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Pedagogy of Multipurpose Farming Machine and Its Effect on Social Work of Farmers

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ABSTRACT:

India's economy is based on agriculture. There is a lot of fieldwork in the agricultural industry, such as weeding, reaping, planting, and other activities that were formerly done with conventional equipment. Working with such equipment was exhausting and time-consuming. Traditional methods are also time-consuming. Agriculture mechanization made farming simpler and faster. For virtually every job in agriculture, there are a variety of equipment available. Machines may help with anything from land preparation to agricultural harvesting and other processes. This machine is not just a faster and more efficient method to do these jobs. Agriculture machinery is more expensive these days, and most farmers with a rural background cannot afford it. The majority of Indian farmers own relatively tiny plots of land, therefore buying this more expensive equipment may not be viable for them. Aside from that, most farmers regard conventional agricultural techniques as their main approaches. In light of the aforementioned considerations, it is necessary to design equipment that can be used many times and is also inexpensive.

Keywords: Agricultural, Farming, Food, India, Mechanization.

1. INTRODUCTION

1.1. India's Agricultural Mechanisation History:

The story of India's agricultural mechanisation is fascinating and astounding in numerous ways. In the past sixty years, the nation has gone from experiencing severe food shortages to being a large exporter of several food commodities and other industrial goods, including agricultural tractors. This has been accomplished despite a population increase exceeding three times the area of arable land.

With 1.25 billion people as well as a 1.3% growth rate, India has the second-highest population in the world in 2014. Nearly two-thirds of the population resides in rural areas, with almost half of them living off agriculture. The nation's total land area is 297 million hectares, 142 million of which are designated as agricultural land. Agriculture's part of the economy has declined from 56% in 1950 to 14% now, despite the fact that the country still has a predominantly agrarian economy. Today, the service sector makes up 59% of the GDP, while the manufacturing sector only contributes 27%. Providing enough food to feed the nation's burgeoning population is the greatest problem facing the agriculture sector[1]–[3].

1.2. Benefits of Mechanization in Agriculture:

Farm mechanization has long been recognized to offer farmers with a variety of economic and social advantages. The enhanced yield that occurs as a consequence of increased automation is the most important of the economic advantages. The advantages of agricultural mechanization make it a key component in shaping the future of Indian agriculture, given the looming water shortage problem and the necessity to guarantee food security in the nation[4]–[7].

- Input savings: Research has revealed a link between agricultural mechanization (access to farm power) and farm output. Farm mechanization is claimed to save a lot of money on inputs.
- Increased efficiency: In addition to the previously mentioned inputs, agricultural equipment aids in improving farm labor efficiency and decreasing drudgery and burdens. Farm mechanization is expected to save farmers 15-20% of their time. It also aids in enhancing harvesting and decreasing post-harvest losses, as well as increasing cultivation quality. These advantages, as well as the cost savings on supplies, enable farmers lower their production expenses and make more money.
- Social Advantages: Farm mechanization has a number of social advantages.
- Assists in the conversion of uncultivable ground to agricultural land and the shifting of soil using sophisticated tilling methods.
- Draught animals use it as a source of feed and fodder for food production.
- Women's burden is reduced as a direct result of increased labor efficiency. Farming methods are becoming more secure.s
- Assists in attracting more individuals to work and live in rural regions by encouraging youngsters to join farming.

1.3. Constructional Features:

The following are the many components of a multifunctional agricultural machine:

1.3.1. Body:

The body is a machine's supporting component. The engine is placed on the front side of this body. The handle is connected to the engine's front side. Behind the front wheels is where the reaper is connected. The seed sowing setup and cultivator are connected to the rear side. The mild steel bar used to construct the body is composed of. The width is 24 inches and the length is 36 inches. The assembly's total length is 6 feet, and its overall height is 3 feet.

1.3.2. Engine:

The heart of a car is its engine. It is an apparatus that transforms the chemical energy of fuel into mechanical energy, which is then applied to propel a moving object. It is, in essence, an electrical generator. Internal combustion engines are found in cars. The internal combustion engine is a type of engine in which combustion (fuel burning) takes place inside of a cylinder and results in the abrupt generation of a high pressure force. Through the employment of a mechanism, this pressure force is used to propel a vehicle or rotate a wheel.

1.3.3. Air Filter:

An air filter's function is to purge the air of moisture and debris. Only clean air is permitted to enter the carburetor. The carburetor and filter are coupled. A device consisting of fibrous material called an air filter is used to filter out solid airborne contaminants such dust, pollen, mould, as well as bacteria. Odors and gaseous pollutants like ozone and VOCs can also be eliminated by filters that contain an absorbent or catalyst like charcoal (carbon). Engines and ventilation systems in buildings are two examples of applications that use air filters[8]–[11].

1.3.4. Carburetor:

A carburetor is a mechanism that combines gasoline & air and sends the mixture to an internal combustion engine's intake manifold. Later carburetors discharged a measured quantity of fuel into the air stream, while early carburetors merely allowed air to flow over the surface of the fuel (i.e. gasoline).

Up until the 1980s, the most common technique of combining gasoline and air for internal combustion engines was by carburetion. Nevertheless, fuel injection quickly overtook carburetion due to environmental legislation and concerns about fuel economy. Carbs were employed in the United States, Europe, as well as other

industrialized countries until the middle of the 1990s, but they required more sophisticated control systems to satisfy emissions regulations.

1.3.5. Differential:

The differential is a device which divides the torque output of the engine into two, permitting each to spin at a separate speed. All contemporary autos, trucks, and the vast majority of all-wheel-drive (full-time four-wheel-drive) vehicles use differentials. Since the front wheels move a different distance than the rear wheels during a turn, these all-wheel-drive vehicles require differentials between each pair of drive wheels in addition to the differential between the front and back wheels.

1.3.6. Silencer:

High-pressure exhaust gas is emitted while an engine is running. This creates a pressure wave in the air, resulting in a rapid explosion and a continuous roar. These two subgroups have frequencies between 50 and 500 hertz. In automobiles, the silencer, usually referred to as a muffler, is linked to the exhaust pipe from the engine to reduce noise. In the muffler, the gases or contaminated air are permitted to gradually expand and cool.

1.3.7. Drive Shaft:

Drive shafts, also referred to as driveshafts, driving shafts, propeller shafts (prop shafts), or Cardan shafts, are mechanical components for transmitting torque and rotation. They are frequently used to connect other drive train elements that cannot be linked directly due to distance or the requirement for relative movement. Torsion and shear stresses equivalent to the difference between the input torque and the load are applied to drive shafts, which serve as torque carriers. Because too much weight would increase their inertia, they must be sturdy enough to endure the pressure. In addition to one or more universal joints, jaw couplings, or rag joints to manage alterations in alignment and separation between the driving and driven components, drive shafts may additionally include a splined joint or prismatic joint.

1.3.8. Chain Drive:

One of the most important components of transportation equipment such as motorcycles, bicycles, cars, conveyors, agricultural machinery, and machine tools is the transmission of power. Chain drives are a combination of belt and gear drives because they are flexible and comprise many links. Only parallel shafts can be connected with chains to transfer power. Chain drives, unlike belt drives, utilize sprockets, which are toothed wheels.

1.3.9. Wheels:

The steering and driving axles of automobiles are fitted with tires. They are therefore designed to support the weight and provide the traction necessary for motorised rotation and steering. By definition, trailers do not have motorized wheels, and most do not have steering or brakes. The weight of the trailer and its planned payload must simply be supported by the trailer wheels, which are mounted on trailer axles. Tires that are properly inflated function at low pressures, typically about 32 pounds per square inch, to cushion passengers while still sustaining the vehicle's weight.

1.3.10. Cultivator:

A range of agricultural tools used for supplementary tillage are referred to as cultivators. The expression can be used to describe linearly drawn frames with teeth (sometimes referred to as shanks) that pierce the earth. In another sense, the phrase describes devices that use revolving discs or teeth to accomplish the same result. A good example is the rotating tiller. Before planting (to aerate the soil & create a smooth, loose seedbed), cultivators turn the dirt over and pulverise it. They also do this once the crop has begun to grow (to kill weeds).

This eliminates surrounding weeds by pulling them up, burying their leaves to limit photosynthesis, doing both at once, or a combination of the two.

1.3.11. Seed Drill:

By measuring out individual seeds, planting them in the ground, and burying them to a certain depth, a seed drill sows agricultural seeds. This guarantees even distribution of the seed. The seeds are drilled into the ground at regular intervals and depths, keeping them covered in soil and shielded from wind and bird predation. This guarantees that plants receive enough sunlight, soil-based nutrients, and water. Before the seed drill was created, it was customary to plant seeds by hand.

1.3.12. Sweeper Blades:

Blades are the components that have direct contact with the soil and therefore have a significant influence on how weeds operate. The blades are the most important part of the machine that collects garbage from the field. It came into direct touch with the seed and was put into the soil.

1.3.13. Sprayer:

Insecticides, herbicides, fungicides, as well as defoliants are frequently sprayed using sprayers on farms to control crop quality. The most prevalent kinds of machine-operated sprayers include low-pressure, high-pressure, air-carrier, & fogger sprayers. Weeds and insects are the main culprits behind crop damage. In modern horticulture and agriculture, insecticides and pesticides—both synthetic and natural—are employed to eradicate insects or stop them from procreating. To apply herbicides, insecticides, and fertilisers to agricultural crops, a special tool known as a "Sprayer" is employed.

2. DISCUSSION

India's economy is based on agriculture. It can spray a large field area in a short amount of time, sow seeds quickly and effectively, and clear the field of unwanted material more quickly than traditional methods. It is possible to do away with the need for animals entirely. It is the greatest choice in the absence of animal weeding since it requires less effort. Wages of labor may be totally overlooked. Some of the benefits of utilizing a multipurpose agricultural machine are that it is a more advanced and quicker way of farming. The characteristics of a multifunctional agricultural machine are discussed in this article. This machine has a wide range of applications since it is presently utilized in agricultural operations.

CONCLUSION

The device was designed and created utilising a four-wheeled engine-driven sweeper weeder machine that was already in existence. Spraying equipment, cultivators, and seed sower setups are also available. The gadget is designed to be simple to use in the field. The vehicle is propelled by a two-stroke gasoline engine, and its controls are located on the handlebars as well as footrest.

The steering system is straightforward and easy to use. The controls on the equipment are convenient and easy to use. Spraying activities are controlled by the control switch. This device is used exclusively for ergonomic purposes to propel the machine forward so that it can draw a cultivator or sweeper blade or carry the nozzle to cover the agricultural area. Thus, this fake is cost-efficient.

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