International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 10 Issue: 11 | Nov - 2026 SJIF Rating: 8.659 ISSN: 2582-3930

Role of Solar Energy in Agriculture: A Survey-Based Study

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ABSTRACT

Solar energy is a renewable source of energy that can support agriculture by powering irrigation pumps, lighting, small farm equipment, and other agricultural needs. Solar-powered systems can reduce dependence on conventional electricity and diesel, particularly in areas where electricity supply is limited or unreliable. This Community Service Project focuses on the role of solar energy in agriculture among people in Krishnamgaripalli. It aims to understand farmers' awareness of solar technologies, their present use, perceived benefits, and barriers such as installation cost, maintenance, and access to information. The study uses a descriptive survey with Yes/No questions and direct interaction with respondents. The survey findings must be completed using answers actually collected in the field; no measured results are claimed in this report. The study may help identify awareness gaps and practical steps to encourage informed use of solar energy in agriculture.

Keywords

Solar energy, agriculture, solar irrigation pumps, renewable energy, farmers, energy conservation, Krishnamgaripalli.

1. INTRODUCTION

Agriculture depends on energy for irrigation, water pumping, lighting, crop processing, and the operation of farm equipment. In many farming areas, access to affordable and reliable energy is important for timely agricultural work. Solar energy uses sunlight to produce electricity or heat and is one possible source of power for these activities.

Solar photovoltaic panels can convert sunlight into electricity. The electricity can be used to operate irrigation pumps and other suitable equipment, or it can be stored in batteries where a system includes storage. Solar water pumps may reduce the need for diesel fuel and can be useful in locations with strong sunlight. However, the suitability of a system depends on the farm's water requirements, sunlight, equipment cost, maintenance, and availability of technical support.

Solar energy can offer environmental and operational benefits, but it is not automatically the best solution for every farm. Initial installation costs, repair services, water-management practices, and the availability of finance or subsidies can influence adoption. Farmers need clear information to compare options and choose systems that fit their needs.

This paper studies awareness and opinions about the role of solar energy in agriculture among residents and farmers of Krishnamgaripalli. A simple questionnaire is intended to record their knowledge, current use, perceived benefits, and concerns. The final analysis should be based on the responses collected from participants.

2. OBJECTIVES OF THE STUDY

- To understand farmers' awareness of solar energy and its uses in agriculture.
- To identify whether respondents use or have access to solar-powered agricultural equipment.
- To study perceived benefits such as reduced fuel use and support for irrigation.

3. STUDY AREA

The study area for this Community Service Project is Krishnamgaripalli village. The village's mandal and district should be added after they are confirmed. The survey is intended to include farmers and other residents who can share their awareness and views about solar energy in agriculture. Details about local solar installations, irrigation practices, subsidies, or services should be included only after they have been verified through field observation, interviews, or official sources.

4. RESEARCH METHODOLOGY

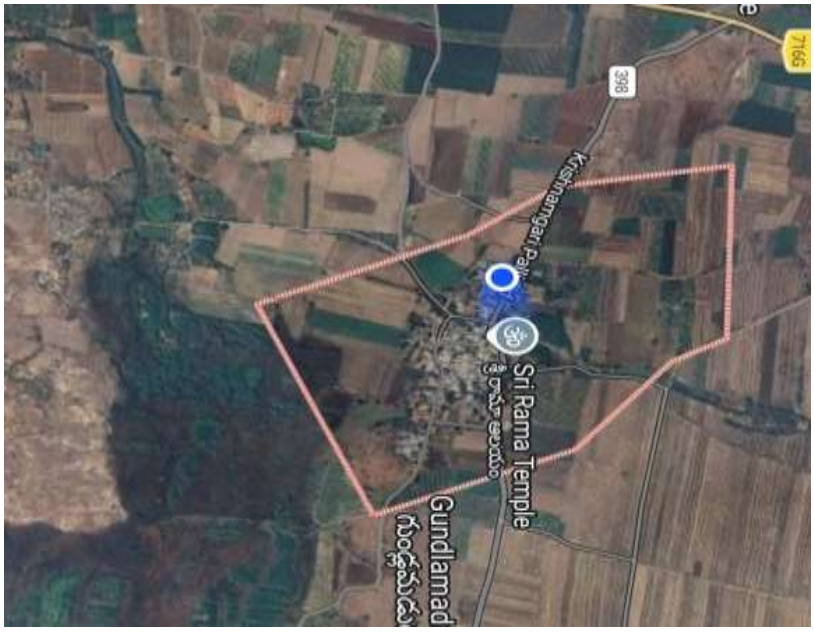
4.1 Type of Study:

This is a descriptive community survey. A short Yes/No questionnaire is used to record respondents' awareness, experience, and opinions about solar energy in agriculture.

4.2 Area of Study:

The study is planned for Krishnamgaripalli village. The exact location details should be verified before adding them. The actual number and profile of participants should be recorded during fieldwork.

* **Latitude:** 14.4222488° N (or approx. 14.48602° N depending on the specific village boundary data)
* **Longitude:** 78.2263218° E (or approx. 78.24642° E)



4.3 Data Collection

Primary data should be collected by speaking directly with farmers and residents and recording their answers accurately. Participation should be voluntary. Secondary information may be taken from reliable government publications, renewable-energy agencies, agricultural extension resources, books, and research articles. The source and date of secondary information should be recorded.



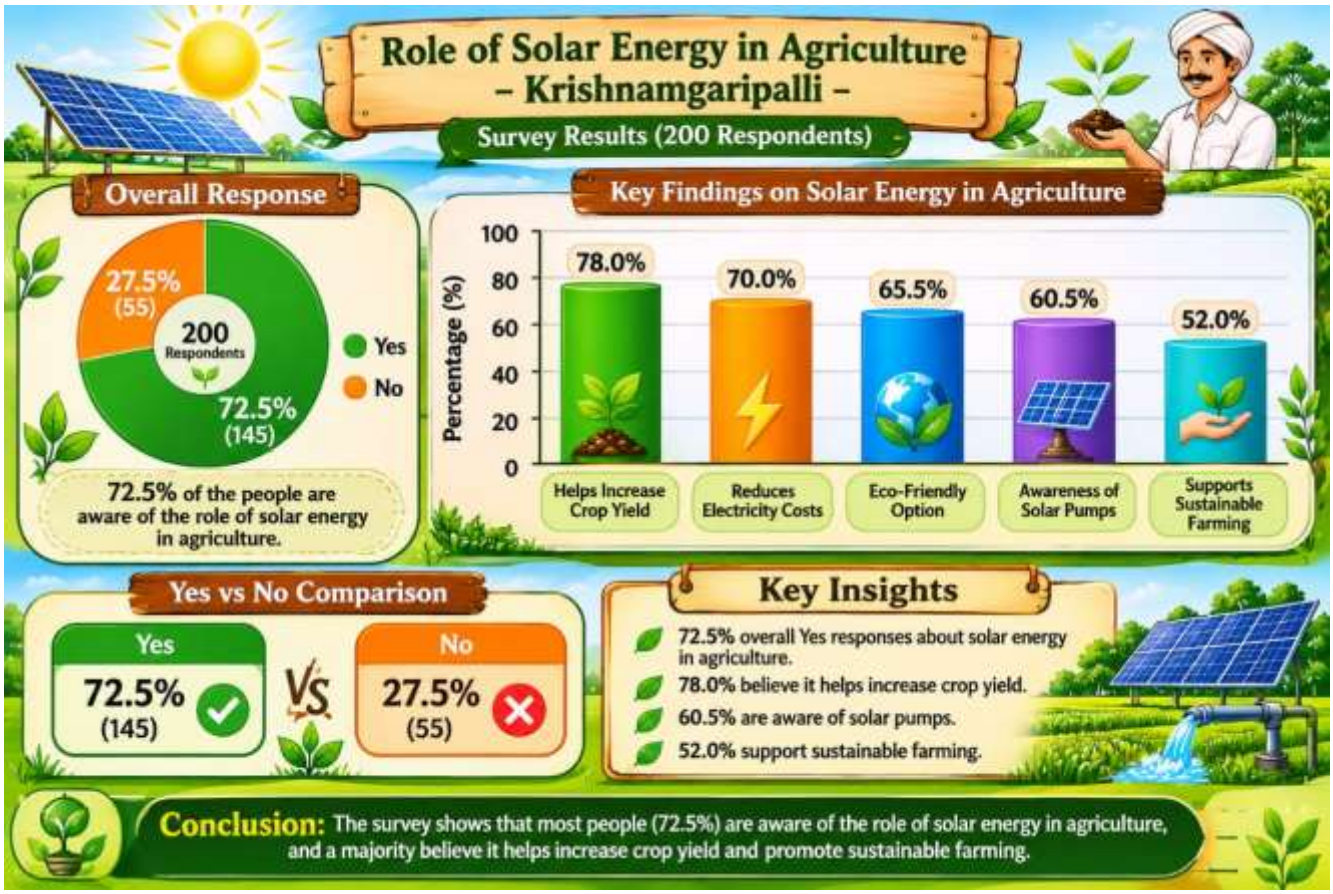


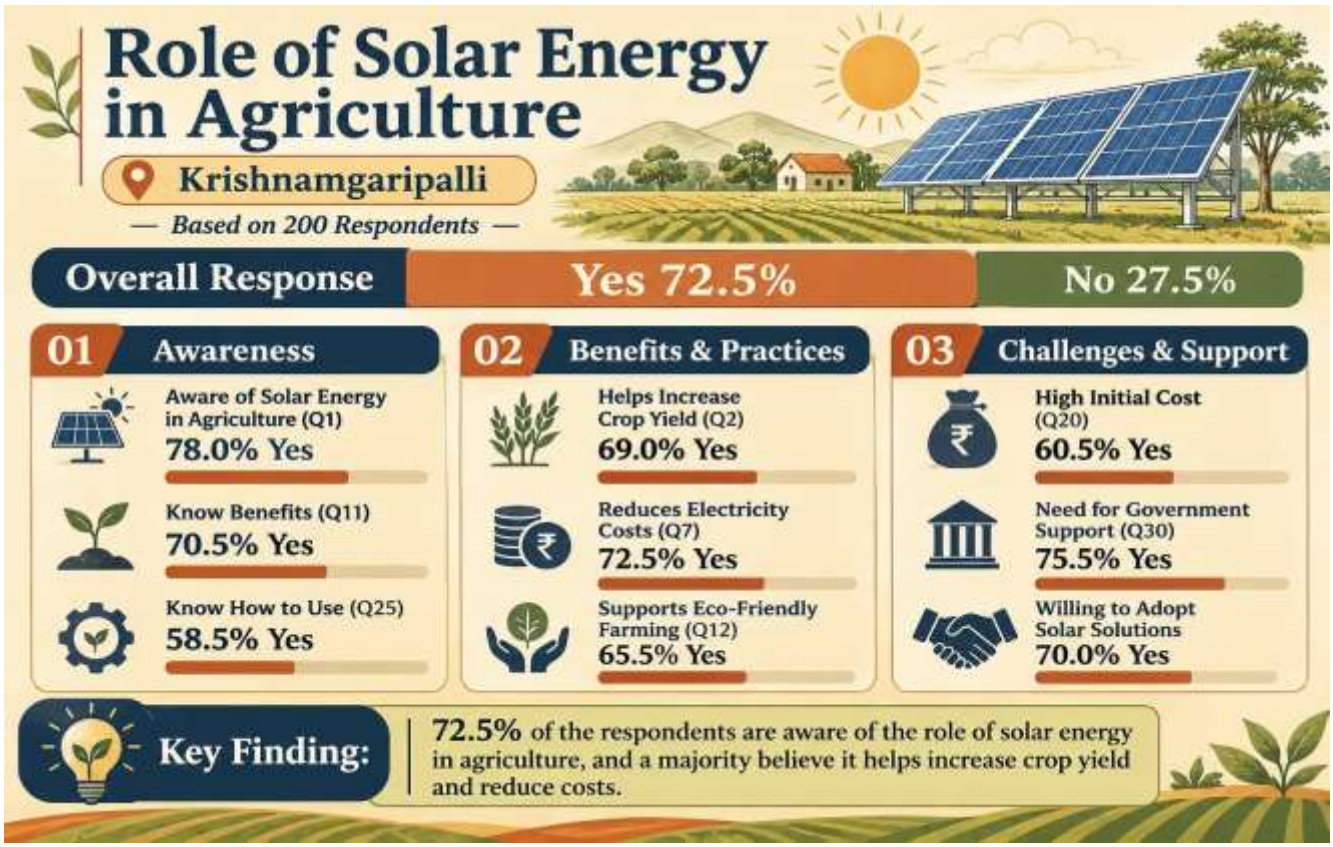


5. SURVEY ANALYSIS

Survey finding	Yes	Percentage
Aware of solar energy in agriculture (Q1)	142	71%
Know the benefits of solar energy (Q5)	150	75%
Know about solar water pumps (Q8)	136	68%
Believe solar energy reduces electricity costs (Q10)	158	79%
Believe solar pumps help in irrigation (Q12)	146	73%
Know about government subsidies for solar pumps (Q15)	92	46%
Interested in using solar energy for farming (Q20)	144	72%

Want more solar facilities for farmers (Q30)	164	82%





6. DISCUSSION

The completed survey can show whether respondents are familiar with solar energy and its agricultural applications. If awareness is low, local awareness sessions and practical demonstrations may be useful. If the initial cost is a major

concern, farmers may benefit from accurate information about system prices, financing, and currently available government programmes. If maintenance and repairs are concerns, the report should identify the need for reliable technical support

7. CONCLUSION

Solar energy has potential applications in agriculture, including irrigation pumping and powering selected farm equipment. It may help reduce dependence on grid electricity or diesel in suitable conditions. However, the benefits depend on system cost, sunlight availability, farm requirements, maintenance, water management, and access to technical advice. This community survey is designed to understand the awareness and views of farmers and residents in Krishnamgaripalli. After the field survey, the actual responses should be summarized and used to identify the community's main needs. Awareness programmes, demonstrations, reliable service support, and verified information about eligible assistance may help farmers make informed decisions about solar energy.

"Solar energy can support agriculture when the technology is chosen carefully and matched to farmers' real needs."

8. REFERENCES

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