

insect pest and weeds in standing crop. Now, it is available in battery operated system also.

**Power Sprayer :** It is used for applying liquid substances such as fertilizers and pesticides to plants during the crop growth cycle. It is used for applying water and water/chemical solutions containing acids or caustic materials for crop-performance.



**Hand Sickle :** The hand sickle is general purpose harvesting hand tool. Sickle is one of the most common hand tools used for harvesting of the crops, grass and cutting of other vegetative matters. Nowadays Naveen sickle is used which is light in weight and easy to handle. This reduces the drudgery and time taken for harvesting



**Combine Harvester :** The combine harvester, sometimes known as the combine, is a device made to efficiently harvest a variety of agricultural crops. Mature crop of mustard can be harvested through combine machine. Harvesting, threshing and winnowing can be done simultaneously through combine harvester. It separates the seed and stover. Harvested produce can be collected in bags. It saves time, labour and cost. But it generally required large field for operation



**Thresher :** Any delay between cutting and threshing causes rapid deterioration of the grains, especially during field drying or when the crop is stacked or piled in the field. Therefore, threshers should be used for threshing purpose. A threshing machine or a thresher is a piece of farm equipment that threshes grain, that is, it removes the seeds from the stalks and husks. It does so by thrash the plant to make the seeds fall out. The thresher consists of threshing cylinder, oscillating box, straw walker, and winnowing and cleaning attachment.



#### Care and maintenance of agricultural machineries

Agricultural machinery is used for a limited period and has to be kept for later use. Therefore, it is essential for farmers to have accurate Knowledge about its care and maintenance so that they can increase agricultural yield by using agricultural machinery for longer period, as well as earn more profit by controlling agricultural production costs and proper care and maintenance. The following care should be taken :

- Every part of agricultural machinery should be inspected. If any nut-bolt or part is broken or not installed in its proper place or properly, it should be replaced or repaired or tightened as necessary. Worn parts of

agricultural machinery should be edge.

- For the proper speed of agricultural machinery, necessary adjustment should be made in the machine so that the tension of the belt etc. is correct and the machine works smoothly.
- Seed and fertilizer sowing machines and crop protection machines etc. should be calibrated and adjusted under trial so that proper amount of seed and fertilizer can be applied.
- Tractor brakes, oil level, filter etc. should be adjusted as required and inspected periodically.
- Agricultural machinery should be cleaned properly after use to remove dust, soil etc.
- Agricultural machinery should be washed thoroughly after use. After the water on the agricultural machinery has dried, its rotating part should be lubricated with grease.
- Parts of agricultural machinery that come into contact with fertilizer and soil should be thoroughly cleaned.
- If agricultural machinery has rubber wheels, do not forget to check their pressure and keep them at the approved pressure.
- Clean the nozzle holes of all types of sprayers thoroughly and keep the tank washed to prevent rust, etc.
- Agricultural machinery that has come off paint etc. can be painted or greased to keep the machine in use for a long time.
- Wrap or tie pipes or wires to protect them from cuts.
- Keep the motor under the shed to prevent water from falling on the electric motor.
- Keep the wheel of the fodder harvester locked with the stand to prevent accidents. If the farmer takes care and maintenance of the agricultural machinery with all these things in mind, he can certainly work for many years with the available agricultural machinery and can earn financial gains.



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## Important farm implements used for rapeseed-mustard cultivation



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## Important farm implements used for rapeseed-mustard cultivation

Farm Mechanization is the using agricultural machinery for different agricultural operations from land preparation to harvesting and threshing. The farm mechanization contributes to increase production through saving the time and ease the work. It helps farmers to grow more crops in less time and with greater efficiency. Agricultural implements are the tools needed or used for agricultural practices like ploughing, leveling, sowing seeds, irrigation, harvesting, etc. The different types of agricultural implements used in rapeseed-mustard cultivation are harrow, cultivator, rotavator, leveler, seed drills, hand hoe, weeder, harvester, power tiller, sprayers, thresher, winnower, etc. It is essential for farmers to get the knowledge of different implements and their use for doing agricultural operations effectively using them.

### The following farm implements or tools are used for rapeseed mustard cultivation

**Tractor drawn Harrow :** Field preparation should be started with the help of harrow to conserve the moisture and removal of weeds. Firstly, we should have started ploughing the field twice with the help of harrow. It can be used for summer deep ploughing to conserve the moisture and removal of weeds. Summer deep ploughing by disc harrow is very necessary after harvest of mustard crop to destroy harmful insect pests and weeds in the field.



**Tractor drawn Cultivator :** After harrowing, field should be ploughed with cultivator twice. Ploughing is used because it loosens or turns the soil and makes it more suitable for sowing seeds. After ploughing by cultivator, field should be levelled with the help of planking. It also helps in levelling the field after harrowing. It also helps in pulverize the soil at the deeper layer means up to 15-20 cm of soil depth.



**Rotavator :** Rotavator is a useful agriculture implement which is used for soil preparation. Rotavator is a powerful piece of machinery, used in field to break up, churn and aerate the soil especially hard soil prior to planting seeds and bulbs. Rotavators uses a set of blades that spin and break through the soil.



**Power tiller :** It is a kind of mini tractor. It can be used for different intercultural operations including weeding, earthing and secondary tillage operations. It comes with different capacity of horse powers for example 8 HP, 10 HP, 12 HP and manufacturer firms.



**Plank or Leveler :** The ploughed field may have big pieces of soil called crumbs. It is necessary to break these crumbs with a plank. The levelling of ploughed soil is done by using an implement called leveler or plank. Planking is done to crush the hard clods to smoothen the soil surface and to compact the soil lightly. Planking should be done after ploughing by cultivator or harrow to conserve the soil moisture and breaking the large clods.



**Laser Leveler :** This is sensor-based equipment for precisely levelling the field. Tractor drawn guided bucket is also found in laser leveler. It saves water up to 20-25% and also enhance the crop productivity and nutrient use efficiency. If our field is not levelled properly, definitely there will be water loss and also deteriorate the soil fertility and finally affected the yield because nutrient and irrigation water will not properly distribute among all plants in the field.



**Seed Drill :** A seed drill is a device used in agriculture that sows seeds for crops by positioning them in the soil and burying them to a specific depth while being dragged by a tractor. This ensures that seeds will be distributed evenly. After recommended fertilizer application in the field, seed drill is used to line sowing of mustard seeds in the field. Seed drills also aid in removing weeds during sowing.



**Seed-cum-Fertilizer Drill :** It is a specially developed solution for the sowing of seeds and fertilizers. This versatile tractor attachment is capable of sowing different seeds and using fertilizer at the same time. It is best suited for many crops such as Wheat, Corn, Oilseeds, Soybean, Pulses and Millets in all types of soil. Both fertilizer and seed can be placed an appropriate depth at the same time through this drill.



**Zero Till Ferti Seed Drill :** This machine enables us to sow directly after paddy harvest without prior field preparation and any manipulation of soil. This saves the diesel, working time and labour. Both fertilizer and seed will be placed an appropriate depth at the same time from zero till seed drill. It also helps in advance sowing of the crop. This machine is used in large scale in rice-wheat cropping system.



**Ridge Planter :** It is suitable for sowing on raise beds or ridges or bunds. Both the bed preparation and sowing can be done simultaneously. Areas where water logging is a problem, it always advised that crop should be grown on raise beds. Crop can be sown with the use of this planter. This type of sowing can be helpful in areas where rainfall occurred after sowing of mustard because sowing is completed on ridges only.



**Hand Hoe/ Spade :** It is useful for turning soil, creating edges, removing sod, digging up or dividing plants, and digging holes. It can be used for bunding, loosening of soil and also for preparation of channels. Making of bund with the help of spade after sowing is very necessary for minimize the water loss and suitable the field to irrigation.



**Khurpi :** This is used for removing weeds and unwanted plants from the crop. The tool is also used for breaking the surface layer, aeration, intercultural operation and mulching of the soil. The khurpi consists of blade, one end is flattened by forging that serves as cutting edge and the other end is made as tang for fitting the handle. It is very effective to control weeds however consume much time and labor.



**Hand Weeder :** This is hand operated weeder. The weeding operation can be done by hand hoe in the field. Intercultural operations can be done in standing crop by using this hand weeder. It also loosens the soil while weeding. It is a labour saving, time saving and easy to handle equipment.



**Sprayer :** It is used for spraying of agro chemicals, fungicide, insecticide and weedicide. The capacity of the tank usually around 15 liters. It is suitable for managing

