

DESIGN & FABRICATION OF THE SOLAR POWERED MULTIPURPOSE AGRICULTURE MACHINE

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ABSTRACT

Agriculture being one of the major occupations in India, Agriculture plays a vital role in the Indian economy. Indian agriculture has registered impressive growth over last few decades. It is very essential to discover and implement new idea in this field, though lot of work has been done in this area. It is unfortunate that, these ideas are not being implemented properly in actual field. This is due to high cost and is complicated for rural people. Multipurpose agriculture or farming machine is basic and major machine involved in agriculture for maximum yielding. The Conventional method of weeding, watering, pesticide spraying and cutting is a laborious process and hence for that reason there is a scarcity of labors and basically, many farmers in India also use bullocks, horses and buffalo for farming operation. This will not satisfy need of energy requirement of the farming as compared to other countries in the world. This result in delayed agriculture crop production practices to overcome these difficulties, we are thinking that human and animal efforts can be replaced by some advance mechanism which will be suitable for small scale farmer from economical and effort point of view. So, we are developing this machine which will satisfy all this need and to solve labor problem. A solar powered multipurpose agricultural machine is designed for weeding, watering, pesticide spraying and cutting purpose. The special vehicle field is gradually increasing its productivity in agriculture field. Some of the major problems in the Indian agricultural are rising of input costs, availability of skilled labor, lack of water resources and crop monitoring. To overcome these problems, the automation technologies were used in agriculture. The automation in the agriculture could help farmers to reduce their efforts.

Keyword: Solar Panels, Pesticides sprayer, Weed and Sprayer etc.

1. Introduction

Spraying of pesticides is an important task in agriculture For protecting the crops from insects. Farmers mainly use Handoperated or fuel operated spray pump for this task. This conventional sprayer causes user fatigue due to excessive bulky and heavy construction. This motivated us to design and fabricate a model that is basically

solar sprayer In our design, here we can eliminate the back mounting of Sprayer ergonomically it is not good for farmer's health point of view during spraying. In this way here we can reduce the users fatigue level. There will be elimination of engine of fuel operated spray pump by which there will be reduction in vibrations and noise. So with this background, we are trying to design and construct a solar powered spray pump system.

1.1 Low agricultural production

Agricultural production is low in India. India produces 27 Qtls Wheat per hectare. France produces 71.2 Qtls per hectare and Britain 80 Qtls per hectare. Average annual productivity of an agricultural labour is 162 dollars in India, 973 dollars in Norway and 2408 dollars in USA.

1.2 Small size of holdings

Due to large scale sub-division and fragmentation of holdings, land holding size is quite small. Average size of land holding was 2 to 3 hectares in India.

1.3 Under employment

Due to inadequate irrigation facilities and uncertain rainfall, the production of agriculture is less; farmers find work a few months in the year. Their capacity of work cannot be properly utilized. In agriculture there is under employment as well as disguised unemployment.

2. Major challenges faced by Indian agriculture

Production of some of the major staple food crops like rice and wheat has been stagnating for quite some time. This is a situation which is worrying our agricultural scientists, planners and policy makers. If this trend continues, there would be a huge gap between the demand of ever growing population and the production.

2.1 High cost of Farm Inputs

Over the years rates of farm inputs have increased. Farm inputs include fertilizer, insecticide, pesticides, HYV seeds, farm labor cost etc. Such an increase puts low and medium land holding farmers at a disadvantage.

2.2 Soil Exhaustion

Soil exhaustion means loss of nutrients in the soil from farming the same crop over and over again. This usually happens in the rain forest.

2.3 Depletion of Fresh Ground Water

Most of the irrigation in dry areas of Punjab, Haryana and Western Uttar Pradesh was carried out by excessive use of ground water. Today fresh ground water situation in these states is alarming. In the coming few years if this type of farming practice continues, these states are going to face water famine.

2.4 Farmers Suicide

Every suicide has a multiple of causes but when you have nearly 200,000 of them, it makes sense to seek broad common factors within that group. The suicides appear concentrated in regions of high commercialization of agriculture and very high peasant debt. Cash crop farmers seemed far more vulnerable to suicide than those growing food crops.

2.5 Impact of Globalization

You can see the effect of globalization on the farm sector in India. All developing countries have been affected by it. The most evident effect is the squeeze on farmer's income and the threat to the viability of cultivation in India. This is due to the rising input costs and falling output prices. This reflects the combination of reduced subsidy and protection to farmers.

4 Components

Several components and materials are required for assembling the final model.

4.1 Solar Panel

Solar power is arguably the cleanest, most reliable form of renewable energy available, and it can be used in several forms to help power appliances. Solar-powered photo voltaic (PV) panels convert the sun's rays into electricity by exciting electrons in silicon cells using the photons of light from the sun. This electricity can then be used to supply renewable energy to battery. By lowering utility bills, these panels not only pay for themselves over time, they help reduce air pollution caused by utility companies. We chose a solar panel of 20w.



Fig 4.1 Solar Panel

4.2 Battery

In the modern era, electrical energy is normally converted from mechanical energy, solar energy, and chemical energy etc. A battery is a device that converts chemical energy to electrical energy.



Fig. 4.2: Battery

4.3 Pump

A pump is a device that moves fluids, by mechanical action. Pumps operate by some mechanism consume energy to perform mechanical work by moving the fluid.



Fig 4.3 Pump

4.4 Plastic Water/Pesticide Tank

It has storage capacity up to 10 liter. It is used for supplying the water as well as to spray the pesticide with nozzle to plant.



Fig.4.4: Plastic water tank

4. CONCLUSIONS

The top concentration of our design is the cost and operational ease in case of small farm units. This multipurpose agro equipment is thus designed to reduce the cost of harvesting, spraying and cutting. In the development of multipurpose agro equipment we utilize the past data and techniques. In this way the design of multipurpose agro equipment is safe. Such human powered machine systems will help to a great extent in improving the production per acre and increase profitability of small and middle class farmers. A new type of multipurpose mechanism is fabricated which is different from other machines and will work on non-conventional energy source which is purely human operated. Such systems are of much importance in Asian countries, as almost all Asian countries are facing electricity and power scarcity which results in twelve to fourteen hours load shedding in rural areas especially in India. Therefore, there is the need to develop a locally, fabricated multiple multipurpose agro equipments.

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