Technical Specifications of the implements proposed to be provided under subsidy

ROTAVATOR

It consists of a MS frame, a rotary shaft on which blades are mounted, power transmission system having primary and secondary speed reduction unit. The blades are made from medium carbon steel or alloy steel, hardened and tempered to suitable hardness. Rotary motion of the tractor PTO is transmitted to the rotor shaft carrying the blades through transmission system having primary and secondary speed reduction unit. A good seedbed with pulverized soil is achieved in a single pass of the rotavator. The detailed technical specifications are as follows:

Type	:	Tractor PTO operated Rotavator
Power source	:	Tractor of 35 HP and above
Hitch Type	:	Three point, CAT-I/CAT-II
Working width (mm)	:	1500-2200
Type of blade	:	C shape with 25 mm overlap of blades or L/ J shape as per demand
Thickness of blade (mm)	:	7-8 (min.)
No. of Blades	:	Minimum of 36 (Depending on sizes)
Distance between consecutive flanges(mm)	:	200-242 (depending upon type and shape of blade)
Total number of flanges	:	6-10
Number of blades per flange	:	6 (max.)
Diameter of rotor shaft (mm)	:	85-90
Rotor diameter (including flange and blade mounted on flange, mm)	:	440-460
Revolution of rotor shaft (rpm)	:	180-240 (Single speed/ Multi Speed Variants)
Side Drive	:	Gear drive/Chain drive variants
Depth control mechanism	:	Arc shape skid on both side of rotavator

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected/covered. Trailing board should be provided. The machine should be painted with high quality paint after applying proper primer. The machine

should be warranted for two years for any manufacturing defects especially seal leakage. The machine should be easily serviceable with good availability of spare parts.

ROTARY PLOUGH (Power Harrow)

Rotary plough(power harrow) is used for mechanical soil tillage and seed-bed preparation on farms and in vineyards and orchards, as well as for row crops. The detailed technical specifications are as follows:

Type	:	Tractor PTO operated
Power source	:	Tractor of 60 HP and above
Hitch Type	:	Three point, CAT-I/ CAT-II
Working Width (mm)	:	1500 mm or above
No. of Blades	:	12-18
Input RPM	:	540 or 1000
Rotor RPM @ 540 PTO (rpm)	:	240 to 300
Rotor drive type	:	Gear drive immersed with oil bath
Distance between Rotors	:	250 mm
Blade Dimension	:	Thickness 12 to 15 mm, Length 280 to 290 mm
Blade Material	:	Boron steel
Blade Mounting	:	Bolt and Nut with stone protection guard
Leveling device	:	Rear Mounted with height adjustment
Drive Shaft	:	Universal joint power transmission shaft with shear bolt safety device

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected/covered. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

LASER GUIDED LAND LEVELER

Laser guided land leveler is used for precise leveling of fields with desired grade. The laser guided land leveler should have the following components:

- Self Leveled laser transmitter with a minimum operating range of 600m (diameter), with self leveling accuracy of ± 1.5 mm for 30meters.
- Laser eye receiver for field survey
- Laser receiver with beam acceptance angle 360 degree
- Automatic control box (Digital or Analog)
- Bucket scrapper- Double tyre
    - Length = 2080-2140 mm
    - Width = 580-585 mm
    - Thickness = 8-9 mm (min.)
    - Thickness of blade = 12-13 mm (min.)
- Rigid mast with arms and height adjustment facility
- Automatic double acting hydraulic cylinder assembly
- Tripod stand
- Grade rod for survey
- Cable Connectors
- Rechargeable Battery with charging cable (Min. 12 V)

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected/covered. The machine should be painted with high quality paint after applying proper primer. The machine/electronic components should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

SUB SOILER

Sub soiler is used to break hardpan of the soil, loosening of the soil and helps the water to seep into the soil for improving drainage. It consists of beam made of high carbon steel, beam and lower supports which are flanged at upper edges for rigidity, hollow steel adaptor welded to bottom end of the beam to accommodate share base, share base having square section, share plate made from high carbon steel and shank drilled and counter bored for set board which secures the base in the adaptor. Share plate is made from high carbon steel, hardened and tempered to suitable hardness. Two symmetrically located bolt holes allow reversibility of share. The working depth of the subsoiler is controlled by hydraulic system and linkage of tractor.

Type	:	Tractor drawn 3 point linkage mounted
Power source	:	45 HP Tractor or above
Hitch Type	:	Three point, CAT-I/CAT-II
No. of Bottoms/tynes	:	Single bottom or more (depending on tractor H.P)
Tyne dimension, mm	:	300 x 50 (min.)
Depth of operation	:	450-600mm
Type of Shovel	:	Reversible, easily replaceable and suitably hardened
Weight, kg	:	65-280

The workmanship should be of high quality. It should be provided with proper stand for storage. It should not have sharp projections. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects.

POST HOLE DIGGER

Post Hole Diggeris used for digging pits for applications like fencing/ tree plantation. Auger size can be decided as per the required hole size. The machine is a tractor PTO operated with the power being utilized to move the auger through a gear box. The detailed technical specifications are as follows:

Power Source	:	Tractor of 35 HP or above
Hitch Type:	:	Three point linkage, CAT-I/CAT-II
Auger Type	:	Screw type
Auger Length	:	1100-1400
Auger Diameter	:	150-950
Thickness of Auger sheet (mm)	:	3-4 (min.)
Cutting Blade	:	Single/Double
Gear Box	:	Should be compatible with various H.P tractors, input RPM-540, preferably with 3:1 ratio
Cutting Blade	:	Blade should be good quality (boron steel or EN -8)s, should be able to withstand the corrosion/ shear, should be easily replaceable
Frame	:	Heavy Duty MS Pipes (rectangular or round)

Provision for carrying PTO shaft with machine should be provided. A stand should also be provided with the machine. The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

SEED CUM FERTILIZER DRILL

Seed cum fertilizer drill machine consists of frame, seed box, fertilizer box, seed metering mechanism, fertilizer metering mechanism, seed tubes, furrow openers, seed rate adjusting lever and transport cum power transmitting wheel. Detailed specifications are mentioned below:

Power Source	:	Tractor of 35 HP or above
Hitch Type:	:	Three point linkage, CAT-I/CAT-II
Seed hopper	:	Separate Hoppers (trapezoidal shape) for Fertilizer and Seeds with mechanism for feed rate control. The hoppers should be sufficiently covered to prevent the entry of water. If the material of fertilizer and seed box is Mild Steel, the thickness of MS sheet should be more than 1.0 mm.
Furrow openers	:	Reversible shovel type
No of furrow opener	:	9 to 15
Metering Mechanism,		
For seeds	:	Fluted roller (As per IS 6813:2000)
For fertilizer	:	Gravity feed or corrugated roller type
Power to metering mechanism	:	From Lugged ground wheel through chains and sprockets
Seed and fertilizer tubes	:	Seed and fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm. Length of plastic tube should be of suitable length without any bends

- The drill should be able to sow wheat and other crops such as soybean, barley etc. and be able to drill all types of granular fertilizer
- Seed and fertilizer rate shall be easily adjustable
- Provision for closing seed and fertilizer discharge should be provided
- Fertilizer placement: before the seed in the same line preferably 25 mm to the side of seed
- Row spacing should be adjustable ranging from 150 to 225 mm preferably in steps of 25 mm
- The Transmission system should be provided with guard for safety
- Furrow openers should be provided with depth adjustment arrangements
- The drill should be provided with adjustable depth wheels
- A permanent type metallic calibration plate indicating the metering position should be provided
- Proper lubrication arrangement for all moving components should be provided
- Marking indicating source of manufacturer, serial number, type and size should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects.The machine should be easily serviceable with good availability of spare parts.

ZERO TILL DRILL

Zero till drill consists of frame, seed box, fertilizer box, seed metering mechanism, fertilizer metering mechanism, seed tubes, inverted T-type furrow openers, seed adjusting lever and transport cum power transmitting wheel. The frame is made from mild steel box section. The tynes are mounted with the help of clamps, to obtain desired row spacing. Zero till drill should be capable of sowing wheat crop in unprepared field after harvesting of paddy. The detailed technical specifications are as follows:

Power Source	:	Tractor of 35 HP or above
Hitch Type:	:	Three point linkage, CAT-I/CAT-II
Seed hopper	:	Separate Hoppers (trapezoidal shape) for Fertilizer and Seeds with mechanism for feed rate control. The hoppers should be sufficiently covered to prevent the entry of water. If the material of fertilizer and seed box is Mild Steel, the thickness of MS sheet should be more than 1.0 mm.
Furrow openers	:	Inverted T-type
No of furrow opener	:	9 to 15
Metering Mechanism,		
For seeds	:	Fluted roller (As per IS 6813:2000)
For fertilizer	:	Gravity feed or corrugated roller type
Power to metering mechanism	:	From Lugged ground wheel through chains and sprockets
Seed and fertilizer tubes	:	Seed and fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm. Length of plastic tube should be of suitable length without any bends

- Seed and fertilizer rate shall be easily adjustable
- Provision for closing seed and fertilizer discharge should be provided
- Fertilizer placement: before the seed in the same line preferably 25 mm to the side of seed
- Row spacing should be adjustable ranging from 150 to 225 mm preferably in steps of 25 mm
- The Transmission system should be provided with guard for safety
- Furrow openers should be provided with depth adjustment arrangements
- A permanent type metallic calibration plate indicating the metering position should be provided
- Proper lubrication arrangement for all moving components should be provided
- Marking indicating source of manufacturer, serial number, type and size should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects.The machine should be easily serviceable with good availability of spare parts.

SPATIAL ZERO TILL DRILL

Spatial zero till drill is similar to zero till drill but is spatially modified. The furrow openers are mounted on frame in three rows. It consists of frame, seed box, fertilizer box, seed metering mechanism, fertilizer metering mechanism, seed tubes, furrow openers, seed adjusting lever and transport cum power transmitting wheel. The frame is made from mild steel box section. The detailed technical specifications are as follows:

Power Source	:	Tractor of 35 HP or above
Hitch Type:	:	Three point linkage, CAT-I/CAT-II
Seed hopper	:	Separate Hoppers (trapezoidal shape) for Fertilizer and Seeds with mechanism for feed rate control. The hoppers should be sufficiently covered to prevent the entry of water. If the material of fertilizer and seed box is Mild Steel, the thickness of MS sheet should be more than 1.0 mm
Furrow openers	:	Inverted T-type
No. of furrow opener	:	9
Frame members	:	3
Lateral Clearance between the adjacent openers (cm)	:	60
Vertical Clearance of frame from ground (cm)	:	60-90
Metering Mechanism,		
For seeds	:	Fluted roller (As per IS 6813:2000)
For fertilizer	:	Gravity feed or corrugated roller type
Power to metering mechanism	:	From Lugged ground wheel through chains and sprockets
Seed and fertilizer tubes	:	Seed and fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm. Length of plastic tube should be of suitable length without any bends

- The drill should be able to sow wheat in standing stubbles in combine harvested paddy feild and be able to drill all types of granular fertilizer
- Seed and fertilizer rate shall be easily adjustable
- Provision for closing seed and fertilizer discharge should be provided
- Fertilizer placement: before the seed in the same line preferably 25 mm to the side of seed
- Row spacing should be adjustable ranging from 150 to 225 mm preferably in steps of 25 mm

- The Transmission system should be provided with guard for safety
- Furrow openers should be provided with depth adjustment arrangements
- A permanent type metallic calibration plate indicating the metering position should be provided
- Proper lubrication arrangement for all moving components should be provided
- Marking indicating source of manufacturer, serial number, type and size should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects.The machine should be easily serviceable with good availability of spare parts.

DSR DRILL/PLANTER

Teh amchine is used for direct seeding of rice. It consists of frame, seed box, fertilizer box, seed metering mechanism, fertilizer metering mechanism, seed tubes, furrow openers, seed adjusting lever and transport cum power transmitting wheel. The frame is made from mild steel box section. The detailed technical specifications are as follows:

Power Source	:	Tractor of 35 HP or above
Hitch Type:	:	Three point linkage, CAT-I/CAT-II
Seed hopper	:	Separate Hoppers (trapezoidal shape) for Fertilizer and Seeds with mechanism for feed rate control. The hoppers should be sufficiently covered to prevent the entry of water. If the material of fertilizer and seed box is Mild Steel, the thickness of MS sheet should be more than 1.0 mm.
Furrow openers	:	Inverted T-type
No of furrow opener	:	9 to 13
Metering Mechanism,		
For seeds	:	Notched Inclined plate type suitable for metering paddy seeds
For fertilizer	:	Gravity feed or corrugated roller type
Power to metering mechanism	:	From Lugged ground wheel through chains & sprockets and gears
Seed and fertilizer tubes	:	Seed and fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm. Length of plastic tube should be of suitable length without any bends

- The drill shall be able to sow paddy seed and also shall be able to drill all types of granular fertilizers
- Seed and fertilizer rate shall be easily adjustable
- Provision should be provided for adjustment of angle of box containing inclined plate metering mechanism.
- Provision for closing seed and fertilizer discharge should be provided
- The drill should be provided with adjustable depth wheels
- Row spacing should be adjustable ranging from 150 to 225 mm preferably in steps of 25 mm
- The Transmission system should be provided with guard for safety
- Furrow openers should be provided with depth adjustment arrangements
- A permanent type metallic calibration plate indicating the metering position should be provided

- Proper lubrication arrangement for all moving components should be provided
- Marking indicating source of manufacturer, serial number, type and size should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

PNEUMATIC PLANTER

Pneumatic Planter uses air/vacuum to carry the seed to furrow opener with precision at uniform depth. The detailed technical specifications are as follows:

Power Source	:	50 HP Tractor or above
Mounting mechanism	:	Through 3 point linkage with tractor
Hitch Type		CAT-I/CAT-II
Power drive from tractor to machine	:	Tractor PTO at 540 rpm
Maximum No. of rows	:	4
Row to row distance	:	30-75 cm, adjustable
Furrow openers	:	Double disc with provision for adjustment of depth
Metering mechanism	:	A vacuum seed metering mechanism arranged in combination with a seed hopper for uniformly dispensing seeds to the ground

- The drill shall be able to meter the seed of Cotton, Maize, Sorghum, Groundnut, Pea, Sunflower, Soybean etc. and also shall be able to meter all types of granular fertilizers
- Power to metering mechanism : Through PTO
- Ground wheel : Should be provided
- Separate Hoppers for Fertilizer and Seeds with mechanism for feed rate control. The hoppers should be sufficiently covered to prevent the entry of water.
- Provision for closing seed and fertilizer discharge should be provided
- The seed and fertilizer rate shall be easily adjustable
- Press wheels should be provided for covering the seeds
- Fertilizer placement: Before the seed in the same line
- Seed & fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected/covered. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts

HAPPY SEEDER

Happy seeder should be capable of sowing wheat crop in standing stubbles of paddy crop placing seeds and fertilizer at the desired depth. Happy Seeder consists of frame, seed box, fertilizer box, seed metering mechanism, fertilizer metering mechanism, seed tubes, a rotar shaft with flail type reversible straight gamma blade in front of the furrow opener assembly, inverted T-type furrow openers, seed adjusting lever and transport cum power transmitting wheel. The machine should be provided with adjustable depth wheels. The detailed specifications are as follows:

- Power source : 45 HP or above Tractor
- Hitch Type : Three point linkage, CAT-I/CAT-II
- No. of tynes : 9/10/11/12/13
- Row to row distance : 225 mm
- Type of furrow openers : Inverted T-type
- Rotor drum diameter : 750 mm
- Rotor shaft diameter : 140 mm
- Rotor RPM : 1500-1600 rpm at 540 rpm of tractor PTO
- Types of flail blades : Reversible straight gamma type
- Flail blade length from rotor surface : 240 mm
- Flail Blade length : 165mm
- Bottom width of flail blade : 85 mm
- Top width of blade : 50mm
- Blade Overlapping above furrow openers: 60 mm
- Minimum diameter of ground wheel : 550mm
- Seed hopper : Separate Hoppers (trapezoidal shape) for Fertilizer and Seeds with mechanism for feed rate control. The hoppers should be sufficiently covered to prevent the entry of water. If the material of fertilizer and seed box is Mild Steel, the thickness of MS sheet should be more than 1.0 mm
- Metering Mechanism

  For seeds : Fluted roller (As per IS 6813:2000)
  For fertilizer : Gravity feed or corrugated roller type
- Power to metering mechanism : From Lugged ground wheel through chains and sprockets
- Seed and fertilizer tubes : Seed and fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm. Length of plastic tube should be of suitable length without any bends

- The transmission system should be provided with guard for safety
- A permanent type metallic calibration plate indicating the metering position should be provided
- Proper lubrication arrangement for all moving components should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected/covered. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects.The machine should be easily serviceable with good availability of spare parts.

RAISED BED PLANTER

The bed planter consists of a frame, planting hoppers, fertilizer box, furrow openers, bed shaperand power transmission wheel. The frame is made of mild steel sections. Bed planter makes bed and sows crops simultaneously and is suitable for wheat, maize, peas, vegetable seeds etc. The detailed specifications are as follows:

Power Source	:	Tractor of 45 HP or above
Hitch Type:	:	Three point linkage, CAT-I/CAT-II
Bed Former	:	MB plough types
Bed Shaper		Scraper type/Roller type
Furrow openers	:	Shovel type or double discs type
No of beds	:	2
No. of rows per bed	:	1-3
Bed dimensions	:	Base width = 67.5 cm Top width = 35-45 cm (adjustable) Slant height = 20 cm
Metering Mechanism,		
For seeds	:	Inclined plate/ vertical plate with spoons with adjustable angle of box
For fertilizer	:	Fluted roller type/corrugated roller/vertical groove disc
Power to metering mechanism		Through chain drive from Ground wheel
Location of fertilizer metering		Before seed in line
Seed and fertilizer tubes	:	Seed and fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm. Length of plastic tube should be of suitable length without any bends

- Suitable mechanism should be provided for changing row spacing and depth control (grooves for moving the openers up and down) for adjusting the depth of furrow openers
- Separate hoppers for fertilizer and seeds with mechanism for feed rate control. The hoppers should be sufficiently covered to prevent the entry of water.

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

SUGARCANE TRENCHER

Sugarcane trencher is used for digging trenches for paired row planting of sugarcane. The detailed specifications are as follows:

Power Source	Tractor of 45 HP or above
Bottom width of trench, cm	30
Depth of trench, cm	20 - 30
Top width of bed, cm	90
Size of frame, cm	MS, 194 x 50
Size of section, cm	75 x 75 x 5
Size of tine, cm	
Width	5
Thickness	2
Thickness of Mould board sheet, mm	MS, 6
Type of Mould board	Adjustable
No. and Length of marker, cm	2, 120
Spacing between the each pair of furrow openers, cm	30
Type of furrow openers	Reversible shovel type
Provision for bed scrapper	Provided
Type of mounting of trench assembly	Clamp type
Hitch	Three point linkage, CAT-I/CAT-II
Provision for mounting the seeding & fertilizer mechanism for inter-cultivation, if needed	Provided

The workmanship should be of high quality. It should not have sharp projections. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should have good availability of spare parts.

MULTI CROP PLANTER

Used for sowing bold grains like maize, groundnut, peas, cotton, sunflower etc. Multi crop planter consists of a frame, planting hoppers, fertilizer box, furrow openers and power transmitting wheel. The detailed specifications are as follows:

Power Source	:	Tractor of 35 HP or above
Hitch Type:	:	Three point linkage, CAT-I/CAT-II
No. of tynes	:	9-13
Row spacing	:	Adjustable
Furrow openers	:	Reversible Shovel type
No of beds	:	2
No. of rows/bed	:	1-3
Metering Mechanism,		
For seeds	:	Inclined plate/ vertical plate with spoons (with al least three
For fertilizer	:	set of plates for different crops) Adjustable opening with agitator
Power to metering mechanism	:	Through chain drive from Ground wheel and gears
Location of fertilizer metering	:	Before seed in line
Seed and fertilizer tubes	:	Seed and fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm. Length of plastic tube should be of suitable length without any bends

- Suitable mechanism should be provided for changing row spacing
- Seed and fertilizer rate shall be easily adjustable
- The drill should be provided with adjustable depth wheels
- The Transmission system should be provided with guard for safety
- Fertilizer and seeds hoppers with mechanism for feed rate control. The hoppers should be sufficiently covered to prevent the entry of water.

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

RIDGE PLANTER

Used for planting maize on ridges. Consists of ridger, hopper with units of inclined plate metering device, driving wheel and furrow openers.

Power Source	:	45 HP Tractor or above
No. of Ridgers	:	3 or more
No. of Furrow openers/ridge	:	1 or 2
Furrow openers	:	Shoe/hoe type
Row spacing:	:	Adjustable
Metering mechanism	:	Seed : Inclined plate type (planter)/fluted roller Fertilizer : Fluted roller/ Adjustable opening with agitator
Power to metering mechanism	:	Through chain drive from Lugged Ground wheel and gears
Seed and fertilizer tubes	:	Seed and fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm. Length of plastic tube should be of suitable length without any bends
Hitch Type:	:	Three point linkage, CAT-I/CAT-II

Additional set of disc plates for different crops should be provided

Hopper seed / fertilizer: Made with M.S sheet of more than 1.0 mm with lid to cover the hopper

Furrow covering device and marker should be provided

Ridger body should be detachable

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

POTATO DIGGER

Machine is suitable for digging and exposing the potato tubers. It comprises of a frame, V type edge/Trapezoidal type digging blade, endless rod chain conveyer attached behind the blade, gearbox, two gauge wheels, idlers and driving sprockets. The machine harvests two rows at a time. Soil-potato mass is picked up and lifted by the chain conveyer. Two oval agitator sprockets oscillate the conveyer chain rod, which helps to separate the soil. Potato tubers with no or very little soil/clods are dropped on the ground behind the digger.

Power Source	:	Tractor of 35 HP or above
Hitch	:	Rear 3 point linkage, CAT-I/CAT-II
Frame:	:	Should be good quality (MS Channel/ Box welded frame)
Digging blade:	:	V type edge/Trapezoidal plate type 42-45cm width
Gauge wheels:	:	Two
Depth Adjustment:	:	Through 2 coulter discs at both end of blades
Conveyer:	:	Endless rod chain conveyer made of MS rods of 13 mm (min.), length of conveyer 150-250cm, 18-20 degree angle with the horizontal, spacing between conveyor rods 25 mm (min.), peripheral speed of conveyor 2-2.2 m/sec

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

SELF PROPELLED REAPER BINDER

The machine is a self propelled unit which is capable of reaping and binding the crop simultaneously. The machine is mainly used for wheat, paddy, oats, barley and other grain crops. Machine consists of engine, gear box, cutter bar, crop gathering unit, binding mechanism, steering system and seat for the operator. Gear box is an integral part of engine. The power from gear box is transmitted to cutter bar and crop gathering unit through the V-belt. The power from the gear box to the ground wheel is transmitted through chain and sprocket arrangement

Prime Mover	:	Min. of 5 HP engine (petrol or diesel) conforming the BIS standards
Traction Wheel	:	Two wheels provided at front with traction type lug pattern
Clutch:		Should be provided on the handle bar
Gear Box:		Mechanical, with provision for forward and reverse speeds, operated by a lever on the handle
Brake:		Should be provided on the handle bar along with provision for parking brakes
Width of cut	:	1300 mm

- Head light should be provided on the machine
- Crop Divider should be provided (Shoe Type)
- Twine bundle should be easily replaceable and binding unit should bind the crop without any damage
- Operator's seat should be well cushioned for comfort.
- Operator's safety: Maneuverability of the machine should be easy
- Noise level should be well within the prescribed limits
- The overall weight of the machine with full fuel tank, sump & gear box but without operator should not be more than 450 kg

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

POWER WEEDER

Power weeder is a self propelled walk behind machine and is used for weeding in horticulture and wider row crops. Machine consists of engine, gear box, rotary unit and lugged pneumatic wheel. The power from gear box is transmitted directly to rotary unit for weeding and lugged pneumatic wheels for providing traction to machine for forward motion. The detailed specifications are as below:

Prime Mover	:	2.5 HP and above engine (petrol or diesel) conforming the BIS standards in respect to performance on different parameters
Working width	:	300 mm and above
Traction Wheel:	:	Two Wheels provided with traction type lug pattern
Main clutch	:	One
Turning clutch	:	Two
Rotary weeding unit	:	Provided with 'C' or 'L-C' type blades mounted on flanges of rotor shaft, no. of blades may vary as per no. of flanges (Min. of 3 blades/flange)
Operator's safety:	:	Maneuverability of the machine should be easy
Noise level	:	Should be well within the prescribed limits

Provisional options:

Detachable Operator's seat: Should be well cushioned for comfort

The overall weight of the machine with full fuel tank, sump & gear box but without operator should not be more than 170 kg.

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

SEMI AUTOMATIC POTATO PLANTER

Semi automatic potato planter of revolving magazine type or belt conveyor with cup type metering mechanism. It consists of a frame, furrow openers, seed box, revolving magazine type or belt conveyor with cup type metering mechanism, seats, ridge formers, seed tubes and a ground wheel for transmitting power to the shaft. The machine is mounted on 3-point linkage of a tractor. The conveying of one potato per cup is regularized by the person sitting on the seat in case of belt cup type potato planter whereas manual feeding is done for revolving magazine type potato planter.

Power source	:	Tractor of 35 hp and above
Ridge forming device	:	M.B type Ridgers
Seed hopper capacity	:	60-70 kg
Type of furrow openers	:	Shovel type
No. of rows	:	2 to 4
Drive to working parts	:	From variable diameter ground wheel
Adjustment for seed spacing	:	Varying ground wheel diameter and change of sprockets
Row to row spacing	:	55-65 cm
Plant to plant spacing	:	15-25 cm
Changing Ridge Spacing	:	Provision should be there for change in ridge spacing (holes on the bar frame)
Soil covering device	:	Should be provided

Adjustment of height of soil covering: Device should be provided for adjustment of height of soil covering

Wing Width	:	Provision should be there for change in wing width for changing width/profile of the ridge formed
Depth Control	:	Mechanism should be there (slots in each shovel)
Internal diameter of seed tube:		105mm
Frame	:	Should be of good quality frame with M.S box fabrication
Type of hitch:	:	Three point linkage (CAT-I/II)

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

AUTOMATIC POTATO PLANTER

Picker wheel type: The machine consists of seed hopper, fertilizer hopper, seed picking mechanism, fertilizer metering mechanism, furrow opener, ridger and ground wheel for transmitting power to the shaft.The hopper for potatoes is made of MS sheet. It is rectangular in shape at the top with sides sloping towards bottom. At the bottom of the hopper there are agitators to improve the delivery of potato tubers to feeder. The rear wall of the hopper has window and a gate for feed regulation. The spacing between adjacent seeds can be varied by suitably modifying the gear ratio.

Vertical belt paired row type: Tractor operated vertical belt paired row potato planter consists of two vertical rubber belts fitted with metal cups in paired rows for picking potato tubers, provision for fertilizer application and shovel type furrow openers. Arrangement of cups on the belt is in Zig-Zag manner. Planter is equipped with multispeed gears to adjust the seed spacing.

Specifications:

Parameters	Picker wheel type	Vertical belt paired row type
Power source	45 HP or above tractor	45 HP or above tractor
Seed metering mechanism	Actuating fingers mounted on picker wheel	Vertical belt cup type
No. of picker wheel/vertical belts	2	2
No. of rows of cup/belt	-	2
Dia. of picker wheel, cm	54-55	-
No. of picking spoons/picker wheel	10	-
No. of cups per vertical belt	-	40
Row to row spacing, cm	55-65	61-71
Plant to plant spacing, cm	10-20	22
Horizontal distance between cups, cm	-	12
Type of furrow opener	Shovel type	Shovel type
Ground wheel diameter, cm	52 (Adjustable)	64
Fertilizer metering mechanism	Available	Available
No. of ridgers/bottoms	3	3-5

Changing ridge spacing: Provision should be there for change in ridge spacing (holes on the tool bar frame)

Soil covering device: Should be provided

Adjustment of height of soil covering: Device should be provided for adjustment of height of

soil covering

Wing width : Provision should be there for change in wing width for changing the width and profile of the ridge formed

Depth Control : Mechanism should be there (slots in each shovel)

Drive to seed metering mechanism: From ground wheel through chain and sprocket

Ground wheel : Should be provided with provision for adjusting the depth/ length of lugs i.e. variable diameter ground wheel

Frame: Should be of good quality M.S box fabrication

Hopper: Adequate capacity depending upon the no. of ridgers. shall be sufficiently strong and should not buckle when fully filled with potato tubers.

Type of hitch: Three point linkage (CAT-I/II)

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

KNAPSACK SPRAYER

- Hand operated continuous knap-Sack Sprayer Piston type single barrel suitable for right hand operation, duly ISI marked as per IS 3906-1995 (fourth revision) with latest amendments
- Material:- Sprayer tank made of virgin high density polyethylene plastic (HDPE), white colour weighing 1150 grams
- Pressure Chamber:- Made of Brass 200gms (seamless brass shell)
- Pipe, brass sleeve pipe (forged) head, brass piston nut, stainless teel ball, total weight not less than 390-400 grams should be fitted inside the tank.
- Tank: 16 litres Capacity
- Weight:- 4.5 - 5.0 kg (excluding packing if any)
- Delivery Hose:- the sprayer must be supplied with 120 cms long virgin PVC hose crimped from both ends with wing nut and hose shank, 2 feet long brass spray lance weighing 120 grams, with brass trigger type cut off device
- Extension Rod:- 60 cm long one and bent as goose neck
- Nozzle:- brass triple action adjustable nozzle weighing 72-75 grams and a brass flat fan nozzle.
- The M.S skirting of the sprayer should not weight more than 800 grams
- Length, height, width, shape and filling hole diameter- according to ISI Specifications
- All parts coming in contact with pesticides are made of special non- corrosive/ incorrodable metals. All hardware used on the sprayer must have rust proof electroplating zinc or power coating.
- All other provisions on the sprayer must be according to as per IS 3906-1995 (fourth revision) with latest amendments

The manufacturer's brand name and ISI monograms must be permanently embossed by moulding (non - erasable) on HDPE tank. A necessary spare part kit including gaskets of all sizes, pins and nuts etc. should be supplied with the sprayer. The sprayer should be guaranteed for manufacturing and operational defects for one year.

Battery Operated Knapsack Sprayer

This sprayer is provided with a rechargeable battery instead of the conventional handle-lever system.

- Tank capacity: 10/13/16 liters
- Discharge rate: Min. 500 ml/min at pressure of 3 kg/cm^2
- Volumetric efficiency: 80 %
- Strap : 02 (Having min. width of 38 mm, min. length of 800 mm)
- Length of delivery hose: 1000 mm (preferably)
- Type of lance: Straight or goose neck type
- Length of lance: 500-900 mm
- Manufacturers name or recognized trademark, nominal length, Batch or code number should be mentioned on the lance
- Type of nozzle: Hollow cone, fan or adjustable type
- Manufacturers name or recognized trademark, Nozzle designation, Batch or code number should be mentioned on the nozzle
- Mass of sprayer : 8-10 kg
- Arrangement for lifting the sprayer should be provided
- Set of gasket should be provided
- Agitator should be provided
- Manufacturers name or recognized trademark, Tank nominal capacity, Batch or serial number should be mentioned on the tank
- The sprayer should be guaranteed for manufacturing and operational defects for one year
- Battery : 12 Volt 7AH Sealed Lead-Acid rechargeable dry battery
- Diaphragm pump.

Power Operated Spray Pump

It consists of a high density polyethylene tank, fuel tank, engine, delivery pipe, , and a spray hose. Specifications are as follows:

Power Source: Min. of 1 H.P, 2 stroke, forced air cool engine

Starting system: Recoil starter

Fuel tank: light weight, high density polyethylene tank

Fuel Tank Capacity: 500-600 ml

Chemical tank capacity: 10/13/16/20/22 liters

Pump type: Positive displacement reciprocating pump (single piston double acting)/Double inlet reciprocating type brass metal pump

Normal working pressure: 100 – 200 PSI

Maximum pressure: 400 PSI

Weight: max. of 12 kg

Shock proof cushion should be provided for ease of operation

Strap : 02 (Having min. width of 38 mm, min. length of 800 mm)

Length of delivery hose: 1000 mm (preferably)

Type of lance: Straight or goose neck type

Length of lance: 500-900 mm

Manufacturers name or recognized trademark, nominal length, Batch or code number should be mentioned on the lance

Type of nozzle: Hollow cone, fan or adjustable type

Manufacturers name or recognized trademark, Nozzle designation, Batch or code number should be mentioned on the nozzle

The sprayer should be guaranteed for manufacturing and operational defects for one year

Tractor Operated Hydraulic Sprayer

Tractor mounted (540 RPM) PTO operated sprayer should have CAD design structure made from M.S Member detachable painted with one coat of red-oxide primer followed by two coats of good quality enamel by spray painting. Sprayer must be equipped with oil bath type triple X stainless steel piston plunger pump. Adjustable telescopic shaft compatible with PTO of any tractor should be provided. Rotationally moulded horizontal U/ V shaped tank made of UV resistant agro chemical material for corrosion resistance material. Bottom bowl must be provided. The sprayer must be provided with 5X mixing and diffusion technology to keep the chemical in suspension form for uniform application. Sprayer must have auto refilling system to fill the tank. Sprayer must be provided pressure hose reel mounted on bearing, swivel joint inbuilt in the reel hub should be provided to prevent the hose from twisting and prevent leakage. The sprayer should have 10mm five layered fiber net pressure hose pipe with working pressure of 60 bars and bursting pressure of 180 bars (min.). Sprayer must be equipped with drip free shut off spray gun with flow rate of 1 to 53 liters at working pressure of 1 to 50 bars. The spray gun with corrosion resistant D-orifice discs should have horizontal throw of 50 feet and vertical throw of 42 feet. The overall dimensions should not exceed 56" X 48" X 56".

	Model -I	**Model-II**
Power Source	35 H.P and above	35 H.P and above
Discharge at rated speed of 540 RPM	35-50 lpm	65 lpm
Capacity (liters)	400	600
Chemical Tank weight (Kgs)	28-30	30
Auto Rewinding of pressure hose reel	Not available	Available
Length of hose pipe (m)	100	200
Maximum Weight (Kgs)	160	200

The sprayer must have a warranty of two years for manufacturing and working defects. The sprayer should be easily serviceable with good availability of spare parts.

Aero Blast Sprayer

Useful for spraying on tall horticulture trees. The machine consists of a spray tank, pump, fan, control valve, filling unit, spout adjustable handle and spraying nozzles to release the pesticide solution into stream of air blast produced by centrifugal blower. The air blast distributes the chemical in the form of very fine particles. The major portion of the swath width is taken care of by the main blast through the main spout and the supplement nozzles cover the swath area near the tractor.

Mounting mechanism:	Through 3 point linkage with tractor
Power source	Tractor of 35 HP or above
Power drive from tractor to machine:	Tractor PTO at 540 rpm
Spray tank:	Polyethylene tank of 400 liters capacity
Type of pump:	Centrifugal pump (single rotor)
Flow rate:	110-150 liters/min
Spray volume variation	100-400 liters/ha
Blower/Fan:	Sprayer should be equipped with high capacity centrifugal blower to produce airblast that helps to distribute chemical in form of very fine particles
Fan speed:	3600-3700 rpm
Flow rate regulation valve:	Should be provided to regulate flow rate ranging from 8-25 l/min
Spout adjustment:	Both vertically and horizontally to suit crop/tree height
Spraying nozzles:	Good quality spraying nozzles should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

Orchard -Aero Blast Sprayer

Useful for spraying on orchard crops. The machine consists of a spray tank, pump, fan for producing air blast, control valve and spraying nozzles to release the pesticide solution into stream of air blast produced by centrifugal fan. The nozzles are mounted on the periphery of the fan. The air blast distributes the chemical in the form of very fine particles throughoutits swath width on both sides of the tractor. Power to fan and pump is provided by tractor PTO. Spray tank is mounted on a strong CI frame and supported by two transport wheels.

Mounting mechanism:	Through 3 point linkage with tractor
Power source	Tractor of 35 HP or above
Power drive from tractor to machine:	Tractor PTO at 540 rpm
Spray tank:	Polyethylene tank of 400liters capacity (min.)
Type of pump:	Centrifugal pump (single rotor)/ Ceramic 3 Piston
Flow rate:	110-150 liters/min
Spray volume variation	100-400 liters/ha
Blower/Fan:	Sprayer should be equipped with high capacity centrifugal blower/fan to produce airblast that helps to distribute chemical in form of very fine particles
Spraying nozzles:	Good quality spraying nozzles should be provided
Control Unit:	3 way up to 600 bar
Filling unit:	Filling unit should be provided on the machine for easy filling of water in the tank
Spraying nozzles:	Twin ceramic hollow cone with anti drip diaphragm
Tyres:	Two good quality tyres should be provided for trailing the equipment

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

SELF PROPELLED FODDER HARVESTER

The machine is a self propelled unit and machine consists of an engine, cutter bar, steering operated by foot operated peddle which guides the wheel provided below the operator seat. The crop after harvesting falls behind the cutter bar and was guided with wooden sticks provided behind the cutter bar in case of small height crop like barseem and tall crop having hard stem. Whereas in case of tall and weak stem crops, binding attachment without twine is required to avoid wrapping of cutter bar. The power from engine is provided to the traction wheels with the help of gear trains. Specifications are as follows:

Power source	:	Min. of 5 HP engine (petrol or diesel) conforming the BIS standards
Cutting width of machine, cm	:	130
Ground clearance and track width, cm	:	Min. 40 and 120
Type of traction/transport wheels	:	Two Wheels provided at front with traction type lug pattern
Wheel base, cm	:	Min. 140
Steering wheel	:	Single wheel, pneumatic ribbed nylon
Weight of machine, kg	:	295 (Without binding attachment) 450 (With binding attachment)
Clutch	:	Should be provided on the handle bar
Gear Box	:	Mechanical, with provision for forward and reverse speeds, operated by a level on the handle
Brake	:	Should be provided on the handle bar, along with provision for parking brakes

Arrangement for adjusting cutting height and range should be provided.

Mechanism for crop conveyance should be provided (Gathering forks)

Steering system : Should be easy to operate for the farmers

Head light : Should be provided on the machine

Knife guards : Should be provided

Crop Divider : Should be provided (Shoe Type)

Operator's seat : Should be well cushioned for comfort.

Operator's safety : Maneuverability of the machine should be easy. Noise level should be within the prescribed limits

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

TRACTOR OPERATED SINGLE ROW HARVESTER CUM SHREDDER

Machine is used for harvesting and chopping hard stem fodder crops and also for shredding crop stalks like cotton, castor etc. The machine is tractor PTO operated and has counter rotating serrated discs for harvesting the fodder and a flywheel equipped with serrated knives for chopping and conveying the cut fodder and a chute for guiding the chopped fodder into trailer attached behind the tractor. The weight of the machine is supported by a support tyre. Specifications are as follows:

Power source	:	Tractor of 45 HP or above
No. of Cutting Rows	:	1
No. of Cutting Disc	:	2
No. of Shredding Knife	:	12
Input RPM	:	540 and 1000
Fly Wheel RPM @ 540 PTO	:	1500 to 1700
Tractor Mounting	:	Rear Three Point Linkage
Chute Type	:	Long Chute with Hydraulic operated provision for changing direction of throw
Crop Guide	:	2 nos. (one on each side of row)
Knife Sharpening Tool	:	In built, adjustable, grinding wheel
Depth Wheel	:	Provided with height adjustment
Blade Material	:	Boron steel
Power Drive to Fly wheel	:	Positive drive through Telescopic Cardan Shaft with universal joint and shear bolt safety device
Drive Shaft	:	Telescopic Cardan shaft with universal joints and shear bolt safety device

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

COMBINE HARVESTER with MAIZE HEADER

Maize harvester combine is a self-propelled unit used to harvest maize, stripping the stalks. The maize cob is stripped from its stalk and then moves through the header to the intake conveyor belt.

Prime Mover: Engine conforming to BIS standard

Track Wheel:	Two good quality pneumatic wheels at front of combine
Steering wheel:	Two good quality pneumatic wheels
Transmission System:	
Clutch:	With min. of one heavy duty friction disc should be provided
Gear Box:	For forward and reverse speed
Differential:	Should be provided
Brake System:	Service Brakes and parking brakes should be provided on the combine
Steering system:	Manual steering control wheel along with the whole system should be provided
Reel Assembly:	Cutter bar type header for harvesting Wheat Paddy and Snapper Picker sheller type header or Tyne bar pick up reel with arrangement for speed variation, forward and backward movement, variation of angle of the tyne should be provided
Crop Divider:	Shoes

Working width: 3-4.4 m

No. of rows: 5-7

Row spacing: 450-685 mm

Provision of height adjustment: Should be provided (Hydraulic/Mechanical)

Crop Conveyer: Screw auger with arrangement for locking the header in raised position should also be provided

Threshing Drum: Axial flow with rasp bar and peg tooth

Length of drum: 1250-1265 mm

Diameter of drum: 600-610 mm

Drum speed: 535-1210 rpm

Concave/ Housing of threshing drum: 2 no. perforated type underneath of threshing drum, 2 nos. square rod, on open flat bars on top of the drum, with provision for adjustment of clearance between the drum and concave

A rectangular type rear beater should be provided

A sheet metal, rectangular and semi circular baffle plate should be provided behind the axial thresher and above the beater

A Plain M.S Sheet stepped grain pan should be provided

Two Nos. Cleaning sieves (top and bottom) should be provided with drive

Blower, with provision for control of air blast should be provided

Grain Conveying Mechanism:

Screw type bottom grain conveyer should be provided

Chain and pad type grain elevator should be provided

Screw type top grain auger should be provided

Screw type bottom tailing auger should be provided

Chain and pad type tailing elevator should be provided

Screw type upper tailing auger should be provided

Grain Tank: Grain tank of min. vol. 2.00 m^3 with a provision for agitating the grains and tank cover should be provided.

A screw type grain unloading auger should be provided

The canopy of the harvester combine should be M.S sheet. Single axle box type header transport trailer made of M.S square section should be provided. The transport trailer should have two good quality pneumatic wheels for transportation.

In general the cutter bar assembly and platform auger should be visible from the operator's normal sitting position. The controls should be provided around the operator and should be easy to reach for the operator. Stone trapper should be provided at the front of the concave.

The workmanship should be of high quality. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

MAIZE SHELLER

It is used for shelling of maize cobs. The machine consists of a threshing cylinder, concave and centrifugal blower mounted on a frame. The threshing cylinder is of spike tooth type. Round bars are used as spikes, which are fitted on the circular rings. The concave is fabricated out of a cast iron sieve with 11 mm opening. The cleaning is done by blowing away the chaff with the help of a blower.

Source of power	5 HP Electric Motor/ 5.5 HP Diesel Engine/ Tractor
Size of feeding hopper, mm	575x510
Threshing cylinder:	Spike tooth type
Length of drum, mm	890
Dia of drum, mm	305
Concave opening size, mm	11
Cylinder concave clearance, cm	1.6 (adjustable)

Hitch System: Should be provided for transportation

Transport Wheels: Good quality Pneumatic wheels should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

MAIZE THRESHER

The thresher consists of feeding hopper, axial flow threshing cylinder, concave, cylinder casing, sieves, blowers and a thrower. The thresher has beater type threshing cylinder. The concave is made of round bars. The machine is capable of threshing the grains from the cob with stalk. The detailed technical specifications are as follows:

Prime Mover:	Tractor 35 HP or other power source
Size of crop feeding hopper	
• Width	760 mm
• Height	360 mm
Threshing Cylinder:	Beater type cylinder on Axial Flow system
Cylinder Speed:	Variable (set of pulleys and belts should be provided to achieve this 8- 16 m/sec)
Concave	Grate of round bars
Cleaning system:	Oscillating sieves
Blower:	Two/Three
Hitch System:	Should be provided for transportation
Transport Wheels:	Good quality Pneumatic wheels should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

MULTI CROP THRESHER

The thresher consists of a feeding chute, threshing cylinder, concave, cylinder casing, oscillating sieves, and winnowing and cleaning attachment and transport wheel. Power to sieves and fans is provided by belt-pulleys of different sizes through tractor PTO/electric motor. Adjustments for cylinder and blower speeds and concave clearance are provided to make the machines suitable for threshing various crops. The detailed technical specifications are as follows:

Power Required :	20 hp or above
Crops:	Wheat, Mungbean, Raya, Pea, Mash etc.
Threshing Cylinder:	Spike tooth type
Arrangement of spikes	Axial
Type of spike	16mm diameter studs
Cylinder Speed:	Variable (set of pulleys and belts should be provided to achieve this 8- 14.6 m/sec)
Cleaning system:	Min. 2 aspirator (Centrifugal)
Hitch System:	Should be provided for transportation
Transport Wheels:	Good quality Pneumatic wheels should be provided
Capacity:	50-400 kg/h (depending upon crop and cylinder size)
Cleaning efficiency:	>96%
Threshing efficiency:	>98%
Brocken grains :	<2%

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

ROTARY MULCHER (CHOPPER)

Rotary mulcher should be suitable for operation with 540 rpm tractor PTO. It should be suitable for hitching with three point linkage of category I/II. Rotary Mulcher should be capable of chopping and spreading the paddy stubbles and loose straw lying in the combine harvested paddy field and leave them in the field in form of mulch which can be subsequently mixed into the soil or decomposed by irrigating the field. The detailed technical specification are given below:

Working width:	155 to 200 cm (as per suitability with tractor 40- 70 HP)
No. of blades:	Minimum of 32 'Y' type and 16 serrated/straight blades
Blade material:	Should be of high quality to withstand the shear preferably boron steel
Input RPM:	540
Rotor RPM:	1500 to 2000
Rotor drive type:	V-belt drive, a min. of 2 belts should be provided
Drive Shaft:	Telescopic Cardan shaft with universal joints and shear bolt safety device

- Metal flap should be provided for front protection
- The machine should have a support roller rear mounted with provision for height adjustment

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

STRAW REAPER

Straw Reaper is used to make bruised straw (bhusa) of the stubbles and loose straw of wheat crop left in fields after harvesting wheat crop with combine harvester and feed it into a trolley on the rear side of reaper covered with a wire net. It consists of a reel, cutter bar, feeding augur, conveyor, bruising cylinder, blower and transport wheels. Detailed specifications are as follows:

Power Source:	Tractor of 45 HP and above
Drive shaft	Universal Telescopic Shaft
Reel:	Spring tyne bar pick up reel, drive to reel should be provided by belt drive, there should be arrangement for lowering and raising of reel and for forward and backward movement of reel
Diameter of reel (mm)	450-590 without spikes
Width of reel (mm)	1980-2030
Cutter bar width (mm)	min. of 1800
Cutter bar Blade	Serrated
Feeding Auger:	Screw/ helical & scoop type, Auger with provision of slots for adjusting the clearance of feeding auger
Beater:	Pentagonal, Star type or Square type
Bruising drum	Serrated blades mounted on a cylinder
Diameter of drum	490 mm (min.)
No. of blades:	240 pc (min.)
Speed of drum	750-1000 rpm
Concave:	Perforated, Should be directly fitted to the mainframe, with provision for adjusting the clearance between the drum and concave
Cleaning Sieve:	Reciprocating/Oscillating, Made of perforated MS Sheet should be provided
Grain pan/ Grain Reservoir:	Rectangular/Semi-circular/Trapezoidal box shaped reservoir should be provided
Method of fixing & location:	Pivoted with linch pins and nut bolts& below the cleaning sieve
Straw Blower:	Two/Three blower per machine, with four blades per blower
Straw Outlet:	Curved Cylinder , M.S sheet fabricated in tubular form
Transport Wheels:	Two ribbed tyres should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected/covered. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

PADDY STRAW CHOPPER SHREDDER

Paddy Straw Chopper Shredder is used to chop the paddy straw left after combine harvesting and spreads the chopped straw evenly in the field.

Model I- Mounted Type: It consists of a rotary shaft mounted with blades named as flails for harvesting and chopping the paddy straw. Power to rotary shaft is provided from tractor PTO through a gear box and belt pulley drives. Counter rows having serrated blades are mounted inside the concave which further assist in chopping the straw.

Model-II Trailed type: Tractor operated paddy straw chopper with combine type/flail type cutting mechanism and double cylinder serrated chopping mechanism with concave.

Machine type	:	Tractor PTO driven, Mounted type	Tractor PTO driven, Trailed type
Power source	:	Tractor of 45 HP or above	Tractor of 55 HP or above
Working width, cm	:	150 (min.)	180 (min.)
Speed of flail rotary, rpm	:	1400-1500	900-1000
No. of row of flails	:	2-4	4
No. of flails on each rows	:	14-20	6
Shape of the flail	:	Inverted Gamma type	Flat Bar type
Cylinder dia. of chopping mechanism, cm	:	60	Large cylinder – 80/57 Small cylinder- 40/25
No. of rows of serrated blades on chopping cylinder	:	-	Large cylinder – 14/10 Small cylinder- 6/6
No. of rows of serrated blades on inside the concave		2-3	Large cylinder- 2-3 Small cylinder - 1
No. of blades on each rows	:	17-21	17-22

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

BALER

Bailer is a tractor operated machine used to collect the cut and raked crop (such as straw, or silage) into compact bales in rectangular form that are easy to handle, transport, and store. Bailer consists of a straw pick up unit, a compression unit, a knotter unit and transport wheels.

Model I- Square Baler :

Model II- Round Baler

	Square Baler	**Round Baler**
Power source	45 or above HP tractor	25- 55 HP tractor
Pick up width	1.60-1.90 m	1.30 m
Knotters	Minimum of 2 knotters should be provided, which are suitable plastic rope. Knotter should have knotting efficiency > 98%.	Minimum of 2 knotters should be provided, which are suitable plastic rope. Knotter should have knotting efficiency > 98%.
Bale length	40-110 cm	NA
Bale cross-section	36 x 46 cm (approx.)	66 x 60 cm(approx.) (L x D)
Rolls per twine box	4-8	9 - 17
Hitch system	Suitable for three point linkage, CAT-II. Trailer hitch should also be provided on the baler	Suitable for three point linkage, CAT-II. Trailer hitch should also be provided on the baler

Shear bolt protection should be provided

Facility for raising or lowering pick up either manually or through hydraulics

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

Disc Mower

Disc Mower is a tractor operated machine for harvesting and windrowing of green fodder and crop residues like rice straw etc.

Power requirement: 35 or above HP tractor

Position relative to tractor: Rear mount, right side

Swath width: Min 1.1 meter

Machine should have a minimum of 4 round discs for efficient harvesting and windrowing

Cutting Mechanism: Disc Type cutting mechanism, dynamically balanced gears and blades

Knives : Minimum 2 knives/ disc, Should be replaceable

Hitch System : Suitable for three point linkage, CAT-I/CAT-II.

The machine should have hydraulically actuated folding arrangements for reduced transport width

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

Gyro Rakes

Power requirement: 35 or above HP tractor

The machine has rotor type swathing mechanism with dynamically balanced rotor. The machine has tandem wheel design for less vibration. Pick up needles should be of high quality & replaceable.

Hitch System: Suitable for three point linkage, CAT-I/CAT-II.

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

Portable Maize Dryer

Indirect heating/ portable batch type maize dryer should have dynamically balanced high capacity centrifugal / axial flow blower with air flow control as per requirement. It should preferably use maize cob husk, paddy husk or light diesel oil as fuel for generating hot air. Hot air temperature should be thermostatically controlled at desired set levels depending upon the moisture content of grains. Hot air generating burner should be automatically controlled with highly sensitive thermostat and solenoid valves. Dryer should be equipped with burner capable of generating clean combustion with no backfire hazards.

It should be capable of carrying out drying at hot air temperature of 80-45 degree centigrade temperature and ambient conditions of 38 degree centigrade temperature and 60% R.H.

Capacity:	3 tonnes/ batch
Drying Bin Size:	4000 X 3000X 1200 mm (M Steel Sheet, Angles, Channels)
Blower Output:	70000-100000 kCal/h
Blower Discharge:	14000 CMH at 35 mm WGP
Blower Motor:	5.0 H.P, 440 V, 3-phase AC
Fuel:	Maize cob husk, Paddy Husk or LDO/Electrical heating system

Note: Manufacturers having different specifications but with similar capacities of dryers may also apply. The decision on their empanelment will be taken by the competent authority.

Sugarcane Tirphali

Power Source:	Tractor of 35 HP and above
Hitch:	Rear 3 point linkage, CAT-I/CAT-II
Frame:	Should be good quality (MS Box), should be 62mm X 62mm X 6mm
Tyne:	Should be made of MS forged (length: 24”, Thickness: 15-18mm, width: 2.5”)
No. of tynes:	9

The tynes should be adjustable (22” to 26”) with 1 step adjustment each

Blade: Reversible shovel type/ sweep type (length: 10”, breadth: 2”, thickness: 6mm)

The workmanship should be of high quality. It should not have sharp projections. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

Pulverizing roller

Pulverizing roller is an attachment to a commercially available cultivator. The pulverizing roller consists of star wheels, central shaft, pulverizing members, mounting link and depth controlling wheel. The pulverizing members are similar in shape to lawn mower blades and are inserted in the cast star wheels in such a way that it forms helical shape and progressively come in contact with soil and breaks it. The roller is attached to the cultivator with the help of two mounting links having bearing housing on one side and tensile springs on other side.

Specifications:

Power requirement (hp/kW)	:	35 H.P tractor or above
Length (mm)	:	950
Width (mm)	:	2340-2760
Height (mm)	:	390
Working width (mm)	:	2010-2385
Number of star wheels	:	6
Distance between star wheels (mm)	:	400-475
Material of star wheel	:	Cast iron
Shaft diameter (m)	:	35
Number of pulverizing members	:	6
Number of springs	:	2
Weight of the machine (kg)	:	115-125

The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable in India with good availability of spare parts.

Reversible M.B Plough

The one/two bottom reversible plough is a hydraulically /mechanically operated basic implement for preparation of land. The Mould Board (M.B) retains their mirror finish at all time contributing to well turned furrows. The plough should have special wear resistant steel bottoms with bar points for toughest ploughing jobs. Bar point bottom ensures longer life as it can be extended or reversed. The mould board bottom reversing mechanism should be operated by a lever provided on the distributor. When the implement is hitched, plough bottom should be free to rotate 180 degree along the axis of the hollow shaft. The detailed specifications are as below:

Specifications

Length (mm)	: 320
Working Width (mm)	: 609/ 914
Weight (kg)	: 375/ 475
Plough bottom	: two bottom (two on each side)/ three bottom (Three on each side)
Working Depth	: 203 mm - 355 mm
Under frame Clearance	: 700 mm
Inter body Clearance	: 850mm
Reversing mechanism	: Hydraulically/ Mechanically operated
Speed of operation (km/h)	: 3 to 4
Area covered (ha / h)	: 0.20 to 0.25
Field efficiency (%)	: 90
Power requirement (hp)	: 55 & Above

The workmanship should be of high quality. It should not have sharp projections. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable in India with good availability of spare parts.

Vertical Conveyer Reaper

It is suitable for harvesting and windrowing of wheat and paddy crops. The detailed specifications are as follows:

Power Source	35 HP tractor or above
	Power to machine is given from tractor PTO with help of intemediate shaft running beneath the body of the tarctor and a coupling shaft
Cutter Bar Assembly width	2.2 m
Type of crop conveying mechanism	Two, lugged nylon canvas belt
Type of pick up mechanism	Star Wheel
Crop dividers	Fitted in front of the cutter bar assembly and stra wheels mounted on the crop dividers
Height Control	Through pulleys and steel ropes with help of tractor hydraulic
Field Capacity	0.4 hec/hr.
Filed Efficiency,%	55-70

The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable in India with good availability of spare parts.

Forage Reaper

It is a Tractor Side Mounted P.T.O Operated Forage harvesting machine used for reaping of forage crops; maize, bajra, oats, barseem etc. The machine should be capable of harvesting all the fodder crops. The technical specifications are as follows:

Power source: 25 HP tractor or above

Hitch: Three point, CAT-I/CAT-II

Cutter bar: 1800 mm (with folding arangement during transportation)

Blades: 2 mm thick serrated blade

Fingers: Alloy Steel

Field Capacity: 0.3 hec/hr

The workmanship should be of high quality. It should not have sharp projections. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable in India with good availability of spare parts.

Fodder Chopper cum Loader

Fodder chopper cum loader is useful for chopping of already reaped fodder crops and then automatically loading the chopped fodder on trolley thorough loading assembly. The technical specifications are as follows:

Power Source: Tractor 35 HP or above / 10-15 HP electric motor

Cutter head should be made of good quality M.S plate

Cutting drum assembly, trolley loading assembly and cutter head should be made of M.S Sheet

Cutting blade gap from cutter head should be adjustable

length of cut should be adjustable as per the requirement of making silage

Feeding belt conveyer should be provided to feed the crop

Feeding chute should be provided

Capacity: the machine should be able to chop 150-300 Qtls/ hr. of fodder

The workmanship should be of high quality. It should not have sharp projections. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable in India with good availability of spare parts.

Self Propelled Paddy Transplanter

Self propelled paddy transplanter should be capable of transplanting mat type paddy nursery in the puddled rice fields with ease. The machine should have the following specifications:-

Drive Type- Self Propelled 4 wheel drive with independent suspension for the wheels

Dry weight- 550 to 650 kg

Prome Mover/Engine - water/ air cooled petrol/ diesel engine with starter motor

Number of shifting positions: - Variable speeds for forward and reverse

Tyre- non puncture solid rubber front tyre, the rear wheel may be thick rim rubber lug

Planting section- Rotary, forced planting system with adjustment for seedling size

No. of planting rows: - 6

Distance between rows: - 30 cm

Hill space: - 12 cms - 21 cms

Seedling type- mat type

Seedling height- 8 cm to 25 cm

Number of leaves: - 2.0 to 4.5

The machine should be provided with standby seedling racks so that the seedlings can be replenished easily and efficiently. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable in India with good availability of spare parts.

Walk Behind Paddy Transplanter

Walk behind paddy transplanter is a self propelled machine for transplanting paddy the machine is provided with transporting, planting and reverse speed selection. The detailed specifications are as below:

Prime Mover/Engine - water/ air cooled petrol/ diesel engine with starter motor

Engine Mounting Frame :- M.S Sheet Fabricated with slots for adjusting belt tension

Floating Mechanism:- Proper mechanism for floating, one on each side and one in the centre should be provided

Planting Mechanism: proper planting mechanism for seedling should be provided

Seedling Feeding Mechanism:

Seeding Platform: - inclined, curved Sliding type

Seedling tray bars should be provided to hold the nursery mat in position

Driving Wheels: two rubber coated wheel with central spokes, should be provided with lugs

Control: The machine should have the following controls on it

Steering Handles with side clutch levers
Throttle control lever on RHS steering handle
Main Clutch lever on control panel
Planting clutch on control panel
Hydraulic machine up down lever
No. of seedling per hill adjusting lever
Transplanting depth adjusting lever
Hill Spacing control lever
Starting / cranking rope
Row Markers on both sides
For initial depth setting a depth selection lever should be provided

Safety Devices: Following safety devices must be provided on the machine
Protecting cover for drive belts
Protecting cover for engine
Front mounting guard

Should have two side floats directly hinged to either side of chassis to maintain level of chassis of the planter with respect land surface profile of the seedling bed.

The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable in India with good availability of spare parts.

Nursery trays

Made of virgin Poly propylene for handling of mat type nursery for transplanting with specifications that suit the self propelled paddy transplanters

Inner size of the tray

Length = 58cm

Width = 28cm

Depth = 3cm

Weight; 500 to 600gms.

Nursery Seeder (Nursery Seeding Machine)

Nursery seeder helps in faster preparations of trays. The machine consists of a system which slides nursery trays sideways while carrying out the operations of pouring soil in the tray, seeding the tray and putting covering soil on the tray. The machine also consists of watering section. The machine should have the following specifications:-

Separate hoppers should be provided for pouring soil, seeding and covering soil

Separate motor (AC 220 V) for belt conveyer and for watering section

The machine should have a minimum working capacity of 300 trays per hour with a provision to adjust the operating efficiency to higher levels.

Cotton Seed Drill/Planter

The amchine is used for planting cotton. It consists of frame, seed box, fertilizer box, seed metering mechanism, fertilizer metering mechanism, seed tubes, furrow openers, seed adjusting lever and transport cum power transmitting wheel. The frame is made from mild steel box section. The detailed technical specifications are as follows:

Power Source	:	Tractor of 35 HP or above
Hitch Type:	:	Three point linkage, CAT-I/CAT-II
Seed hopper	:	Separate Hoppers (trapezoidal shape) for Fertilizer and Seeds with mechanism for feed rate control. The hoppers should be sufficiently covered to prevent the entry of water. If the material of fertilizer and seed box is Mild Steel, the thickness of MS sheet should be more than 1.0 mm.
Furrow openers	:	Inverted T-type
No of furrow opener	:	9 to 13
Metering Mechanism,		
For seeds	:	Notched Inclined plate type suitable for metering paddy seeds
For fertilizer	:	Gravity feed or corrugated roller type
Power to metering mechanism	:	From Lugged ground wheel through chains & sprockets and gears
Seed and fertilizer tubes	:	Seed and fertilizer tubes should be made of transparent plastic. The thickness of the plastic tubes shall be a minimum of 2.5 mm. Length of plastic tube should be of suitable length without any bends

- The drill shall be able to sow cotton seed and also shall be able to drill all types of granular fertilizers
- Seed and fertilizer rate shall be easily adjustable
- Provision should be provided for adjustment of angle of box containing inclined plate metering mechanism.
- Provision for closing seed and fertilizer discharge should be provided
- The drill should be provided with adjustable depth wheels
- Row spacing should be adjustable ranging from 150 to 225 mm preferably in steps of 25 mm
- The Transmission system should be provided with guard for safety
- Furrow openers should be provided with depth adjustment arrangements
- A permanent type metallic calibration plate indicating the metering position should be provided
- Proper lubrication arrangement for all moving components should be provided
- Marking indicating source of manufacturer, serial number, type and size should be provided

The workmanship should be of high quality. It should not have sharp projections. All the moving parts should be properly protected. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.

Sugarcane Ridger

The ridger is used for the sugarcane crop. It consists of a rectangular frame made of mild steel angle or channel section, 3-point hitch assembly, shanks and ridger body. The ridger body should have mouldboard, share point and tie bars to vary the wingspan of the ridgers. The depth of operation is controlled by the hydraulic of the tractor. The detailed technical specifications are as follows:

Power Source:	Tractor of 45 HP and above
Hitch:	Rear 3 point linkage, CAT-I/CAT-II
Frame:	Should be good quality MS angle or channel section
No. of base	2 -5
Row Spacing (mm)	Adjustable 610 to 860
Wing Span Adjustment (mm)	350-500
Share Point	Should be made of medium carbon steel or low alloy steel, hardened and tempered to about 42 HRC. The share point should be replaceable.

The workmanship should be of high quality. It should not have sharp projections. The machine should be painted with high quality paint after applying proper primer. The machine should be warranted for two years for any manufacturing defects. The machine should be easily serviceable with good availability of spare parts.