involving any extra labour cost.
- As compared to manual mixing, uniform mixing of urea and other chemicals with crop residues can be done by this machine.

Cost

- Unit cost : ₹ 2,00,000

Impact and benefits

- No extra labour, power and time is required for adopting this technology.
- The ammonia treatment of wheat straw can easily be adopted by the farmer during threshing period using thresher-cum-ammonia treatment machine.
- Nutritional quality of wheat straw is improved by three times of crude protein and 1.5 times of ME value by urea ammoniation process.
- Air pollution is also reduced by this technology as mechanized *in situ* ammoniation greatly reduces free spreading of fine straw particles in the atmosphere.

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Tomato Seed Extractor



Salient features

- Tomatoes are crushed in the crushing assembly and goes in to a separator assembly which separates the seeds and juice from skin. The seeds and juice are separated using vibratory sieve mechanism and collected separately. Thus the seed, juice and skin are obtained separately at three separate outlets.

Dimension (l×w×h) : 15,80×10,00×900 mm

Power required : 1.1 kW, 3 phase motor

Manpower : Two workers

Performance

- Capacity of machine : 45-60 kg(fruits)/h
- Seed recovery : 98%
- Juice recovery : 80%

Cost

- Unit cost : ₹ 65,000

Impact and benefits

- Reduces the manpower and water requirement for seed extraction compared with conventional method.

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Tractor/Electric Motor Operated Multi Crop Thresher for Seed Spices



Salient features

- The diameter of threshing cylinder was kept as 660 mm and length as 550 mm. The sieve sizes used for threshing of different crops are big sieve of 5.5 and 7 mm, small sieve of 5.5 mm and dust sieve of 1.6 mm. The rotating speed of threshing cylinder was 540, blower 480 and drive pulley 440 rev/min.
- Spikes size : 30×120×6 mm
- Power required : 5.6 kW

Performance

- Output : 240 -260 kg/h
- Threshing efficiency : 100%
- Cleaning efficiency : 99%

Cost

- Cost of threshing of cumin : ₹ 100/kg

Impact and benefits

- It facilitates threshing of seed spices.
- High capacity enables farmers to complete threshing in time and be safe from weather vagaries.

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Power operated Pigeonpea Stripper



Salient features

- With the help of pigeonpea stripper pods and leaves are separated with minimum damage to plant structure. Stripped material can be threshed in any suitable thresher.
- Stripping drum length : 600 mm
- Stripping drum diameter : 380 mm
- Spike loop height : 100 mm
- Power requirement : 1.1 kW, Single phase motor

Performance

- Capacity : 150 kg/h

Cost

- Unit cost : ₹ 10,500
- Cost of operation : ₹ 30/h

Impact and benefits

- Reduction in drudgery and increase in grain recovery along with utilization of plant structure for various domestic purposes.
- Easy to operate and maintains plant structure.

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Aonla Processing Pilot Plant



Salient features

- This plant is suitable for small entrepreneurs for value addition of *aonla*. Grading (500 kg/h), pricking (100 kg/h), shredding (200 kg/h), juice extraction (150 kg/h), concentration (30 litres/batch), drying (100 kg/batch) and bottle filling operations are performed with this plant.

- Total power requirement : 20 kW
- Manpower : 3 persons

Performance

- Capacity : 100 kg/h (However, different machines are of different capacity)

Cost

- Unit cost : ₹ 10,00,000

Impact and benefits

- Mechanization of operation resulted in increased output and efficiency.
- Various process combinations can be adopted depending upon the product desired.

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Power operated Litchi Peeler

Salient features

- Two stainless steel (SS) rollers rotating at differential speed in opposite direction.
- One roller has SS spikes whereas the other has knurled surface.
- Graded fruits are fed between the rollers; fruit moves between the rollers; the longest dimension of fruits is aligned in the direction of inclination of rollers and conveyed towards the spikes mounted on the rollers.
- Fruits in contact with rollers start rotating; spikes pierce the peel of fruit; due to rotary motion of the fruit, the spike makes a cut on the peel; the knurling of roller restricts the movement of the fruit due to friction.
- The peel opens due to shear developed by differential speed and is separated from the fruit.
- The belt provided at the top of the rollers produces compression and avoid jumping of fruit.

Performance

- Capacity : 120 kg/h
- Peeling efficiency : 96%
- Loss of pulp : < 4%

Cost

- Unit cost : ₹ 2,00,000-2,50,000
- Cost of operation : ₹ 10/kg of fruit

Impact and benefits

- It increases the efficiency of process.
- Increases the hygienic condition of process.
- Helps the farmer to get high price for their products.
- Reduces the processing cost for litchi products.

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Hand Operated Emery Disk Horizontal Mill (*Chakki*)



Salient features

- Consists of stationary lower and rotating upper emery disks, used for dehusking and splitting of pretreated pulse grains. Use of bearings at central pivot and handle base reduces the efforts.

Performance

- Capacity : 10 kg/h

Cost

- Unit cost : ₹ 3,000
- Cost of operation : ₹ 25/h

Impact and benefits

- Use of emery casted on steel plates gives better maneuverability for fixing bearings at central pivot and handle base, which in turn reduces drudgery and increases the capacity over stone mill (*chakki*).
- Useful for domestic level dehusking and splitting of pulse crops.

Contact

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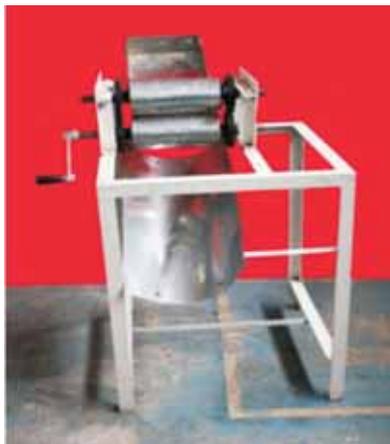
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Hand Operated Low Cost *Aloe vera* Gel Extractor



Salient features

- The unit consists of one pair of wooden rollers with stainless steel lining. Each roller is fixed tightly with the help of bush and frame arrangement on both the sides. The rollers are tapered continuously from one end to other with a slope in order to have varying clearance to allow the leaves of varying thickness to be squeezed properly. The rollers are rotated with the help of a handle attached to the shaft. The bottom roller moves in clockwise direction while the upper roller in anticlockwise direction.

The whole assembly is fixed on a base frame which supports the unit during operation.

- Manpower required : One person.
- Manual cutting method has been replaced by pressing between two rollers.

Performance

- Capacity : 20 kg/h
- Efficiency : 95%
- Losses : 4%

Cost

- Unit cost : ₹ 5,000
- Cost of operation : ₹ 5.0/kg

Impact and benefits

- Increases the capacity of operation.
- Drudgery reduction and easy to operate.

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Hand Operated Rubber-Steel Vertical Mill (*Chakki*)



Salient features

- Vertical rubber-steel disk type mill (*chakki*) for dehusking and splitting.
- Stationary rubber and rotating steel disks are used for dehusking and splitting of pretreated pulse grains.

Performance

- Capacity : 5 kg/h

Cost

- Unit cost : ₹ 3,000
- Cost of operation : ₹ 25/h
- Output cost : ₹ 5.00/kg

Impact and benefits

- Useful for domestic level dehusking and splitting of pulse crops.

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Aonla Pricking Machine



Salient Features

- Aonla is pricked with wooden or stainless steel pins for the preparation of *murabba*. Machine expedites the process of pricking.
- Dimension (l×w×h): 100×60×210 mm

Performance

- Capacity : 15-20 kg/h

Cost

- Unit cost : ₹ 5,000
- Cost of operation : ₹ 3/kg

Impact and benefits

- Drudgery reduction.
- Time and cost saving.

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Apricot Grader



Salient features

- Dried apricots can be graded with this machine.
- Dimension (l×w×h): 1,100×660×430 mm

Performance

- Capacity : 200-250 kg/h
- Efficiency : 80-92%

Cost

- Unit cost : ₹ 2,300
- Cost of operation : ₹ 0.5/kg

Impact and benefits

- Machine grading reduces cost of grading and saves time.
- Value addition of apricots improves income of farmers.

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Apricot Decorticator



Salient features

- Suitable for decortications of apricot. The unit is made of mild steel sheet having capacity of 5 kg.

Threshing cylinder : 100 × 300 mm
(diameter × length)

Roll adjuster : 25 mm

Angle stand : 35 × 5 mm

Performance

- Capacity : 120-150 kg/h
- Decortication : 85% efficiency

Cost

Unit cost : ₹ 18,000

Impact and benefits

- Less time of decortication.
- High decortication efficiency.

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Bamboo Slicer-cum Incense Stick Maker



Salient features

- A simple hand operated machine, consists of a rigid frame on which a cartridge moves freely across entire length of the plate by simple lever operation. A powerful adjustable high speed stainless steel blade is fixed over the plate. The cartridge crosses the blade point in its operation.

Performance

- Capacity : 2 kg/day (Manual)
: 8 kg/day (Motor operated)

Cost

- Unit cost : ₹ 8,000

Impact and benefits

- An additional income of ₹ 150/day can be generated.

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Coconut Slicing Machine



Salient features

- Coconut endosperm is pressed to the surface of the rotating wheel which comes in contact with the blades, gets sliced and chips are produced.
- Coconut chips of uniform thickness are produced.

Performance

- Capacity : 50 nuts/h

Cost

- Unit cost : ₹ 50,000
- Cost of operation : ₹ 0.5/nut

Impact and benefits

- Increased safety in slicing.
- Drudgery involved in coconut slicing is reduced.

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Double Screen Cleaner



Salient features

A batch type hand operated equipment to replace existing traditional practice, i.e. manual horizontal/vertical sieving to clean the grains. It separates impurities like stubbles, chaff, dirt and broken from wheat, bengal gram, soybean and other cereals and pulses. It consists of main frame scalper/grading screen, draper rod, handle, shutter etc. and operated by hanging it on

any elevated point with ropes. A batch of 5-10 kg is fed into the cleaner which swings to and fro till the batch is sieved.

- Dimension : 900×600×140 mm
- Weight : 17.6 kg
- Man power requirement : 0.5 man-h/q

Performance

- Unit capacity : 150 – 225 kg/h
- Cleaning efficiency : 99.0 %

Cost

- Unit cost : ₹ 4,500

Impact and benefits

- Reduced man power requirement over conventional system.
- Reduces drudgery of operation.

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Fiber Reinforced Plastic Demand Fish Feeder



Salient features

- Fibre reinforced plastic demand fish feeder has main components of feed hopper (Capacity=30 litres) and activation mechanism. The feeder is installed in a pond with the activation mechanism extending into the water through an activator rod. The activating mechanism includes steel

bait rod, feed platform, feed protecting cover and pendulum or feeding tray. The feed drops by gravity on to the adjustable acrylic feed platform positioned below the hopper and above the water level. When fish activates the rod, feed pellets retained on the feed platform, slowly drop on to the water surface. The gap (distance) between the feed platform and the end of the hopper cone is adjusted as per the size of the pellet feed.

Performance

- Capacity : 10 kg feed/batch, sufficient to feed 500 kg fish if fed @ 2% of their body weight/day.

Cost

- Unit cost : ₹ 3,100

Impact and benefits

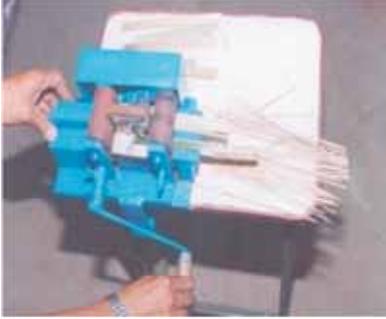
- The growth rates of fish are 10-15% higher in the demand feeding cisterns/ tanks with feeders than the hand fed tanks.
- Nutritionally enriched and expensive feed can be saved to a great extent. In 110 days of fish rearing period, one feeder can save 47 man-h or ₹ 960 @ ₹ 20/man-h.
- This will help to avoid organic pollution in the rearing ponds by delivering demanded quantity of feed into it.

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Bamboo Stick Making Machine



Salient features

- It is a simple hand operated machine for making sticks of bamboo for use in manufacturing of incense sticks. Its weight is about 2 kg.

Performance

- Capacity : 5 kg (sticks)/day

Cost

- Unit cost : ₹ 3,000

Impact and benefits

- Improved output capacity as compared to conventional manual stick making.

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Radial Arm Type Cashew Kernel Extraction Machine



Salient features

- Single operation enables splitting of nut between two horizontally mounted blades specially shaped to suit the contour of the raw nut. Simple lock nut and bolt assembly to adjust the distance between the holder and splitting blade.
- Constant onward movement of blades enabled penetration into inner edge of shell, protecting the kernel damage.

- Dimension (l×w×h) : 0.7×0.5×0.75 m

Performance

- Operational capacity : 9.3 kg/h
- Efficiency : 88.1 %
- Whole kernel : broken ratio : 9.84:1

Cost

- Unit cost : ₹ 6,500

Impact and benefits

- Cashewnut processing industry and farmers are indirectly benefitted.
- Operator's drudgery is reduced.
- Operation in sitting posture reduces the drudgery of operation.

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Tender Coconut Punch and Cutter



Salient features

A simple tender nut punch wherein tender nut is placed on the nut holder which is circular and hollow in shape with a diameter of 10 cm and operated through a lever mechanism. As the lever is spring loaded it automatically tries to move upwards. The cutting blade is mounted concentric to the stand and retained at a height of 15-20 cm.

The serrated curved blade or knife is made of leaf spring of 6 mm thickness and is 45 cm in length.

Performance

- Capacity : 150 – 200 nuts/h

Cost

- Unit cost : ₹ 10,000

Impact and benefits

- Risk of injury using traditional knife is eliminated.
- No chopping of husk and hence no garbage.

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Winnower cum Cleaner Grader



Salient features

- Suitable for cereals, pulses and oilseeds crop like wheat, paddy, maize, pigeon pea, lentil, red gram, soybean, horse gram, mustard, barnyard millet, jowar and bajara for winnowing and cleaning.

Dimensions (l×w×h) : 1,450×
1,450×1,210 mm

Weight : 60 kg

Manpower required : 1 person

Performance

- Cleaning capacity : 250-200 kg/h (Rice, lentil, soybean)
- Winnowing capacity : 300-350 kg/h (Rice, lentil, soybean)
- Average cleaning efficiency: 94-97%.
- Winnowing efficiency : 96-98%.

Cost

- Unit cost : ₹ 6,000

Impact and benefits

- Reduction in weight and saving of cost.
- Use of fibre reinforced plastic (FRP) results in less mechanical vibrations as compared to fans of (mild steel) MS sheet.

Contact

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Manually Operated Onion Grader



hopper is around 1,500 mm.

Salient features

- It is a double roller type grader, which grades onion on the basis of diameter. Total weight of the grader is around 125 kg and it can be moved across the fields with its caster wheels. The grader has provision for grading onion in five grades (<35 mm, 35–50 mm, 50–60 mm, 60–80 mm and > 80 mm) according to the size of onions. The height of the

Performance

- Output capacity : 1.0 tonne/h
- Grading efficiency : 90–95%

Impact and benefits

- Help farmers to grade their produce efficiently and reduce the manpower requirement.
- The grader can be used for grading of many other fruits and vegetables such as sweet orange, sapota, lemon, etc. with little modifications.

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Pedal-cum-Power Operated Ice Crusher



Salient features

The ice crusher consists of a crushing cylinder with spikes, casing, feeding chute, outlet slots, discharge chute, flywheel, chain and sprocket power transmission system with pedal and seat arrangement. The speed of crushing cylinder is about 485–500 rev/min for an average pedaling and 720 rev/min with 0.745 kW motor. Two labours are required

for manual crushing and one labour is sufficient with electric motor. The technology helps the fishermen to save about 40-60% of ice requirement.

Performance

- Capacity : 1,000 kg/h by manual pedaling
3,000 kg/h with one hp electric motor
- Efficiency : 95-97%

Cost

- Unit cost : ₹ 30,000 (with one hp electric motor)
- Cost of operation : ₹ 60/h

Impact and benefits

- Increase in the production of crushed ice helps in the preservation of fish on board or in the fish landing centre.
- Reduction in the human drudgery as compared to traditional method.
- Reduction in the crushing time.
- Increased turnover/output and hence increased profit/income.
- Eco-friendly technology.

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Pedal Operated Ash Gourd (*petha*) Pricking Machine



Salient features

- Ash gourd is cut into large pieces and placed on conveying belt of machine for pricking.

Dimension : 100×38×110 mm
(l×w×h)

Weight : 80 kg

Performance

- Capacity : 35 kg/h

Cost

- Unit cost : ₹ 25,000

Impact and benefits

- Hygienic processing.

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Pedal Operated Potato Peeler



Salient features

- The pedal operated potato peeler has been developed for small scale entrepreneurs where electricity is not available. The rotating perforated stainless steel drums remove skin of potatoes.

Dimension : 1,200×450×850 mm
(l×w×h)

Weight : 75 kg

Manpower requirement : 5.3 man-h/tonne

Performance

- Capacity : 1,800 kg/day

Cost

- Unit cost : ₹ 17,000
- Cost of operation : ₹ 300/tonne

Impact and benefits

- Higher income generation.

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Pedal Operated Potato Slicer



Salient features

- The pedal operated potato slicer is suitable for small scale entrepreneurs where electricity is not available. It consists of main frame, feeding unit, stainless steel blade, etc.

Dimension : 1,050×600×1,300 mm
(l×w×h)

Weight : 46 kg

Manpower requirement : 5.3 Man-h/tonne

Performance

- Capacity : 1,800 kg/day

Cost

- Unit cost : ₹ 12,000
- Cost of operation : ₹ 300/tonne

Impact and benefits

- Higher income generation.

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Paddle-Operated Spinning Wheel (*Charkha*)



Salient features

- The innovative spinning wheel (*charkha*) consist of two parts, one being table top and other being small spinning wheel. The spinner sits on the stool and operates the paddle of the *charkha* by her foot resulting in reduction in physical stress on the shoulders.

Performance

- The innovative *charkha* results in an improvement in spinning efficiency and by 73.50 (%) remuneration by 146.64 (%) The spinning loss of Pashmina also reduced from 12% to only 3%.

Cost

- Unit cost : ₹ 3,000 with stool

Impact and benefits

- The table top spinning mill (*charkha*) reduces the loss & Pashmina therefore increases the
- Decrease in drudgery (Backache, numbness to legs, etc) of operation.

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Power Operated Onion Grader



60–80 mm and > 80 mm.

Salient features

- The motorized grader has two sets of counter rotating double rollers, which grades onion on the basis of diameter. Total weight of the grader is around 300 kg. The grader has one 0.75 kW motor for rotating the rollers. It has provision of grading onion in five grades, i.e. <35 mm, 35–50 mm, 50–60 mm,

Performance

- Output capacity : 1.5 to 2.0 tonnes/h
- Grading efficiency : 87–90%

Impact and benefits

- Help farmers to grade their produce efficiently and reduce the man power requirement.
- The grader can be used for grading of many other fruits and vegetables such as sweet orange, sapota, limes, etc. with little modifications.

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Multi-Purpose Tray Dryer



Salient features

- It is a batch type unit, i.e. Louisiana State University(LSU) type for grain and tray type for food products drying. It consists of blower, heating unit, plenum/drying chamber, trays and stopper for recirculation. It can be used for drying raw soybean before storage and soy products to safe storage limit.
- Dimension : 2720×600×1300mm (l×w×h)
- Weight : 175 kg
- Labour : 1.0 man-h/q requirement

Performance

- Capacity : 50 kg/day

Cost

- Unit cost : ₹ 70,000
- Cost of operation : ₹ 250-750/tonne

Impact and benefits

- Reduced cost of drying.

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Aonla Segmentation and Seed Removal Equipment



Salient features

- It is a device useful for seed removal and segmentation of Indian gooseberry (*Aonla*) fruit. The unit consists of motor (100 W, single phase); assembly for moving; rotation disc on which *aonla* fruit is placed; indexing table with drive gears for positioning the fruits just below the knife assembly; a knife assembly consisting of a centre shaft to which six segmentation blades are attached; seed outlet; tray for collecting deseeded and segmented *aonla* and control panel.

Performance

- Capacity : 12-15 kg/h

Cost

- Unit cost : ₹ 50,000

Impact and benefits

- Saving in time and cost of deseeding is 94.5% and 87.3% respectively.
- Saving in time and cost of segmentation is 94.3% and 88.9% respectively.
- More hygienic and reduced time of operation compared to traditional method.

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Aonla Shredding-cum-Stone Extracting Machine



Salient features

- A continuous flow power operated machine to extract whole stone from mature *aonla* fruits and simultaneously obtain *aonla* shreds at relatively lower costs without health hazards.
- Dimension : 1,370×330×650 mm (l×w×h)
- Power requirement : 0.75 kW, 3 phase
- Manpower : 1 worker

Performance

- Capacity : 60-70 kg/h
- Material recovery : Shred 97-98%, Stone 93-94%

Cost

- Unit cost : ₹ 75,000

Impact and benefits

- Reduce the labour cost, product cost and injury to human being.

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Axial Flow Cotton Pre-Cleaner



Salient features

A portable unit developed for on-farm cleaning of seed cotton by farmers, traders and cotton ginneries. It consists of cylinder, grid bar, top cover, feeder and power drive assembly. Seed cotton is fed at one end of the spiked cylinder through feeder and it moves axially along the length of the cylinder as it rotates. Foreign matter gets dislodged from the cotton by agitating and scrubbing

action of cylinders and falls through grid bars. The trash gets accumulated in trash chamber. The machine is compact, covered with safety guards and operator friendly.

- Type of cylinder : Single spiked cylinder
- Cylinder length : 1,200 mm
- Cylinder diameter : 443 mm
- Cylinder speed : 225 rev/min
- Power requirement : 1.86 kW
- Dimension (l×w×h) : 1.5 × 1.2 × 1.2 m
- Manpower requirement : Two persons

Performance

- Output capacity : 650 kg seed cotton/h
- Cleaning efficiency : 30-40%

Cost

- Unit cost : ₹ 75,000
- Cost of operation : ₹ 44/h
- Custom hiring rate : ₹ 109/h

Impact and benefits

- Axial flow pre-cleaner can be effectively used for on-farm cleaning of cotton to realize the better prices for cotton and enhance farm income.

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Cleaner/Grader for Small Seeds



Salient features

- Suitable for cleaning/grading of light small seeds such as cumin, coriander, etc.
- Consists of four vertical cylinders of diameter varying from 80 to 240 mm mounted on a horizontal pipe through which air is blown at a speed of 2.30 to 2.70 m/min. The lightest material, i.e. dust etc., is collected in a cyclone separator attached to the blower end of aspirator.

- Power requirement : 0.37 kW motor, 230V AC, 50 Hz, Single phase

Performance

- Output capacity: 140, 185 and 285 kg/h for cumin, coriander and berseem respectively.

Cost

- Unit cost : ₹ 25, 000 (without motor)

Impact and benefits

- Reduction in cost of separation/grading and cleaning of light seeds.

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Coconut De-Shelling Machine



Salient features

- A power operated machine suitable for coconut de-shelling. Useful for large scale copra processing units.

Performance

- Capacity : 400 half cups/batch
- De-shelling efficiency : 92.2% at moisture content of 35% (d.b.)
- Optimum speed : 10 rev/min

Cost

- Unit cost : ₹ 50,000

Impact and benefits

- Labour and time saving.

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Coconut Testa Removing Machine



Salient features

- Coconut kernel is pressed to the surface of the friction wheel and testa is collected at the bottom.

Performance

- Capacity : 75 coconuts/h

Cost

- Unit cost : ₹ 25,000
- Cost of operation : ₹ 0.30/nut

Impact and benefits

- Testa removal is an important operation in the development of high value coconut products like desiccated coconut, virgin coconut oil, etc.

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Continuous Feed Type *Aloe vera* Gel Extractor



Salient features

The equipment consists of a set of two pressure rollers on the top and a set of two rollers at the bottom on a frame above an endless belt, to flatten the *Aloe vera* leaf fed between rollers. The bottom set of pressure rollers could be rotated manually by means of a handle or by means of three phase 0.75 kW motor through gear transmission mechanism. Sliding bearing arrangements

are provided to adjust the gap between the two set of rollers based on the average thickness of *Aloe vera* leaf. Four pressure springs are provided between the top set of rollers and bottom set of rollers for fine adjustment of the gap between the rollers to match the curvature of the leaf. Two blades, made of high carbon steel, one each, just above the bottom set of rollers and just below the top set of rollers, are provided. The outer skin at the bottom of the *Aloe vera* leaf gets peeled up as the leaf is moved forward between the rollers. The gel is directly collected in the tray, partially filled with clean water. The top and the bottom leaves are collected separately.

- Manpower required : Five persons

Performance

- Capacity : 200-225 kg/h

Cost

- Unit cost : ₹ 40,000

Impact and benefits

- Saving in cost of operation and time for gel extraction worked out to be 49.5 and 70% respectively.

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Continuous *Khoa* Making Machine



Salient features

- The machine is based on thin film scraped surface heat exchanger (SSHE) technology. Buffalo milk is pumped to first SSHE, where it is concentrated to 30% solids. Further concentrated to 60% solids during the second stage. In the third stage *khoa* is prepared with

desired texture. The system contains all process controllers for mass flow rate control and system pressures of steam at different SSHEs.

Performance

- Capacity : 50 kg/h using buffalo milk

Cost

- Unit Cost : ₹ 20,00,000 (excluding cost of boiler)

Impact and benefits

- Automated production process leading to better product quality and less contamination over conventional method of *khoa* making.

Contact

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Curry Leaf Stripper



Salient features

- The equipment is useful for stripping of curry leaves used in culinary and pickle industries. The machine consists of four main components, viz. power source (0.75 kW single phase motor), pulling mechanism, stripping mechanism and collecting tray. The stripping mechanism is designed to carry out the function of gripping and

holding the leaves, while the branch with petioles is pulled through the gripping mechanism as the leaves are stripped by reciprocating motion of the gripper.

Performance

- Capacity : 40-50 kg/h

Cost

- Unit cost : ₹ 20,000

Impact and benefits

- Hygienic method of stripping of curry leaf compared to traditional hand stripping method.
- Saving in labour and saving in cost is 80% and 60% respectively.

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Defibering Machine for Coconut Husk



Salient features

The unit has been developed for extraction of fibers from green coconut husk. It works on the principle of fiber-combing. The green coconut husks are fed to a puncher and crusher system and further carried to combing cylinder via a conveyor belt.

Speed of cylinder : 700 rev/min

Power requirement : 3.73 kW (3 phase)

Performance

- Capacity : 60-70 Coconut husks/h

Cost

- Unit cost : ₹ 2,00,000

Impact and benefits

- It reduces the loss of coir fibres, improves the cleaning efficiency and productivity of fibres.
- Offshore retting process will be eliminated thereby conservation of water bodies.

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Dehumidified Air Dryer



Salient features

- The dryer is associated with heat pump to remove the moisture from exhaust air at the evaporator surface and recirculating the dehumidified air to the dryer after heating to the desired level at the condenser. Samples can be dried at low temperature and low humidity condition to maintain the quality. Suitable for fruits, vegetables, spices, medicinal and aromatic plants. Heat pump is attached for energy saving and providing low, relative humidity air.
- Power requirement : 1 kW
- Manpower : One person requirement

Performance

- Capacity : 25-30 kg/batch
- Efficiency : 90%
- Losses : 2%

Cost

- Unit cost : ₹ 1,50,000
- Cost of operation : ₹ 2-3/kg

Impact and benefits

- Improve the quality of the dried product.
- Low energy consumption.

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Drum Roasting Machine for Raw Cashewnuts



Salient features

- Continuous type drum roasting machine consisted of three major components, viz. revolving type roasting cylinder, bucket elevator and smoke outlet.
 - It consists of revolving drum heated by liquid petroleum gas (LPG) throughout its length to maintain uniform temperature, a bucket elevator to regulate the feed, drive assembly and smoke outlet.
- Chimney height is around 4 m sufficient enough to exhaust smoke generated from roasting process.
 - Floor space required : 2.4×1.6 m
 - Power requirement : 0.75 kw single phase
 - Roasting cylinder diameter : 0.25 m
 - Roasting cylinder length : 1.2 m

Performance

- Capacity : 135 to 160 kg raw cashewnuts (depending on size)/h
- Temperature: 400-450°C
- Feed rate : 7- 8 nuts/s

Cost

- Unit cost : ₹ 85,000

Impact and benefits

- Kernels obtained by drum roasting mode of processing are very much preferred in certain countries for its taste.
- Drum roasted nuts results in easy kernel peeling.
- Mechanized roasting machine with optimized process parameters yields better results.

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Dual Mode Convective Dryer for Raw Cashewnut



Salient features

- Dual mode dryer consisted of three major components, viz., drying chamber, aspirator and heat exchanger. Floor space required : 3.2×2.1 m
Power required : 0.5 kW (2.4 kW if, electrical)

Performance

- Capacity : 100 kg raw cashewnuts/batch
- Quantity of cashew shell cake required : 2.1 to 3.0 kg/h

Cost

- Unit cost : ₹ 90,000
- Cost of operation : ₹ 0.44/kg

Impact and benefits

- The dryer can also be run using solar energy which is cheaper and environment friendly.

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Endless Screen Type Potato Grader



Salient features

- Type : Manually/ engine operated
- Dimension (l×w×h) : 2,600×2,350 ×1,630 mm
- Size of grading sieves : 50 and 30 mm size square openings
- Power requirement :
 - (a) Manual operation
 - (b) 2.2 to 3.7 kW diesel engine
- Man-power requirement : 5 to 8 persons

Performance

- Output capacity : 4.5 tonnes/h (with engine operation) and 2.5 tonnes/h (with manual operation)
- Grades obtained and range : Tuber diameter > 5 mm,
Tuber diameter between 30 and 50 mm
and
Tuber diameter < 30 mm
- Tuber damage : Negligible

Cost

- Unit cost : ₹ 80,000

Impact and benefits

- Mechanizing grading reduces the cost and time of operation with uniform grades.

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Fish De-Boner



Salient features

- Fish meat bone separator works on belt and drum mechanism. It consists of food grade stainless steel cylinder of 6 mm thickness, food grade rubber belts, rectangular feeding tray, 0.75 kW single phase motor as power source and chain and sprocket arrangement of transmitting drive.
- The mechanism involves feeding of dressed fish between counter rotating belt and perforated drum. The meat gets squeezed through holes into the cylinder under pressure applied by the conveyor belt partially encircling the cylinder while bones and skin retain on the outside of the drum and eject through a discharge chute. Suitable for small and marginal fishermen and small scale fish processors.

Performance

- Capacity : 50-75 kg/h
- Efficiency : 90-95%

Cost

- Unit cost : ₹ 65,000
- Cost of operation : ₹ 50/h and ₹ 1.5-2.0/kg of fish

Impact and benefits

- Helps in recovery of meat from fillet trimming.
- Dual opportunity of diversification of fish processing industry and utilization of low-value fish for human consumption.
- Promotes use of low-value and under-utilized fish species for human consumption.
- Creates income and employment opportunity to the rural fishermen.
- Diversified foods for the consumers.

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Fish Descaling Machine



Salient features

- The fish descaling machine consists of descaling head, flexible shaft, safety shield and motor of 0.75 kW with AC drive.
- The diamond shaped descaling head with its unique design works with maximum efficiency at 2,800 rev/min. The machine is suitable for descaling of Indian major carps.

Performance

- Descaling efficiency : 99 %

- Energy requirement : 0.25 kWh

Cost

- Unit cost : ₹ 8,500

Impact and benefits

- Reduction in drudgery, high capacity (3 times faster descaling) and increased safety because of provision of safety shield.
- Injury free operation will lead to occupational safety and well being of fish retailers.

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Forced Flow Dryer for Curry Leaf



Salient features

- It consists of a drying chamber, plenum chamber, heating chamber and a blower driven by 1.5 kW three phase electric motor. Loading and unloading of the material is done through the door provided at the drying chamber. An inspection door is provided at the front of the dryer. The ambient air entering

through blower gets heated up in the heating chamber having 6 kW electric heaters and enters into the plenum chamber. From the plenum chamber the hot air enters into the drying chamber, where product is kept for drying. The hot air after absorbing moisture from the product is discharged into atmosphere through the exhaust provided above the drying chamber.

- Dimension : 900×900×1,650 mm.
(l×w×h)
- Energy required : 29 kWh
- Manpower : 2 persons

Performance

- Capacity : 50 kg fresh curry leaf/batch

Cost

- Unit cost : ₹ 1,00,000

Impact and benefits

- Better quality of product is obtained over conventional method.
- Better control over the drying temperature.

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French Fry Cuts Making Machine



Salient features

- Dimension (l×w×h) : 740 × 300 × 220 mm.
- Weight : 24 kg
- Reduction ratio : 40:1
- Cutting mechanism : Holder plate and cutter unit.
- Power source : 0.37 kW Single phase electric motor

Performance

- Capacity : 2-3 q/h
- Thickness of cuts : 5 mm and 10 mm squares

Cost

- Unit cost : ₹ 15,000

Impact and benefits

- Suitable machine for cottage industry level processing.
- Create job opportunities/additional income sources for rural youth.

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Power Operated Fruit Grader



Salient features

- The main components of the machine are hopper, conveyor, fruit carrier, weighing assembly, collection platform and power transmission system.
- Suitable for spherical fruits, viz. citrus, orange, lemon, apple, pear, peach, pomegranate etc.

Performance

- Capacity : 350-400 kg/h

Cost

- Unit cost : ₹ 35,000

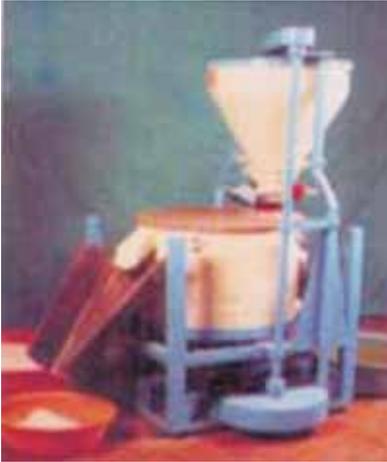
Impact and benefits

- Grading of fruits enhances the cost price according to their weight and size.
- Less time consuming and suitable for spherical fruits.

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Grain Flour Separator



Salient features

- An equipment for separating milled wheat flour into bran, fine flour (*maida*), semolina (*suji*) and coarse flour (*atta*) and is operated through 0.75 kW single phase electric motor. It consists of hopper separation chamber with appropriate screens, shaking unit and outlets.
- Dimension : 1,270×1000 ×
(l×w×h) 1,510 mm
- Weight : 127 kg
- Manpower : one person requirement

Performance

- Capacity : 80-120 kg/h

Cost

- Unit cost : ₹ 20,000

Impact and benefits

- Capacity enhancement of a worker compared to the worker without machine.

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Power Operated Grain Pearler



Salient features

- It is a 3.7 kW three phase electric motor driven equipment for pearling of coarse cereals and dehusking / scratching of pulses. It consists of hopper, carborandum wheel, concave, cyclone separator and drive mechanism. It can also be used for bran removal from wheat, sorghum, pearl millet, barley and maize.
- Dimension : 1,030×1,230×
(l×w×h) 1,390 mm
- Weight : 113 kg
- Man-power : 0.5 man-h/q
requirement

Performance

- Capacity : 20 kg/batch

Cost

- Unit cost : ₹ 9,000

Impact and benefits

- Reduction in cost of pearling operation.

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Guar-Seed Dehulling Machine



Salient features

- The machine is developed for wet dehulling of pretreated *guar* seeds (soaked in 0.2% aqueous ethanol solution under submerged condition for a specified duration at specified temperature and tempering of pretreated seeds for 5 min). The dehuller works on principle of abrasion and shear applied simultaneously. It comprises feed hopper, feed regulator, two discs made of galvanized wire mesh and air column to separate hull. The feed rate, clearance between discs, rotational speed of lower disc and air flow rate could be adjusted in the dehuller as per requirement.

- Dimension (l×w×h) : 1,200×970×1,350 mm
- Weight : 78 kg
- Power required : 1.1 kW

Performance

- Capacity : 80 kg(pretreated seeds)/h
- Dehulling efficiency : 92 %

Cost

- Unit cost : ₹ 25,000 (including prime mover)
- Cost of operation : ₹ 0.75/kg seed

Impact and benefits

- Help farmers to get enhanced benefit of their produce.
- Less energy intensive and saves valuable gum.

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Hydraulic Type Cashew Apple Juice Extractor



Salient features

- It consists of a power pack unit (hydraulic regulation), stainless steel disk type compressor, juice loader with outlet and drive mechanism. A lock and release mechanism is provided for easy loading of perforated cylindrical fruit container for every batch.
- It can be used for extracting juice for any type of fruit and can be operated by women workers. Application of uniform compression load on fruit enabled to extract clear juice preventing pomace mixing with juice.
- The juice extractor is installed on movable trolley and hence it can be transferred to farm, for juice extraction.

- Dimension (l×w×h) : 1.2 × 0.4 × 2.0m
- Power required : 0.09 kW hydraulic power pack system

Performance

- Capacity : 260 kg/h
- Juice extraction efficiency : 75%

Cost

- Unit cost : ₹ 50,000

Impact and benefits

- This processing facility requires less investment, it encourages starting rural agro industries and in turn improving rural economy.

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Power Operated Millet Mill



Salient features

- The pilot scale millet mill is suitable for dehulling and polishing minor millets, namely kodo, barnyard, proso, little and foxtail millet.
- The plant is capable of pearling barley, sorghum and pearl millet also. In the developed process, all fractions of seed are obtained separately, thus complete utilization of biomass is possible.
- The seed is dehulled using rubber roll sheller. The clearance between rollers is adjustable from 0.1 to 0.75 mm, which may vary according to the seed size. The hull is removed from the dehulled lot using aspirator. Then the dehulled seeds are polished in abrasive polisher. This plant can be operated by two persons. The machine is equipped with safety guards.

Performance

- Capacity : 100 kg pretreated seeds/h
- Dehulling efficiency : 86-95%

Cost

- Unit Cost of pilot plant : ₹ 1,50,000
- Cost of operation : ₹ 1.00 per kg of seed (including labour charges)

Impact and benefits

- The value addition of minor millets in production catchment provides additional income to farmers.
- Increases the efficiency of process and reduces the losses in processing.
- Helps the farmer to get high price for their products.

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Power Operated Minicard for Sliver Production



Salient features

- With this machine cleaning of fibres is achieved by feeding cotton uniformly to the cylinder and combing it with wire points. Uniform web is converted into sliver by calendar rollers and trumpet. The machine is suitable for making sliver as well as to collect the clean web of cotton for further use.

Safety guards are provided on both sides of machine. Emergency switch is also provided to ensure safety. One person (semi - skilled) is required to run this machine.

Dimensions (l×w×h)	: 1.25×2.50×1.5 m
Cylinder length	: 610 mm
Power	: 1.12 kW
Weight	: 1,500 kg

Performance

- Capacity : 2 kg (sliver)/h

Cost

- Unit cost : ₹ 7,00,000

Impact and benefits

- The roving sliver is outsourced from mills and processing plants to make yarn on Amber and other spinning wheels. Independency of yarn making at cotton production site, i.e. fibre to fabric can be achieved.
- Additional income avenue for the farmers by production of sliver, web and yarn. The clean web can be used for surgical cotton and equivalent use.

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Multi-sheath Feeder to Raspador Fibre Extraction



Salient features

- Raspador fibre extractor has been developed to extract fibres from soft pithy plant materials like banana pseudo-stem, sisal, hemp, etc. This unit consists of a large rotating cylinder called scutching drum with a number of blades over it. During the extraction, pithy matter is separated from fibrous

matter by scutching action. The designed feeder attachment can feed about 3-6 sheaths at a time to the extractor with considerable ease. Feeding multiple sheaths simultaneously not only increases the productivity but also reduces cost of production by way of reduced power requirements.

Cost

- Unit cost : ₹ 25,000

Impact and benefits

- The extracted fibres used for spinning yarn at the village level can be utilized for value-added products adding income to farming families.
- Multi-sheath feeder helps to increase fibre production up to 1.5 to 2 times without additional energy consumption or manpower requirement.

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Onion Seed Extractor



Salient features

- The extraction unit consists of cylindrical sieves (1.4 mm diameter perforations) in which beater drum is rotated, which imparts beating/impact/rubbing/shear action. The detached seeds and lighter husk pass through cylindrical sieve over the inclined seed separator sieve. The separated seeds are finally collected through clean seed outlet.
- Dimension : 1380×1000×1600 mm (l×w×h)
- Power requirement : 0.75kw single phase electric motor

Performance

- Capacity : 1 tonne/day
- Extraction efficiency : 98%
- Cleaning efficiency : 90%
- Seed loss : 1.86%
- Overall efficiency : 88%

Cost

- Unit cost : ₹ 75,000
- Cost of operation : ₹ 65/h

Impact and benefits

- About 14-15% more seed recovery over conventional system.
- The technology is beneficial with respect to better capacity and seed recovery over conventional system (beating and winnowing).

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Rotary Sieve Grader for Raw Cashewnuts



Salient features

- This unit consists of bucket elevator with controller, concentric rotary sieve drums and product outlets.
- Blinding of nuts inside the sieve holes can be prevented by rotary motion due to gravitational fall. Hopper bottom facilitates collecting the graded nuts just below each concentric rotary drum.

Floor space required : 3.0 × 1.2 m

Power requirement : 0.9 kW motor

Performance

- Capacity : 225 kg/h
- Grading efficiency : 92.8%

Cost

- Unit cost : ₹ 1,20,000

Impact and benefits

- Size of the raw cashewnuts help the cashew farmers to adjudge the quality of their nuts and forecast the expected price.
- Reduces the dependence on human work force.

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Snow Ball Tender Nut Machine



Salient features

- The machine consists of a circular blade having 24 teeth of 8 mm width that rotates at a speed of 1,440 rev/min. The prime mover of the machine is a 0.37 kW single phase electric motor. The adjustable stop cutter box made of stainless steel with a clearance of 15 mm, helps the user to control the depth

of cut and protects the user from possible injury while operating the machine. The machine is used to make a groove around the shell of the husked tender nut. A flexible knife, scooping tool, is used to scoop out the tender nut kernel from the shell. Remove the detached shell and keep the snow ball tender nut in an ice-cream cup with the eye portion facing up.

Performance

- Capacity : 10 snowball tendernuts/h

Cost

- Unit cost : ₹ 20,000

Impact and benefits

- Snow ball tender nut is a health drink and a snack at the same time.
- Since the coconut water is not exposed to the atmosphere therefore less health risk.

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Power Operated Stone Apple Slicer



Salient features

- The raw stone apple (*bael*) is fixed within a tunnel and a motor-operated circular saw slices the fruit. The spring and lever action shifts the fruit to the bottom of the saw for cutting at a desired thickness.
- Power required : 0.375 kW
- Manpower required: One person

Performance

- Capacity : 20 kg/h
- Efficiency : 98%
- Losses : 2%

Cost

- Unit cost : ₹ 12,000
- Cost of operation : ₹ 200/ kg

Impact and benefits

- Increases the capacity of operation.

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Power Operated Suction Winnower



Salient features

- The suction winnower has the advantage that it removes light impurities in direction opposite to the operator. Grain-chaff biomass is allowed to fall in close chamber, through a hopper. Lighter particles are sucked away with the help of suction blower and clean grain is obtained. Speed of blower can be adjusted with the help of step pulley. Air flow rate can also be controlled by bypass arrangements.

Blower speed : 1,440 rev/min

Power required : 0.9 kW, Single phase motor

Performance

- Capacity : 150 kg/h

Cost

- Unit cost : ₹ 10,000
- Cost of operation : ₹ 28/h

Impact and benefits

- Reduces drudgery and provides safe working environment to the operator.

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Tray Dryer



Salient features

- The developed tray dryer has a plenum chamber, which facilitates horizontal as well as vertical hot air movement. The drying chamber has racks to hold 14 trays or more as per capacity. Total surface area of tray is 5.8 m² which is sufficient to load about 30 kg of fresh sliced fruits and vegetables for drying in thin layer. Trays are made of aluminum frame to hold heat resistant nylon mesh.

Performance

- Capacity : 30 kg/batch (6 to 10 hours based on the initial moisture content, based on type of product and drying air temperature)

Cost

- Unit cost : ₹ 40,000-45,000

Impact and benefits

- Proper drying of agricultural commodities leads to reduction in post-harvest losses.
- The dried product shows improved quality, retains good colour and flavour.

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Power Operated Worm Sieving Machine



Salient features

- Unit is suitable for sieving of worms from vermi compost. It is useful for all the farmers associated with production of vermi-compost irrespective of the crop and soil.
- Power requirement :1.5 kw single phase motor
- Manpower requirement : Two persons.

Performance

- Capacity : 7.4 q/h (motorized operation)
3.6 q/h (manual operation)
- Maximum sieving efficiency : 98%

Cost

- Unit cost : ₹ 20,000
- Cost of operation : ₹ 2.36/q under motorized operation
₹ 6.18/q under manual operation with handle

Impact and benefits

- The machine increases the total daily output of worker besides minimizing the worm mortality rate.
- Vermi compost has environmental benefit as it has significant impact in enhancing production and productivity through build up of soil fertility.

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Pulse Mill Plant



Salient features

A complete *dal* milling plant consisting of two CIAE mini *dal* mills, cleaners/ graders, polishing machine, soaking machine and appropriate handling mechanisms, all being operated from a single electrical console. The mill is suitable for milling of pigeonpea and other pulses such as blackgram, green gram etc. can also be milled in this plant.

- Total power requirement : 11 kW
- Man-power requirement : 4 persons
- Land requirement : 200 – 250 m²

Performance

- Capacity : 0.5 tonne/h
- Efficiency : 96-99%
- Dal recovery : 75-78%

Cost

- Cost of plant and machinery : ₹ 22,00,000
- Cost of operation : ₹ 19/kg (excluding value of by-products)

Impact and benefits

- Low dust and noise pollution since the system is a close circuit unit.
- Life of carborandum rollers is more than the conventional *dal* mill rollers.

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Roughage Block Making Machine



Salient features

- The machine is suitable to prepare animal feed blocks from grass, crop residues, straw, leaves and other conventional/non-conventional feed materials. The rotary motion of the motor is converted to give a linear vertical motion to a crosshead mounted on screw shaft. Suitable switch gears have been provided to monitor the direction of movement. The raw animal feed materials are loaded in die block and pressed to make a suitable cattle feed block.

- Dimension (l×w×h) : 1,750×1,450×750 mm
- Power requirement : 2.2 kW, 3 phase electric motor
- Manpower requirement : 3-4 workers

Performance

- Size of feed block : 300×300×200 mm
- Weight of block : 5-6 kg/block
- Capacity : 48-50 blocks/h

Cost

- Unit cost : ₹ 85,000

Impact and benefits

- Farmers can utilize surplus biomass for block making and can earn profit.
- Less storage space required for storage of biomass.

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Vegetable Dryer



Salient features

- It is used to dry vegetables like cauliflower, cabbage, onion etc. at rural level. It consists of drying chamber, plenum chamber, heating unit chamber and an air blower with 20 trays of Nylon wire mesh fitted on aluminum frame. The temperature in the drying chamber is controlled with the help of a thermostat. Moisture content of the 50 kg product can be reduced 90% to 6% in 11-14 hours.

- Dimensions (l×w×h) : 2,720×965×2,605 mm
- Weight : 175 kg

Performance

- Output capacity : 50 kg/day

Cost

- Unit cost : ₹ 70,000
- Cost of operation : ₹ 400-500/q

Impact and benefits

- Reduced cost of drying.

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Low Cost Fish Descaling Hand Tool



Salient features

- Consists of food grade stainless steel 304 descaling plate, polypropylene sheet and handle.

Performance

- Descaling time required: 70-80 s for average 500 g fish as compared to 120s for traditional hand tool.
- Descaling efficiency : 95%.

Cost

- Unit cost : ₹ 300

Impact and benefits

- Higher capacity of descaling with reduced drudgery and time saving.
- Safer descaling as no incidence of injuries to fish retailers/processors.

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Fish Processing Table-cum Retail Sales Unit



Salient features

- Consists of sink, dicing board, offal's collection section, weighing balance, hand sealer and fish display-cum-storage section.
- Ergonomically designed to reduce the drudgery of the fish retailers, hygienic processing.

- The design of display-cum-iced storage section is based on the heat transfer studies.
- Table design is based on the work space envelop of an average Indian population.

Performance

- 25 kg of fishes can be displayed and iced stored for 6-8 h at 0 °C with freshness.

Cost

- Unit cost : ₹ 12,000

Impact and benefits

- The technology will lead to fish processors comfort at workplace, hygiene and cleanliness in processing at the retail shop.
- Table can be accommodated in smaller area.

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Poultry Processing Table



Salient features

- Designed considering ergonomics and hygiene requirement of the poultry dressing.
 - The design of table is optimized for minimum space requirement and maximum ease of operations due to space constraint faced by the poultry meat retailers.
 - Utilities provided on the table are sink, dicing board, double jacketed temporary meat holding bowl, water tap, weighing balance and money drawer.
- Provision to dress the bird after the slaughter in the hanging position.

Performance

- Separation of clean area from unclean area on the table top.
- Unidirectional flow of processing is maintained.

Cost

- Unit cost : ₹ 12,000

Impact and benefits

- Clean and hygienic processing.
- Enhanced comfort for poultry butcher.

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Instant Corn Dessert Mix



Salient features

- Convenience food that can be sold as instant and shelf-stable product.
- Protein, fat, minerals, crude fibre, calories, and *in vitro* protein digestibility are 17.34%, 14.96%, 3.68%, 1.1%, 449.2 kcal/100g and 70.32% respectively.
- Cost effective way of preventing vitamin A deficiency.

Performance

- Corn based instant dessert mix possesses good reconstitution property.
- Improved accessibility of the protein and starch reserves of endosperm to the digestive enzymes.

Cost

- Product cost: ₹ 150/ kg

Impact and benefits

- Promotes value addition and product diversification of corn and generates source to extra income for corn growers.
- Easy adoption by the rural households and suitable for cottage and small scale enterprises.
- Long shelf-life facilitates transportation to distant places for better remuneration.

Contact

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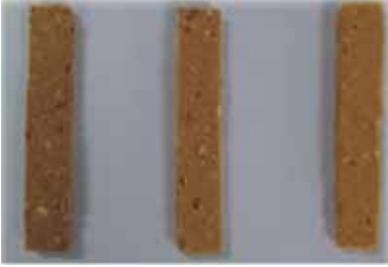
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Corn Energy Bar



Salient features

- High energy food targeted at people that require quick energy but do not have time for a meal.
- 100 g of corn energy bar provides 9.2 g fat, 12.6 g protein, 158.8 mg calcium, 4.1 mg iron and 414.4 kcal energy.

Performance

- Crunchy texture with three months shelf-life under refrigerated conditions.

Impact and benefits

- Easy to mould into desirable shape and size.
- Better choice for a quick meal or snack than a fast food meal and other highly processed packaged convenience foods.
- Technology is easily adoptable by the rural households and suitable for cottage and small scale enterprises.

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Gum Inducing Technology for Production of Gum-Arabic from *Acacia senegal*



Salient features

- A simple process of administration of gum inducing (Ethephon) solution (4 ml) of specific concentration into the main stem of the tree through a small hole.
- Gum exudation starts within 5 to 10 days and lasts up to 1-2 months.
- Gum production on application of the Technology – 500 g (average) per tree.

Performance

- The technology is well perfected and time tested. It has more than 90% efficiency at farmers fields in arid zone.
- The capacity of operation is 50 trees/person/day during the period of gum exudation.
- The operational losses are to the tune of 10%.

Cost

- Cost of treatment : ₹ 10/tree
- Gum production : 500 g/ tree
- Current sale price of gum : ₹ 100-300/ kg

Impact and benefits

- By conventional method farmers get 15-25 g of gum arabic/tree, while by using gum inducer technology, the exudation of gum/tree ranged between 300 and 700 g/tree, with an average of 500 g/tree.
- Treating half of the trees of arid region of western Rajasthan in alternate years, a farmer can earn ₹ 11,500-13,000/ha.
- Low capital investment, high benefit: cost ratio and low gestation period.
- Eco-friendly technology.

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Camel Milk *Kulfi*



Salient features

- Kesar *kulfi* is prepared from boiled and concentrated camel milk to 2:1 ratio followed by the addition of sugar, custard powder with continuous stirring and after that it is kept for cooling.
- Milk concentrate was added with saffron, dry fruits and vanilla essence. It is mixed and filled in cones and kept for freezing.

Impact and benefits

- Generate extra income for farmers.
- The preparation of camel milk value-added products will help improve the economic viability of camel rearing.

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Flavoured Camel Milk



Salient features

- Added 0.1% sodium alginate with continuous shaking to avoid clumping of sodium alginate preheated (45°C to 60°C) the milk followed by addition of 6% sugar and addition of lemon colour to give colour.
- After homogenous mixing of above addition, it was boiled and cooled to 5°C and then added the 0.06% pineapple essence in one litre milk.

Impact and benefits

- Generate extra income source for farmers.
- The preparation of camel milk value-added products will help improve the economic viability of camel rearing.

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Value Added Product from Camel Milk



Salient features

- **Camel Milk Peda**
The *khoa* made up of camel milk was mixed with well powdered sugar in 3:1 ratio.
- **Camel Milk Chocolate Barfi**
It is prepared from camel milk *mawa* and sugar by mixing them in 4:1:5 ratios along with 10-15% chocolate powder
- **Camel Milk Rasogolla**
 - *Chhana* made from camel plus cow milk (1:1 ratio) and camel milk plus buffalo milk (1:1, 1.5:1 ratios) were used.
 - 2% *maida* was added into the *chhana* to avoid cracks in ball.
 - *Chhana* balls were boiled in the sugar syrup for 20-25 minutes.
 - *Chhana* balls were transferred to hot water for 10-15 minutes for texture stabilization and colour improvement.
 - Finally *chhana* balls were put into the sugar syrup with rose essence.
- **Camel Milk Gulabjamun**
Gulabjamun was prepared from camel milk *khoa/mawa*. *Khoa* and *maida* were mixed in 9:1 ratio, made into balls, fried in pure ghee and dipped in concentrated sugar syrup.

Impact and benefits

- Generate extra income source for farmers.
- The preparation of camel milk value added products will help to improve the economic viability of camel rearing.

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Camel Milk Cheese



Salient features

- The camel milk was filtered and heated. $\text{CaSO}_4/\text{CaCl}_2$ was added with continuous shaking.
 - Afterwards allow cooling up to 40°C and starter culture is added.
 - The temperature is maintained between 35°C and 40°C and after 30 min different concentrations of rennet/pepsin are used for the coagulation of milk.
- Coagulation time was found to range between 1.5 and 2 h. Further coagulated milk was kept for 2 h at 40°C and afterwards cutting was done.
 - After cutting the cheese curd, cooking was performed at 40°C till the whey got separated.

Impact and benefits

- Generate extra income source to farmers.
- The preparation of camel milk value-added products will help improve the economic viability of camel rearing.

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Value Added Products from *Aloe vera*



Salient features

- **Crack cream**
Key components: *Aloe* juice, olive oil, glycerine, etc.
- **Aloe moisturizer**
Main components: *Aloe* juice and olive oil.
- **Aloe candy**
Main components: *Aloe vera* and sugar
The active ingredients are intact.
Shelf-life is more than six months at room temperature.

- **Aloe jelly**
Main components: *Aloe vera* and sugar/non-sugar sweetener.
The active ingredients are retained.
Improved shelf-life.
Since low or sugar free, can be consumed by diabetics.

Cost

Cost of production:

Crack cream	: ₹ 15/100 g
<i>Aloe</i> moisturizer	: ₹ 15/100 g
<i>Aloe</i> candy	: ₹ 62/100 g
<i>Aloe</i> jelly	: ₹ 23/100 g

Impact and benefits

- Shall create demand for farm produce indirectly benefiting the farmers.
- **Crack cream:**
 - Highly effective for cracked feet, dry/dehydrated skin.
 - Healing effect on skin lesions and cracks.
 - Acts as a skin moisturizer and softener.
- ***Aloe* moisturizer:**
 - Most suitable for normal/oily skin.
 - Makes the skin texture smooth and shiny.
 - Removes black spots formed due to cold.

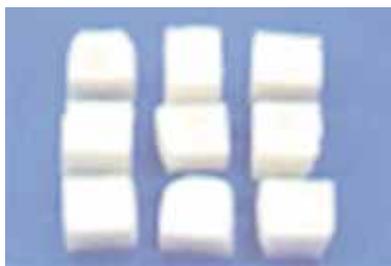
- ***Aloe candy:***
 - Employment generation.
 - Rich source of active polysaccharides.
 - Can be consumed with bread.
- ***Aloe jelly:***
 - Source of employment generation.
 - Can be consumed in breakfast with bread.

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Value Added Goat Milk Products



Salient features

- Removal of goatee odour from goat milk.

Cost

- *Kulfi*
Cost price : ₹ 6/piece
Selling price : ₹ 10/piece
Benefit : cost ratio: 1.67:1
- *Paneer and flavoured Whey drink*
Cost price : ₹ 107 (1 kg *paneer*
+ 30 glasses whey
drink)
Selling price : ₹ 150/- per kg
paneer
Benefit : cost ratio: 1.4:1

Impact and benefits

- Additional source of income for the farmers.
- Goat milk is a rich natural food with vitamins, minerals, casein proteins, high concentration of medium chain fatty acids.
- Better digestibility in comparison to milk of cow.

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Supplement Feed Blocks for Livestock



Salient features

- Prepared from locally available feed resources using simple gadgets fabricated locally.
- An appropriate means of self-delivery of critical nutrients to livestock maintained under arid- and semi-arid rangeland on dry grasses and crop residues.

Performance

- Increases milk production (18-24%).
- Reduction in nutritional disorders.

Cost

- Total capital cost : ₹ 75,000
- Total working cost : ₹ 1,80,000 (₹ 18/block)
- Total production : 20 tonnes (10,000 blocks each of 2 kg)
- Value of produce : ₹ 3,50,000 (₹ 35/block)
- Total profit : ₹ 95,000

Impact and benefits

- Enhances of farmers income through increase in livestock productivity.
- Improves production in the livestock.
- Check Nutritional deficiency imbalances.
- Increases milk yield in cows, buffaloes, goats and sheep.
- Increases food and water intake (appetite).

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Safe Storage of Pulses Using Sand Layer



Salient features

- The technology involves a two stage process.
- Extended sun-drying of pulse grains on a concrete threshing yard/black tarpaulin /black polyethylene sheet for 25 hours (spread over 3-5 days) in a single grain layer.

- Storage in a plastic or metal bin with one inch (2.54 cm) thick layer of sand spread uniformly on the top surface of the grain.
- The storage bin is then closed with a tight lid without any disturbance to the sand layer till the end of storage period.

Performance

- Technology can be used for storage of pulses up to one tonne.

Cost

- Depends on the cost of the bin (metal/plastic) and drying facility used (black polyethylene/tarpaulin/cement concrete floor/threshing yard).

Impact and benefits

- Post-harvest losses of pulse grains stored for seed or consumption purpose by the farmers is minimized.
- Provides total control of bruchid infestation, a major problem in stored pulse grains.

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Biomass Fired Batch Type Grain Dryer



Salient features

- Indirectly heated hot air from the furnace is used to dry grain on a perforated bed.
- Power requirement : 0.75 kW
- Manpower requirement : One person

Performance

- Capacity : 500 kg /h
- Time : 2.5-3 h
- Losses : 1%

Cost

- Unit cost : ₹ 25,000
- Cost of operation : ₹ 0.25 per kg of raw material (₹ 3.00/kg of water removed).

Impact and benefits

- Higher capacity of operation.
- Can be used in rainy season.
- Reduction in foodgrain losses.

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Agriculture Waste Fired Dryer for Red Chillies



Salient features

- The dryer is used to dry freshly harvested red chillies and vegetables using agricultural waste as fuel.
- Power required : 0.75 kW, single phase motor
- Manpower required : Two persons

Performance

- Capacity : 100 kg freshly harvested red chillies/batch

Cost

- Unit cost : ₹ 35,000
- Output cost : ₹ 20/kg freshly harvested chilli

Impact and benefits

- Machine has low initial and operating cost with moderate capacity.
- Required less time as compared to conventional system.
- Labour saving.

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Cabinet Type Solar De-hydrator



Salient features

- A cabinet type solar de-hydrator having 5.0 kg capacity for drying raw mango slices, *mabua* flowers, *aonla*, pomace, etc. It can also be used for cooking in rural areas.

Performance

- Capacity : 5.0 kg

Cost

- Unit cost : ₹ 5,000

Impact and benefits

- Helpful in dehydrating raw mango slices and pulp.
- Hygienically dehydrated fruit product can be prepared by using solar energy.

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Indirect Solar Drier



Salient features

- A 25 kg capacity solar drier fabricated with wooden box fitted with glass of 4 mm thickness. Solar collector with area of 2.4 square meter ($2.1 \times 1.1 \times 0.3$ m) has black painted plywood to absorb solar radiation insulated with saw dust.
 - A drying chamber ($1.1 \times 0.7 \times 1.0$ m) divided into four divisions, separated by three removable trays, has been provided. Front side of drying chamber is covered by glass slat (6 mm).
 - The bulbs are provided in the solar air heater for heating during late evening or during bad weather in order to reduce the drying time.
- This drier can be profitably used for drying of fruits, vegetables, seeds, medicinal plants and other local products.

Cost

- Unit cost : ₹ 15,000 for 25 kg capacity

Impact and benefits

- The farmers will be benefited in terms of saving time and labour by 50% besides fetching better market price.
- The technology is environmental friendly and can be used at community level for better income generation both individually and through local level ventures, eg. SHGs, NGOs, cooperative societies.

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Non-Tracking Solar Cooker



Salient features

- A solar device for cooking food wherein four dishes can be prepared simultaneously.
- No tracking towards sun needed.
- Easily fabricated by village artisan.
- Double walled boxes of galvanized steel and aluminum sheet. Four aluminum/stainless steel boxes with lid and with double top glass cover and a reflector.
- Dimension (l×w×h): 960×320×210 mm.

Cost

- Unit cost : ₹ 3,500

Impact and benefits

- No adverse effect on health as smokeless boiling involved.
- Saves conventional fuel and time.
- Reduction in CO₂ emission.

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Solar Dryer for Vegetables and Fruits



Salient features

- A device for solar drying of various products. Consists of two serially inclined stainless steel wire mesh trays with glass top cover.
- Absorber area : 1.14 m²

Performance

- Capacity : 10 kg/batch
- Drying time : 2 - 4 days/batch

Cost

Unit cost : ₹ 6,000

Impact and benefits

- Minimization of post-harvest losses of vegetables.
- Encouragement for export of solar dried vegetables with export potential.
- Saves conventional fuel.

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Solar Tunnel Drier



Salient features

- Suitable for drying of red chilli, mushroom, all types of vegetables, ginger, turmeric, etc.

Dimension (l×w×h)	: 5.19×1.22×0.61 m
Drying area	: 5.49 m ²
Air temperature	: 55-60°C
Drying tray	: 1.21×0.61×0.09 m
No. of chimneys	: 2
Collector material (cover)	: UV polyethylene 200 micron sheet
Orientation of tunnel	: E-W direction

Performance

- Efficiency : 40-48%
- Drying period required : 26 h for red chilli
: 5 h for mushroom
: 8 h for leafy vegetables

Cost

- Unit cost : ₹ 15,000
- Cost of operation : ₹ 450/tonne dried product

Impact and benefits

- Time saving and output product is hygienic.
- Utilization of clean source of energy, no environmental pollution.

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Parabolic Solar Concentrator for Milk Pasteurization



Salient features

- Parabolic solar concentrator has 1.08 m diameter and 0.26 m depth.
- One batch consumes 90 minutes and total 2 batches of milk can be pasteurized.

Performance

- 10 l milk/batch could be pasteurized at 63°C in 95 minutes.
- The benefit: cost ratio of the parabolic solar concentrator is 1:10.
- The average overall heat loss factor (F^{UL}) from the sensible cooling curve was found as 22.78W/m².
- The average optical efficiency is 32.85% at average solar insolation of 672 W/m².
- The quality of the pasteurized milk is comparable with conventional pasteurization units with better economics.

Cost

- Cost : ₹ 6,000

Impact and benefits

- Farmers can get higher price of pasteurized milk.
- The shelf-life of product is increased.
- No electrical energy is required for milk pasteurization.
- Sale of pasteurized milk may lead to better price of milk, and socio-economic conditions of farmers are likely to be improved.
- Milk can be pasteurized at village level without huge infrastructure.
- Increased shelf-life of produce with better hygiene.

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High Rate Digester for Agro-Industrial Effluent



Salient features

- An anaerobic filter based dairy effluent treatment plant of 16,000 l/day capacity having influent chemical oxygen demand (COD) in the range of 3,000-3,500 mg/l.
- Biogas produced is used for electricity generation.

Performance

- The digester showed 80% COD removal from the influent.
- Biogas production was found to be ranging between 40 and 45 m³/day.
- Methane content of the biogas was in the range of 70-75%.

Cost

- Initial cost is dependent on the capacity of the digester and it is site specific.

Impact and benefits

- It produces energy and drastically reduces the COD of dairy effluent.
- Besides, the unit generates good quality biogas and its utilization leads to considerable saving in electrical energy.
- No chemicals are required to process the effluent.
- No offensive odour is associated with it as the reactors are closed.
- The sludge production is low eliminating the need for huge sludge drying area.

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Biphasic Biomethanation System for Fruit and Vegetable Market Waste



Salient Features

- A pilot scale biphasic biomethanation system of 10 tonnes/day capacity for fruit and vegetable wastes.
 - The process is odourless. Handling of organic solid wastes becomes easier.
 - Besides biogas, good quality organic manure is produced from the process.
- The system is fed with fruits and vegetables waste @ 3 tonnes/day and scaled up to 10 tonnes/day.
 - Treated ETP water in the ratio of 1:4 mixed with the leachate and fed into the methane reactor.
 - The solid residue after extraction of the leachate could be briquetted and used as boiler fuel or composted to manure.

Performance

- Approximately 30 m³ biogas could be produced from 3 tonnes/day fruit and vegetable waste.
- The methane content in produced biogas varies from 65 to 75%.

Cost

- Unit cost : ₹ 5-6 lakhs/tonne fruit and vegetable waste.

Impact and benefits

- Reduces the cost of solid waste disposal and checks environmental pollution.
- Produces green energy and reduces electrical energy cost.
- Good quality organic manure is obtained.
- The odour-free system for production of biogas and solid fuel/manure.
- Pollution due to uncontrolled open degradation of waste material is eliminated.
- Using system, dairies could become self sustaining in terms of their energy needs.

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Biomass Combustor-cum-Hot Air Generator



Salient features

- Air pre-heated by the flue gas coming out from the biomass combustor.
 - Biomass consumption rate is 10-15 kg/h.
 - Hot air temperature ranges between 70 and 120°C.
 - Weight of the device : 1,000 kg.
 - Centrifugal blower specifications include 1,500 m³/h, 5.63 kW, 1,880 rev/min, 750 mm WG.
 - Operating range is 250 to 800 m³/h air flow rate and 4 to 15 kg/h fuel burning rate.
- Labour requirement is one worker per day for operation.

Performance

- The maximum efficiency of the combustor is up to 64.6 % with mixed wood and 62.3 % with briquettes as fuel at air flow rate of 800 m³/h and fuel feeding rate of 4 kg/h.

Unit cost

- Cost : ₹ 2,20,000

Impact and benefits

- Industries may save up to 40% in cost of air heating required for various purposes.
- Lower environmental pollution.
- Efficient operation facilitates wood conservation.
- Provides opportunity for carbon credit to the user.

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Open Core Downdraft Gasifier



Salient features

- Open core throatless downdraft gasifier suitable for operation with mixed wood pieces, various crop-residue briquettes, and groundnut shell as fuel.
 - Made up of mild steel with cast iron grate.
 - At bottom ash pit is given for collection and removal of ash and char along with provision for grate rotation, manually.
 - Insulated internally with sheets of calcium silicates and insulite 7 and 11.
 - Centrifugal blower: of 400 m³/h capacity equipped with 3.73 kW motor.
- Weight of gasifier : 1,000 kg
 - Labour requirement : One person.
 - The producer gas can be used directly for thermal application and for power generation after conditioning.

Performance

- The industry could save on an average ₹ 160/h in 16 h/day continuous operation of the system.

Cost

- Unit cost : ₹ 2,00,000

Impact and benefits

- For small scale industries, the technology can replace completely the conventional fuels for thermal applications and for decentralized power generation up to 50 kW with suitable sub-assemblies for gas cooling and cleaning.
- Crop residue has become an economic commodity and generate revenue for farmers.
- Promotes green energy.
- Provides carbon credit opportunities to the users.
- Enhances revenue to farmers.

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Poly House Type Fish Drying System



Salient features

- Suitable for drying of fishes at sea-shore.
- Consists of UV stabilized polyethylene sheet as glazing material for capturing heat.
- The structural frame is made up of mild steel square bars, angle and flat.
- Dimension : 1,570×870×1,500 mm (l×w×h)

- Two stainless steel sliding trays of 750×950 mm size, each used for drying of fish.
- Two chimneys of 150 mm diameter and 840 mm height are fitted to facilitate exit of hot humid air after drying.
- The aperture area is 1.44 m².
- Capacity of the unit is 15-20 kg small to medium sized (100-150 mm long) marine fishes.

Performance

- The effective drying time is 12 h (2 days) for moisture reduction from 65 to 14% (w.b.) as compared to 3 days in open sun drying.
- Yield of dried fish ranges from 40 to 49%.

Cost

- Unit cost : ₹ 15,000
- Cost of drying and value addition in the cost of per kg fish was computed to be ₹ 2.12 and ₹ 17.90, respectively, near sea-shore.

Impact and benefits

- Quality of dried fishes is better than open sun dried fishes.
- There is net value addition in the cost of per kg of dried fish. Thus, there would be considerable increase in the income of fishermen and ultimately their socio-economic conditions would improve considerably.
- There is net one day saving in drying time.
- There is no dust and dirt contamination in the dried product.

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Natural Convection Solar Dryer



Salient features

- Suitable for drying of green chilli, *makhua*, copra, nuggets, cabbage, garlic etc.
 - It consists of a flat plate collector and drying box with trays.
 - Dryer dimensions can be varied in accordance with requirements.
 - Typical size of the collector is 2.2 m².
 - Typical capacity of the trays is 15-20 kg.
- Glazing cover is made up of polycarbonate transparent sheet.

Performance

- Drying cost was calculated to be ₹ 9.70, ₹ 10.00, ₹ 15.00 and ₹ 30.00, respectively, for cabbage, green chilli, copra and nuggets.
- Value addition to the raw produce in this case was calculated to be ₹ 4.70, ₹ 6.5, ₹ 13.00 and ₹ 18.00 per kg of cabbage, green chilli, copra and nuggets, respectively.

Cost

- Unit cost : ₹ 30,000
- Payback period : 27 months

Impact and benefits

- Natural convection solar dryer uses solar energy for drying, so need of electricity for drying is eliminated.
- The dried product is free from dirt and dust.
- The quality of dried product in terms of nutritional value, colour and aroma are better as compared to sun-dried product.
- There is no environmental pollution as solar energy is used in drying process.
- Farmers get better price of their produce.
- There is considerable reduction in drying time as compared to open sun drying.

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Fibre Reinforced Plastic Automatic Fish Feeder



Salient features

- Fibre reinforced plastic (FRP) feed dispenser of 10 kg capacity (pellet feed of 2.5 mm diameter and specific gravity 0.77) consists of four major components, viz. feed hopper, hopper lid, housing box and floating buoy.
- The opening/closing mechanism of the sliding door which is incorporated inside the housing box operates on the magnetic field generated by passing electric current through a solenoid coupled with a time switch.
- The quantity of pre-determined feed delivery per activation cycle is controlled by adjusting the dial of the captive segments of time switch by pull or press method. An additional EM 2000 interval timer delay relay is used with 15 min– 24 h relay, if small quantity of feed is needed per activation cycle. The system has power supply through 24 V battery charged by photo voltaic panels. The total unit is placed on a FRP conical float filled with proper material as well as ballast required for stability for floating in the pond.

Performance

- Powdered feed can be delivered 28-905 g at time settings of 5-15 s with 2.2-11.3% error, whereas pellets of 2.5 and 3.0 mm can be delivered at the rate of 993-2,491 g/cycle and 1,393-4,284 g/cycle with 5.6-39.5% and 3.5-80.5% error at 5-15 s respectively.

Cost

- Unit cost : ₹ 42,000 (FRP automatic fish feeder)
- Unit cost : ₹ 65,000 (FRP fish feeder with stand)

Impact and benefits

- Nutritionally enriched and expensive feed can be saved to a great extent by using the gadget.
- The feeder is reliable to dispense a measured quantity of dry feed to fish.

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Manual Drip Lateral Coiler



Salient features

- An aid to help farmers in coiling the drip laterals from field to reduce cost of operation and avoid tangling of laterals.
Dimension : 1,638×1,040×954 mm
(l×w×h)
Weight : 40 kg

Performance

- Field capacity (Coiling) : 0.17 ha/h
- Field capacity (Decoiling) : 0.60 ha/h

Cost

- Unit cost : ₹ 3,600

Impact and benefits

- Saving in collection cost and time.
- Easy to transport and operate.

Contact

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Palmyrah Tree Climbing Device



Salient features

- The device comprises an upper and lower frame member made using 19 mm hollow square pipe of 2 mm thickness. It is provided with a tree holding section having 'U' shaped gripping aid.
- The upper and lower frame members are connected with a safety strap to prevent the accidental slipping of the lower frame down the tree and to facilitate retrieval of lower frame should it inadvertently slip from the engagement with the worker's feet while ascending and descending.
- A safety rope is secured to the body of the worker from the front cross rail to the rear concave rail of the rigid base section of upper frame with an adjustable buckle for safety of the worker and for preventing the accidental slipping of the upper frame when worker performs the required operation at the tree top. The climbing device consists of a knife holding box, an iron ring for holding wooden tongs and an iron ring for holding lime container fitted in the upper frame.

Dimension (l×w×h)	: 1,125×545×730 mm
Weight	: 16.7 kg
Manpower requirement	: One person
Weight	: 16.7 kg

Performance

- Capacity : 6 trees/h and 24 fruits/h

Cost

- Unit cost : ₹ 6,000
- Cost of operation : ₹ 53/h

Impact and benefits

- Less possibility of injuries during operation.

Contact

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Safety Attachment to Coconut Climber



Salient features

- A simple cost effective device, fitted with a rope, tightens the device with tree for safety of climbers. A positive locking for Chemberi (SS) model of tree climber to lock the machine to tree trunk to facilitate the climber to ascend or descend up to crown of the tree.

Performance

- Capacity : 50-70 trees/day

Cost

- Unit cost : ₹ 750

Impact and benefits

- The attachment provides safety to the climber during climbing and harvesting operations.
- It eliminates the risk of falling down.

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Tractor Drawn Multi-Utility Elevator Platform



Salient features

- The tractor operated elevator attachment is a versatile and reliable worker-positioning platform for harvesting fruit, spraying, pruning and training of orchards.

Maximum height of harvesting : 8 m
Load bearing capacity : 200 kg
Man power requirement : Two person

Performance

- Capacity of fruit harvesting : 70-150 kg/h

Cost

- Unit cost : ₹ 2,00,000

Impact and benefits

- Reduction in manpower requirement and cost of operation.

Contact

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Cotton Seed Blower



Salient features

- This technology provides a system for cleaning of the seeds at end user level to obtain viable seed.

Cost

- Unit cost : ₹ 35,000

Impact and benefits

- Highly suited for small-scale seed producers to remove trash, sieve and clean lots. The machine could be used by the farmer individually or on a custom-hire basis. Cleaner seed free from unviable seeds will translate into better crop stand and population.

Contact

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Power Operated Disintegrator Machine



Salient features

- A small power operated machine to reduce the size of compost for mixing and preparing the media.

Dimension : 710×622×1,354 mm
(l×w×h)

Weight : 120 kg

Performance

- Capacity : 180-200 kg/h

Cost

- Unit price : ₹ 21,500

Impact and benefits

- Saving in cost of production of organic manure.

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Mole Plough for Pipeless Drainage in Vertisols



Salient features

- Dimension of leg : 1,250×250×25 mm
- Foot diameter : 75 mm
- Expander diameter : 85 mm
- Weight : 70 kg
- Desired soil moisture at moling depth : 26-28% (d.b.)
- Clay content : > 40% at moling depth
- Life of mole drains : 5 years

Performance

- Field capacity : 0.24 ha/h
- Draft requirement : 29.6 kN
- Depth of moling : 0.5 – 0.6 m
- Speed of operation : < 1 km/h

Cost

- Unit cost : ₹ 15,000
- Cost of operation : ₹ 3,500/ha (spaced at 4 m)

Impact and benefits

- It saves about 90% time over conventional practices of surface drain construction. Saves about 60% of labour cost and the life of mole drains is over 5 years, whereas surface drains are to be constructed every season.
- Man-power requirement for weeding reduces by more than 50%, hence reduced input cost.
- Improved soil health provides better environment for the crop to grow and less chances of weed infestation and associated problems.

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Technology for Agricultural Drainage in Vertisols



Salient features

- Design details of open channels:
 - Spacing : 15 to 20 m interval
 - Depth of channel : 0.5 m
 - Side slopes : 1: 1
 - Bed gradient : <0.5%
 - Drainage coefficient (DC) : 5.34 mm/day
- Drain spacing : 20 m
- Drain depth : 1.0 m
- Corrugated perforated PVC pipe : 72/80 mm diameter
- Filter material: Geo-textile non-woven fabric SAP 240

Performance

- Surface drainage system resulted in 20-40% yield increase in soybean, maize and pigeonpea crops over-control.
- Sub-surface drainage (SSD) system resulted in 50-60% increase in yield of same crops over control.

Cost

- Surface drainage : ₹ 1,250-1,750/ha
- Subsurface drainage : ₹ 65,000/ha

Impact and benefits

- Higher income through better soil-water-air-plant environment. Surface drainage system resulted in 20-40% increase in yield and the SSD system resulted in 50-60% increase over control for soybean crop.
- Additional yield of soybean obtained up to @ 0.4 tonne/ha (₹15,000/tonne). SSD also resulted in 15% (0.2 tonne/ha, ₹ 20,000/tonne) increase in yield of subsequent *rabi* season chickpea crop over the control.
- Improved soil health provides better environment for the crops to grow and less chances of weed infestation and associated soil degradation problems.

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Anti-vibration Device for Increased Comfort of Power Tiller Operator



Salient features

- It comprises a vibration isolators for engine, handle bar and handle. The key element of the isolator is an isomer (Steryl butadiene rubber) bonded to the walls of two sleeves under specified pressure and temperature, that in turn assumes rigid connectivity under designed compressive and shear load conditions.
- Four number of vibration isolators of size $115 \times 100 \times 45$ mm are mounted between engine and chassis. The vibration transmitted from the engine is absorbed by the engine mount. Further absorption of vibration transmitted from terrain is done by providing four numbers of vibration isolators of size 100×60 mm between the power tiller body and handle bar. The third stage vibration absorption is done at handle through an isolator of size $150 \times 50 \times 50$ mm fitted between handle frame and the handle grip. The device can be installed in all the commercially available power tillers with slight modifications.

Performance

- Reduction of hand transmitted vibration by 41 to 52 % and 48 to 56% during roto-tilling and transport operations respectively.

Cost

- Unit cost : ₹ 4,500

Impact and benefits

- Safe exposure limit of the operator is increased from <0.5 h to 2-4 h for roto-tilling and from 0.5-1 h to 4-8 h for transport mode.
- The device helps to minimize the health hazards of the power tiller operators due to vibrations.

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Anti-vibration Devices for Increased Comfort of Tractor Operators



Salient features

- The anti-vibration device consists of isolators to reduce the terrain induced vibration reaching the operator. The device can be installed in all the commercially available tractors without any disturbance to the operator. The isolator has two mild steel plates of 10 mm thickness sandwiching 12 numbers

of isomer (Steryl butadiene rubber) blocks of 25 mm diameter and 20 mm height arranged in a rectangular fashion. All the blocks are riveted to one mild steel plate properly in order to be secured in position while operating. Other mild steel plate is detachable so as to enable easy fixing to the bottom of the seat. The overall size is 300×230×40 mm and it weighs 10 kg. The isomer is strained in compression when the load is applied along its perpendicular direction. The isolator is fixed in between the body of tractor and seat. It isolates the vibration transmitted to the seat from the wheel.

Performance

- Reduction in whole body vibration is 12-42%, 25-46% and 70-83% for disc ploughing, cultivator operation and transport mode respectively.

Cost

- Unit cost : ₹ 6,000

Impact and benefits

- Safe exposure limit of the operator is increased from 4 to 8 h to more than 8 h during disc ploughing and cultivator operations and from 2.5 to 4 h to more than 8 h during transport operation.
- The device helps to minimize the health hazards of the tractor operators due to vibrations.

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Tractor Operated Pumping Device for Removing Poisonous Gas from Wells



Salient features

- Poisonous gas in wells can be removed with this blower type poisonous gas pumping device. It can be operated by tractor (22 kW or more)
- Dimension (l×w×h): 900×800×1,600 mm
Weight : 150 kg

Performance

- Gas removal : 4.6 m³/ min

Cost

- Unit cost : ₹ 40,000
- Cost of operation : ₹ 350/h

Impact and benefits

- It helps to remove the poisonous gas/air from well.
- Useful in saving lives of workers.

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