



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 3, March 2024

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.423

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6381 907 438

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# Solar Based Mobile Plough with Water Sprinkler

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**ABSTRACT:** This paper presents the design and prototype implementation of a versatile agricultural mechanism tailored to the needs of farmers engaged in soil preparation and irrigation. The most important work in agricultural fields is soil ‘tillage’ along with water sprinkling and this job must be conducted before planting the seeds. A plough is an essential tool for soil tillage; ‘tillage’ is the basic operation in farming. The plough is known as Nagal or Nagali in Indian languages. In most cases, several ploughs attached to a Tractor to its rear side will be in use. Here a machine is designed that performs as like the tractor but without fuel, solar energy is used to run this mechanism. The mechanism integrates two essential functions: ploughing the soil and sprinkling water, offering a comprehensive solution for enhancing agricultural processes. In this regard, the plough mechanism arranged at rear side of small 4-wheeler vehicle is designed with two or three ploughs. Similarly, the water sprinkling mechanism is also arranged over this moving mechanism.

**KEYWORDS:** 89C52 Main Processor, L293D H Bridge IC, DC Motor, 89C2051 Micro Controller, Plough, Water Sprinkler.

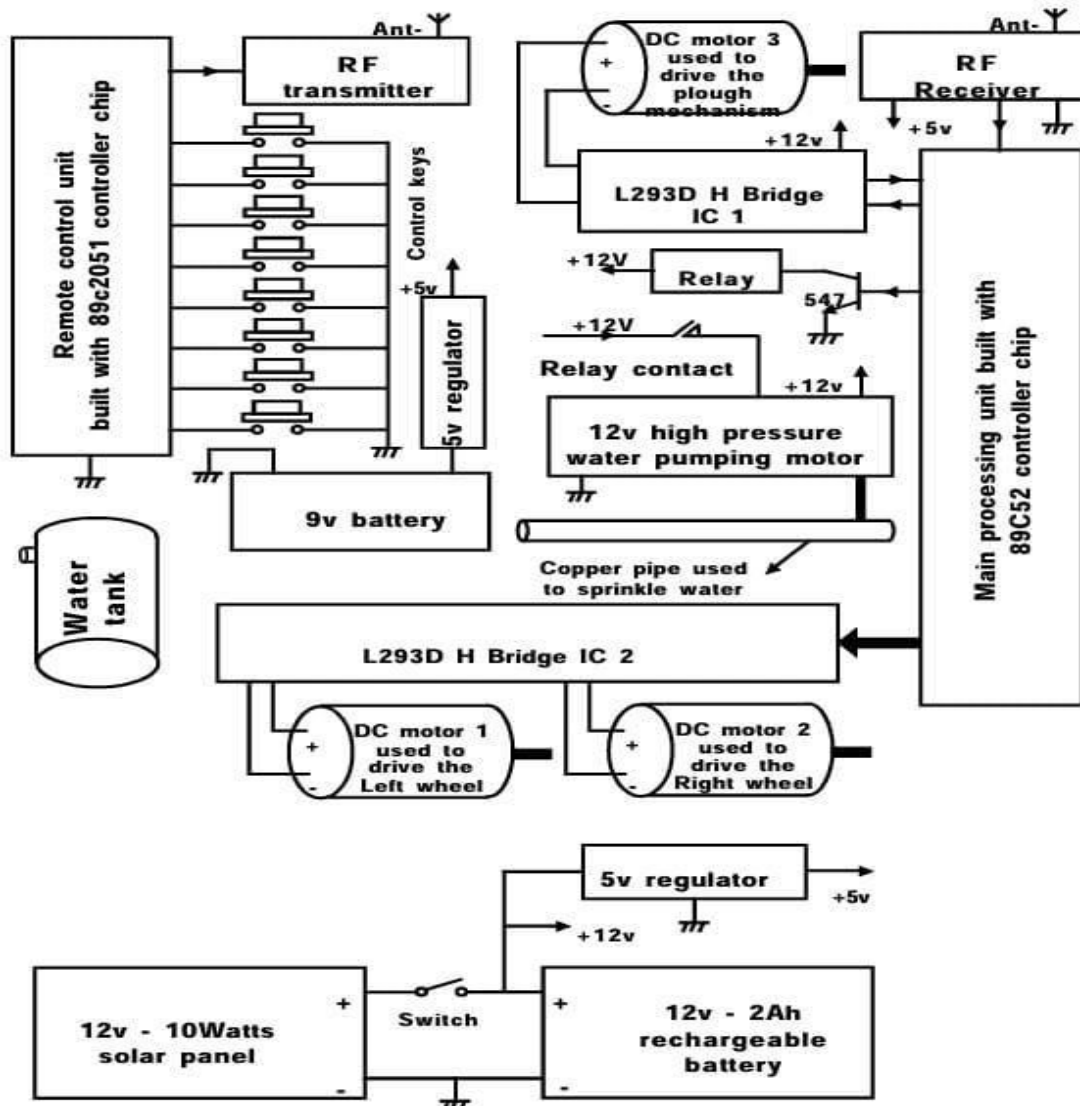
## I. INTRODUCTION

The designed mechanism serves farmers by combining soil ploughing and water sprinkling functionalities. It features a rear-mounted ploughing mechanism for tilling soil and a front-mounted water sprinkler for irrigation. A prototype module has been developed to validate the concept practically, with potential for scalability to larger, high-power devices for real-world applications.

The water sprinkling system includes a small tank and a pumping motor controlled remotely to deliver water through a copper pipe with tiny drilled holes, ensuring even distribution across the soil. A plough is a tool generally used in agricultural farms in farming for initial cultivation of soil in preparation for sowing seed or planting to loosen or turn the soil. Ploughs are traditionally drawn by working animals such as horses or cattle, but in modern times may be drawn by tractors. The plough's primary purpose is to aerate the soil, bringing nutrients to the surface while burying weeds and crop remains.

These days, as the technology is advanced, especially in the field of agriculture, lot many agriculture Robots or Electro-mechanical machines are used for various applications. Here in this robot such embedded system is designed using 89c51 microcontroller chip. In few robots often sensors are used to gather data about their surroundings to navigate. But in this project work sensors are not used, because the vehicle is controlled through remote by which the machine will be under the control of humans. The remote-control unit is constructed with 89c2051 controller chip.

BLOCK DIAGRAM



II. RELATED WORK

Existing research in agricultural machinery has explored various innovations to improve farming practices. Some studies have focused on integrating solar power into mobile agricultural equipment to enhance sustainability and efficiency. Solar-powered devices offer the advantage of renewable energy sources, reducing reliance on fossil fuels and minimizing environmental impact.

Additionally, advancements in mobile ploughing technology have aimed to streamline soil preparation processes. Integrating water sprinkler systems into mobile ploughs represents another area of research interest, as it addresses the dual needs of soil cultivation and irrigation in a single system.



However, while previous work has explored either solar-powered mobile machinery or integrated ploughing and irrigation systems separately, there remains a gap in the literature regarding the development of a solar-based mobile plough with a water sprinkler.

This paper aims to address this gap by proposing a novel concept that combines solar power with mobile ploughing technology and water sprinkling functionality, offering a comprehensive solution for sustainable and efficient agricultural practices.

### **III. METHODOLOGY**

The project involves the practical construction of a solar-based mobile plough with a water sprinkler system, requiring the integration of various electronic, electrical, and mechanical components. Key active components include the 89C52 main processor, voltage regulator, L293D H Bridge IC, DC motor, 89c2051 chip, and plough.

The methodology begins with the procurement and assembly of the necessary hardware components. The 89C52 main processor serves as the central control unit, coordinating system operations. A voltage regulator ensures stable power supply to the components, while the L293D H Bridge IC facilitates motor control for the mobile plough. A DC motor is employed to drive the mobile plough, and the 89c2051 chip enables remote control operation.

Once assembled, firmware programming is executed to enable desired functionalities. This involves coding the microcontroller chips to control motor operation, receive remote commands.

Overall, the methodology involves the careful selection, integration, and testing of electronic hardware components to realize the practical implementation of the project concept.

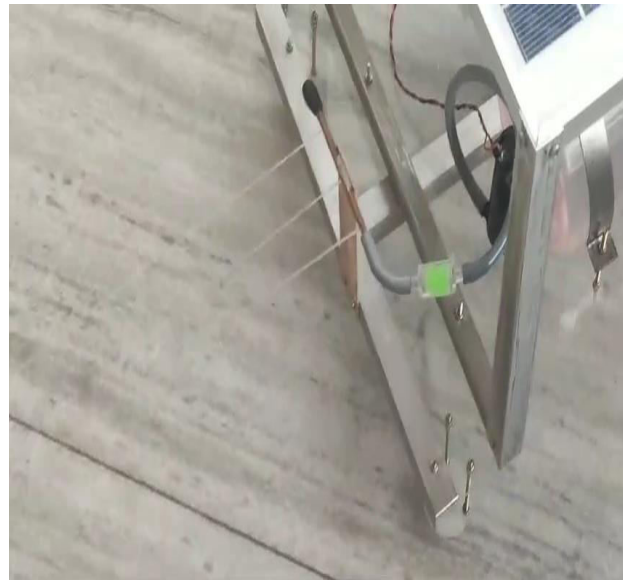
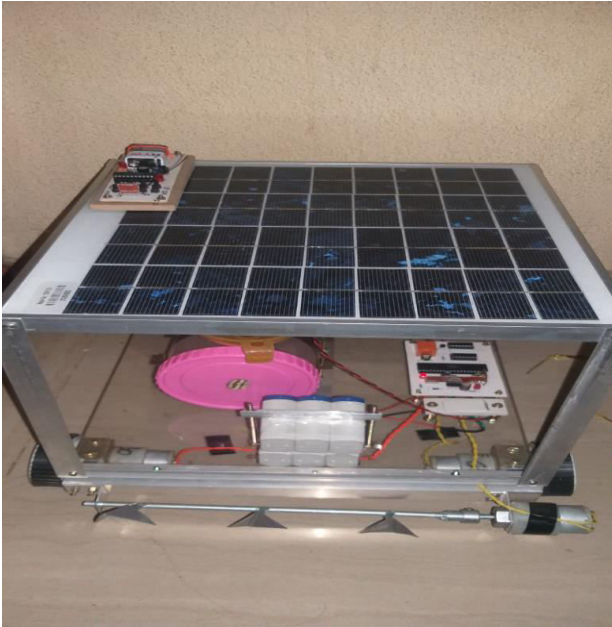
### **IV. EXPERIMENTAL RESULTS**

The experimental results demonstrate the successful implementation and functionality of the solar-based mobile plough with a water sprinkler system.

The integration of the water sprinkler system provided uniform irrigation coverage, promoting optimal soil moisture levels for crop cultivation.

Furthermore, the ploughing functionality demonstrated consistent performance, effectively aerating soil and preparing it for planting. The remote control operation facilitated convenient control of the system, enhancing usability and efficiency.





### PLOUGHING

### WATER SPRINKLING

- **Efficiency:** Solar systems outperform traditional methods, offering **higher effectiveness**.
- **Cost:** Significant savings are realized through solar adoption, providing a **more economical** option.
- **Environment:** Solar technology reduces carbon footprint and **promotes environmental conservation**.
- **Soil:** Implementation of solar-powered systems improves soil health and supports sustainable land management.
- **Yield:** Solar technologies enhance crop production, resulting in increased yields.
- **Conclusion:** Solar-based solutions are feasible and recommended for sustainable agriculture practices.



Overall, the system presents a promising solution for sustainable and efficient agricultural practices, with potential for widespread adoption and significant benefits to the farming industry.

#### V. CONCLUSION

By this we can conclude, The "**Solar & RF based mobile plough with water sprinkler**" project aims to utilize wireless RF modules for control, eliminating the need for fuel by harnessing solar energy. The development and testing of the system have proven its feasibility and effectiveness. By harnessing solar energy and employing wireless RF control, the system offers a sustainable and efficient solution for agricultural operations. While successful in prototype demonstration, ongoing refinement and enhancements are necessary to optimize its performance and functionality for real-world applications. Overall, this project represents a significant step towards advancing sustainable agricultural practices.

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