Suggestion for farmers to adoption of Solar Pumps in Jodhpur District of Rajasthan, India

Abstract:

The Jodhpur district of Rajasthan is where the research investigation was conducted. There are seven tehsils in the Rajasthani district of Jodhpur. The two tehsils with the most solar pumps built were Osian and Balesar. Ten villages from each selected tehsil were selected based on which villages would most benefit from solar pumps. Due to their abundance of solar pumps, twenty communities were picked, and among them, one hundred twenty-five (125) responders were chosen. The research paper outlines some recommendations for enhancing the program's management as well as issues farmers ran across when adopting solar pumps. The adoption of solar pumps in agriculture is a promising and sustainable solution to address multiple challenges faced by farmers and the environment. Traditional irrigation methods often rely on fossil fuels or grid electricity, contributing to environmental degradation and high operational costs. Solar pumps, powered by renewable energy, offer a compelling alternative that can enhance agricultural productivity, reduce carbon emissions, and improve the livelihoods of farmers. This article explores the benefits of adopting solar pumps and provides suggestions for their widespread implementation.

Keywords: solar pumps, pumping systems, carbon footprint, irrigation

Introduction

In an era of growing environmental consciousness and the pressing need for sustainable solutions, solar pumps have emerged as a transformative technology in various sectors, particularly in agriculture and water management. These innovative devices utilize solar energy to pump water, offering a clean, cost-effective, and environmentally friendly alternative to conventional pumping systems. As we delve into this article, we will explore the fundamental aspects of solar pumps and the numerous benefits they bring to both rural and urban communities. Solar pumps represent a shining example of harnessing renewable energy for practical applications. Their introduction into various sectors, including agriculture, water supply, and rural development, has the potential to drive economic growth, reduce greenhouse gas emissions, and enhance the quality of life for countless communities worldwide. As technology continues to advance and costs decrease, the widespread adoption of solar pumps

promises to play a pivotal role in creating a more sustainable and energy-efficient future for all. Benefits of adoption of solar pumps by the farmers: **Cost Savings:** Solar pumps have lower operational and maintenance costs compared to diesel or electric pumps. Once installed, they require minimal ongoing expenses, leading to significant long-term savings for farmers. **Increased Crop Yields:** Reliable access to water through solar pumps allows farmers to efficiently irrigate their fields. This leads to increased crop yields, reduced crop loss due to drought, and improved overall farm productivity. **Mitigation of Climate Change:** Solar pumps significantly reduce the carbon footprint of agriculture. They decrease greenhouse gas emissions by eliminating the need for diesel generators or grid electricity, making farming practices more environmentally friendly (Choudhary et al., 2023; Upreti et al., 2023). **Energy Independence:** Solar pumps provide farmers with energy independence, reducing their vulnerability to fluctuating fuel prices and unreliable electricity grids. This ensures a more stable and secure energy supply for irrigation. **Energy Independence**: Solar pumps provide farmers with energy independence, reducing their vulnerability to fluctuating fuel prices and unreliable electricity grids. This ensures a more stable and secure energy supply for irrigation.

Methodology

The **Jodhpur district** of Rajasthan is where the study was conducted. There are seven tehsils in the Rajasthani district of Jodhpur. **Osian** and **Balesar** were picked out of the group since they had the most solar pumps installed. **Ten villages** from each selected tehsil were selected based on which villages would most benefit from solar pumps. **125 respondents** from the twenty villages with the highest concentration of solar pumps were selected for the research study (Anonymous 2019). The investigator employed the personal interview approach and an interview plan to collect data and information. Following data tabulation, a variety of statistical measures were used to generate specific findings, including percent, mean, mean percent scores, standard deviation, ranking, and correlation.

Result & Discussion

Suggestions for the Adoption of Solar Pumps:

1. **Financial Support and Incentives:** Governments and financial institutions should offer subsidies, grants, and low-interest loans to encourage farmers to invest in solar pump systems. These financial incentives can help offset the initial costs of installation.

2.Technical Training and Education: Training programs and workshops should be provided to farmers to educate them about the benefits and proper maintenance of solar pumps. Knowledge dissemination is essential to ensure the long-term success of these systems.

3.Demonstration Projects: Implementing pilot projects and demonstration farms that showcase the advantages of solar pumps can help raise awareness among farmers and build confidence in the technology.

4.Access to Quality Equipment: Ensure access to high-quality and reliable solar pump systems. Encourage collaboration between governments, NGOs, and private companies to make these systems affordable and readily available to farmers.

5.Networking and Information Sharing: Create platforms for farmers to share their experiences with solar pump adoption. Knowledge sharing can help address concerns and build a supportive community of solar pump users.

Suggestions for further Research

1. The findings of this research may be utilized by the policy makers, administrators and executors, regarding programmes of solar pumps for better assessment and refinement of the technology.

2. The present study was confined to the limited area and up to limited respondents due to limited time and resources available with the investigator. Therefore, it is suggested that area of research could be extended further and large number of respondents could be included for valid conclusion.

3. There is no single and appropriate intervention for developing and protecting solar pumps in rural areas and in view of the numerous and varied constraints and opportunities, there is need to develop location – specific strategies, training, demonstration and programmes.

4. The investigator has taken the age, caste, education level, size of land holding, size of family, social participation, occupation, annual income, extension participation and mass media participation as the independent variables which may be considered by the organization before execution of the solar pumps.

5. It was observed that most of the adopted farmers had medium level of knowledge. So it is suggested that extension functionaries should make efforts to organize demonstration of the technology, provide appropriate literature and training about the new technology and procedure of availing the subsidy provided by Government.

6. To change the attitude of the farmers and motivate them to adopt this solar technology, the field functionaries should organize field trips to show the live demo of the technology and remove the doubt of the respondents regarding this solar technology. They should also show the worth of technology on the respondents' field by comparative analysis of technology with existing technology.

7. In addition to educational and motivational programmes the Government should provide sufficient numbers of solar pumping system to the respondents on subsidized rates as the initial cost of the technology is high.

Recommendations

Based on the findings and observations, the following recommendations were pointed out: -

1. Majority of the respondents were having medium level of knowledge about solar pumps. Therefore, it is recommended that KVK and department of agriculture should conduct variety of extension activities like training, demonstrations, field day, exhibitions, campaign, farmers fair and KisanGosthi etc. in order to reach all the section of farming community and to convert low level knowledge into medium and medium to high level knowledge.

2. Since majority of the respondents had medium extent of adoption of use of solar pump for irrigation, thus the efforts may be made to bring about changes in their extent of adoption from medium to high level by providing skill-oriented trainings and programmes to them which improve their technical and operational know-how and efficiency about use of solar energy technology.

3. The VEWs/Extension personnel may be provided special awareness campaign, programmes, training in operation and maintenance of solar pumps so that they can provide guidance to the respondents as and when needed.

4. The fair price shops may be established in the villages which have all the quality spare parts of solar pumps for sale to the respondents at reasonable rates at village level.

5. Government may formulate such loan advancement policies which have less formalities and credit should be provided to the respondents timely in easy installments.

6. Model demonstrations of solar pumping system must be identified and shown to the respondents, which would reduce many constraints like inadequate awareness about the advantages of solar pumps, lack of systematic campaign for popularizing the solar pump sets, lack of knowledge about maintenance and repair of solar pump set and wide publicity for its adoption etc.

7. The technology developers should make efforts to reduce the initial cost of the technology as this was the major constraints reported by the respondents to adopt solar pumping system.

Conclusion:

The adoption of solar pumps in agriculture offers a multitude of benefits, ranging from cost savings to environmental sustainability. To realize these advantages, governments, agricultural organizations, and stakeholders must work together to provide financial support, education, and access to quality equipment. By promoting the widespread adoption of solar pumps, we can empower farmers to improve their livelihoods while contributing to a more sustainable and environmentally friendly agricultural sector.

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