

Review Article

Review on conventional and mechanised agricultural methods

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Abstract

India is land of farmers. As we know population of India is increasing day by day and to fulfil the need of food modernisation of agricultural sectors are important. By using chemical pesticides and fertilizers fertility of soil is decreasing. Hence, organic farming is used by farmers. Same traditional methods are used by the farmers for spraying fertilizers and pesticides, equipments are also same for ages. Using backpack sprayer for spraying fertilizer leads to back pain and is beneficial for small farms. Making modifications in conventional spraying methods will lead to equal distribution of pesticides and fertilisers on the farm and eventually reduce the waste hence, reduce the cost of production.

Keywords: Backpack, Pesticides, Mechanisation, Multipurpose sprayer

1. Introduction

India is a land of farmers. Almost 65% people of India's population is indirectly depend on farming. But the methods of farming are conventional. They are still using conventional equipment's from many years for farming procedures like seed sowing, spraying pesticides, and digging and levelling the soil, weeding etc.

There is no mechanisation in the processes like farmers are still sowing the seeds by using hand, spraying pesticides by using backpack sprayer, use plough for digging the soil.

It is now realized that in order to meet the food requirements of the growing population and rapid industrialisation, modernization development of agricultural field is inescapable. Many farms production suffers because of improper preparation and delayed harvesting, threshing.

Mechanisation will reduce unit cost of production through higher productivity and less input consumption. In order to meet the requirements, steps were taken to increase the availability of implements, irrigation pumps, and tractors, combine harvesters. It is generally said that mechanisation of small farms is difficult but with proper mechanisation higher productivity can be obtained.

It is normally said that mechanization of small farms is difficult. But Japan have a average land holding even smaller than India, with advanced technology, take the agriculture to great level. In order to minimize the efforts of small farmers, to increase efficiency and

save farmer's time for taking up additional effort, the use of modern time saving machines and implementation of new technology in agricultural sector is very important now days.

2. Literature Review

Following are the various methods of application of pesticides and fertilisers.

A) Spraying Methods

Backpack Sprayer

Backpack sprayer is one of the most conventional and easy method of spraying pesticides. There are two types of backpack sprayers are available in market. First one is compressed air operated sprayer that needs to carry on the operator back. Capacity of the conventional backpack sprayer is about 15-20 litres and operator has to pump the lever continuously in order to get required pressure. Second type is hand operated hydraulic pump that forces pesticides through one or more nozzle

Hydraulic Spray pump uses the reciprocating mechanism in which quantity of pesticides is controlled by piston movement. The pressure generated in the backpack sprayer is about 90 pounds per square inch (psi). The capacity of the hydraulic spray pump is about 20-25litres.sprayer convert's pesticide formulation often it may carry a mixture of water (sometimes pesticides or any other chemicals).pesticides coming out from the nozzle

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which is at very high velocity range from 100-150 m/s into small droplets. And the size of droplets can be resized by using different nozzles and by maintaining the pressure under which it is forced. Large droplets of mixture increases the capacity of mixture to carry per unit land covered. but in this type of spraying, the operator has to carry pesticides filled tank, which causes fatigue and back pain and hence reduces human efficiency.



2. Lite-trac spraying

Lite-Trac is a trading name of Holmen Farm Supplies Ltd, a manufacturer of agricultural machinery registered

In England and based in Peterborough. The Lite-Trac Derived its name from “light tractor”, due to the designed. Chassis enables the inherently very heavy machines manufactured by the company to have a light. Footprint for minimum soil compaction. In this piston sprayer is mounted on rear side of tractor .power is given to the Sprayer through V belt pulley drive. Operating pressure is about 400 psi. Designed nozzle assembly or sometimes long pipe in which different size of nozzle is attached can be used for spraying. Disadvantage of using this sprayer is that there will be a more loss of pesticide and again this mixes with atmosphere causes pollution.



Lite-trac spraying

Motorcycle Driven Multi-Purpose Sprayer

In the 1994, Mansukhbhai Jagani, developed an attachment for a motorbike to get a multi-purpose tool Bar. It which addresses the twin problems of farmers in Saurashtra namely paucity of labourers and shortage of bullocks. This motor cycle driven plough (Bullet Santi)



Motorcycle Driven Multi-Purpose Sprayer

can be used to carry out various farming operations like furrow opening, sowing, inter-culturing and spraying operations. The Mansukhbhai’s intermediate-technology contraption proved efficient and cost-effective for small sized farms.

4. Aerial Sprayer



Aerial Sprayer

Aerial sprayer is another type of spraying; it is beneficial for the farmers whose having large farms. This technique is not affordable by farmers having small and medium farm. It is modern agricultural technique in foreign. In India farmers having small farms as compared with the foreign country and finance available for new techniques are also less therefore they can’t afford such a costly techniques. Aerial spraying the spraying is done with the help of small helicopter controlled by remote or sometimes driven by human. On that sprayer is attached having multiple nozzles and sprayed it on the farm from some altitude. It is less time consuming and less human effort required for spraying fertilizers. Disadvantage of using this sprayer is that pollution increases and it’s a

costly techniques which small farmers can't afford.

B] Fertilisation Methods

Row placement

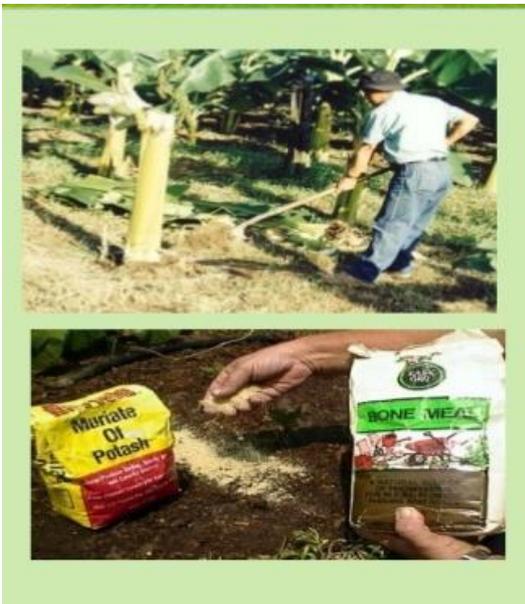
When the crops like sugarcane, potato, maize, cereals etc., are sown close together in rows, the fertilizer is applied in continuous bands by throwing through hand on one or both sides of the row, which is known as row placement. In this method operator has to carry fertilizer with him in a bucket which again increases fatigue to the operator.



Row placement

2. Plough sole placement

In this method, fertilizer is placed at the bottom of the plough furrow in a continuous band during the process of ploughing. Every band is covered as the next furrow is turned. This method is suitable for areas where soil becomes quite dry up to few cm below the soil surface and soils having a heavy clay pan just below the plough sole layer.



Plough sole placement

Banding

Banding is convenient way to make in Season fertilisers items which requires high nitrogen vegetables like corn. Make narrow furrow 6-8 inches long away from the base of the plants and 2-3 inches deep. Distribute the organic material equally in the furrow and cover with soil.



Banding

C] Digging Methods

Country plough



Country plough

Tillage is the prime operation to do in farming. It is done to achieve desirable condition for seed placement and growth of plants in farm. This is done mainly with bullock drawn plough made up of Acacia wood. Usually, small village farmers and owners of the land are unable to use tractors over there and in that situation ploughs are highly useful.

Spade



Spade

It is used for formation of bunds, ridges and furrows and irrigation. Handle is made up of Acacia wood and the working area is made up of iron.

Weeder



Weeder

The tool is used for removing deep-rooted weed with their rhizome. Grass is easily removed with the help of weeder. The tool made up of iron comprise a handle and working area. The farm labourers first pierced the soil with the help of this weeder and lift the lower layer soil upwards & vice versa.

Future scope

In order to reduce human effort we can modify sprayer with new one which consist of Base frame is made of Mild steel fabricated structure mounted on 4 wheels that hold entire assembly of the sprayer. The rear side carries rear wheel shaft that carries rear wheel while front wheel steering carries the front wheel bracket which provides necessary turning effect. in this project two stroke IC engine mounted on rear side of frame from which power is transmitted to blower and gearbox through belt & pulley drive .From gearbox

power is transmitted to router which made of stainless steel through chain and sprocket drive. Pesticide tank is mounted above the blower having capacity of 30 liter. For controlling the flow of pesticide there is one stop valve provided between tank and blower. For engagement and disengagement of router with the gearbox, router engagement pedal is provided which operated manually.

Hopper is mounted at the centre of the frame projected vertically from base which contains fertilizer or seeds or mixture of both. Below the rear side of base, one trapezoidal shape plate is provided which is used for levelling irregularities of soil.

It is used for performing 4 operations simultaneously. When the engine is started power is transmitted to the router through gearbox. Router has 5 to 6 radial blade which dig the soil and then feeding is done by hopper .After feeding levelling is done by plate and simultaneously spraying can also be done through blower.

Conclusions

There are many farming and fertilizing method out of which can use economically friendly or which can use greatest technology. The primary aim of project is that to reduce the pollution to the great level and reduce the efforts required for farming

The suggested model has removed the problem of back pain, since there is no need to carry the tank (pesticides tank) on the back. It is used for performing 4 operations simultaneously. Such as digging the soil, sowing the seed, spraying the pestiside, and levelling the soil.

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