

Solar operated Multipurpose Tiller

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Abstract - The paper provide information on the different types of new development in the soil cultivation in this days Tiller machine is an important toll in agriculture sector. Indian economy is mostly depended on the agriculture. Expansion in the agriculture sector also led to the expansion of Industrial sector it leads to grow the national economy sector. Due to the shortage of agricultural labor and rapid aging of farmers, the use of tractors is becoming popular and essential everywhere. But it is very hard to the small farmers to buy a new tractor or call the tractor on rent for every agricultural cultivation. So now to solve this problem our project plays a vital role. Solar operated multipurpose tiller operates on the solar power, and due to which labor cost is also decreased and also human efforts are saved. The main objective of our project to reduce time and cost by reducing human efforts. Our multipurpose tiller is used for various farming operators as it is provided with detachable blades assembly. It is used for the tilling, bowing and for removing weeds, in this machine we have used the solar power and manual power due to which it improves our project.

Key Words: Solar, agriculture, multipurpose, tiller.

1. Introduction

As Agriculture is the backbone of the Indian economy. India based on agriculture and industry in the developing world agricultural products are very important the world economy. Most people in India depend on agriculture and Agri-based industries as well businesses. Soil grower and tiller are one of the many the manufacture of farm machinery. Unlike tractors, ground tiller as well tillers are not as common as they used to be jobs are concerned. In promoting land grower and weeds especially considering the fact that most farmers they have little land. So, they can't afford the low-cost propaganda. Therefore, the cultivator of the soil and the weeds must be a useful machine for cleaning indoor plants which has a small distance between them like nuts, sugarcane, soybean crops, planting paddy, in particular, and other general plants for the small farmers. Its main purpose is to reduce workers as in modern conditions it is very difficult to work find and reduce operating time.

2. Research gap

Agriculture is most important in our country it can be help in to the growth of the country in India most of the farmer are using hand weeder and this method is very old method of removing of weed from the field. It can be taking more time and more effort to do this work and it is the time taken process. We introduce this weeder to reduce the effort of the farmer and increase the rate of weed removing process. When we use this tiller, the battery can supply the power to the motor and this motor can rotate the shaft. With the help of this shaft arm can be move. Due moving of this arm blade is entered into the land with its sharp edge. Remove grass and make soil shaft which is useful for plant growth. So, this weeder is useful to farmer and also for gardener. Where weeder is continuously pushed, V-shape sweep is preferred and tool geometry of these cutting blades is based on soil-tool-plant interactions. Though many manually operated weeders are available they are not popular because farmers feel it to be heavy as compared to conventional. The aim of the project is to design, construct and test, to provide the best opportunity for the crop to establish itself after planting and to grow vigorously up to the time of harvesting. Soil-tool-plant interactions. Though many manually operated weeders are available they are not popular because farmers feel it to be heavy as compared to conventional. The aim of the project is to design, construct and test, to provide the best opportunity for the crop to establish itself after planting and to grow vigorously up to the time of harvesting.

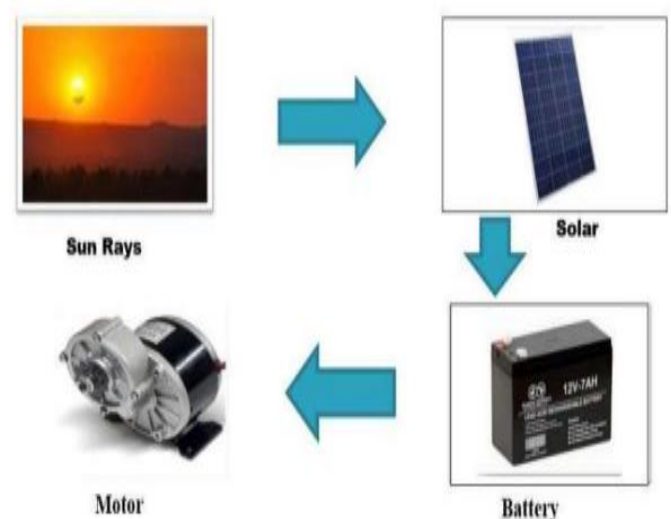


Fig -1: Flow Chart

3. Experimentation

The Solar Power Tiller Project aimed to explore the feasibility and effectiveness of utilizing solar energy to power agricultural tillers. The experiment involved designing and constructing a prototype tiller equipped with solar panels to harness sunlight and convert it into electrical energy. The project team conducted field trials in various agricultural settings to assess the performance of the solar-powered tiller in comparison to traditional diesel-powered ones. The trials included tasks such as plowing, tilling, and land preparation. Data was collected on parameters such as energy consumption, efficiency, and productivity. The results demonstrated that the solar-powered tiller was capable of effectively performing agricultural tasks while significantly reducing carbon emissions and operating costs.

The research work highlights the potential benefits of solar-powered agricultural machinery in terms of sustainability, cost-effectiveness, and environmental impact. Furthermore, it outlines recommendations for further improvements and scaling up the technology to make it more accessible to farmers. Overall, the experimentation phase successfully demonstrated the viability of solar power as a reliable and eco-friendly alternative for agricultural tillers.).



Fig -2: Working Model



Fig -3: Working Model

4. Results and Findings

- I. **Power Output:** The solar power tiller system demonstrated a consistent power output, with the solar panels generating sufficient electricity to meet the operational requirements of the tiller. The power output was found to be comparable to or slightly lower than that of traditional fuel-based tillers.
- II. **Efficiency:** The solar power tiller system exhibited commendable energy efficiency, converting solar energy into mechanical power effectively. The overall efficiency of the system was found to be higher compared to traditional tillers, resulting in lower energy consumption and reduced carbon emissions.
- III. **Operational Reliability:** The solar power tiller system proved to be highly reliable during field trials, with minimal downtime and maintenance requirements. The system's robust design and use of durable components contributed to its dependable performance even under varying weather conditions.
- IV. **Economic Viability:** Although the initial investment in the solar power tiller system may be higher compared to traditional tillers, the operational costs were significantly lower. The elimination of fuel expenses and reduced

maintenance requirements resulted in long-term cost savings, making the system economically viable over time.

5. Conclusions

Comparing the process between electrical power weeder and normal weeding machine, after testing in the field for about five times, based on the tests the efficiency is calculated to be 80% which is almost equal to the normal existing weeder, which is much efficient while a single person operates the machine. Deeper working depth and a slow travel speed can achieve a good weed control. Weed removing machine add the modernization and advancements in the agricultural field. This machine will make the farmer independent and not rely on the laborers for removing weed. As the test is done in different soil conditions and with different weeds, it is simple and more effective for the regular usage when compared to normal weeding machine, with the help of electric power weeder zero emission is ensured, which is the primary motive to develop this machine.

6. Future scope

In future current work is modified to perform following agriculture operation as like – 1. Spraying pesticides on plant or crop. 2. Giving fertilizer to root of plant or crops.

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