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IMPACT STUDY OF SOLAR BASED LIFT IRRIGATION IN SOHAGPUR BLOCK (MP)

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Abstract— The Study is conducted to see impact of Solar Lift Irrigation System (SLIS) on farmers livelihood and income. the project takes place in a small region Sohagpur block of Shahdol (MP); in Sohagpur block 46 SLIS has been installed which is impacting 30 villages with 250 families with a total of more than 200 acres of cultivated area. Before this intervention farmers usually used the T.C. Connection pump or diesel pump for irrigation, but it was costly and not feasible after this intervention there was a huge change in their life and farming.

Some of the beneficiaries changed their cropping patterns and some of them increased their variety of crops. Before this, they depend on rain-fed paddy production only, but they are producing vegetables, wheat, chana, paddy, arhar, etc. SLIS has been distributed here in small groups so everyone can benefit from it, thus an increase in their income and livelihood can be seen there. Some farmers also started brick manufacturing units on their farms as a side business to increase their livelihood and income. As Solar energy is form of renewable energy so it can be future for human in upcoming days and for farmers it is very helpful now, they do not need to suffer from lack of electricity or they don't need take risk in night for irrigation purpose only because of availability of electricity in Night now they can irrigate their farm in day as per their convenience even in summer time they are now able to do farming with different types of crops.

I. INTRODUCTION

THIS Solar lift irrigation systems rely on electricity supplied by solar photovoltaic panels (PV panels) to power pumps that collect, lift, and distribute irrigation water. The world's water and energy resources have been put under a lot of strain due to a rise in population. As a result, in order to assure global energy, food, and environmental security, it is now imperative that conventional energy sources and irrigation technologies be replaced by renewable energy and high-efficiency irrigation, respectively. An explanation of the advantages of solar lift irrigation systems Manufacturers will want to stay on top of emerging irrigation technology developments and modify their equipment to meet client demand. Irrigation pipes for solar lift irrigation must still be produced effectively and operated by

sophisticated devices. The key to agricultural operations that are both cost-effective and environmentally benign is increasing the production of numerous crops while limiting water use. Irrigation systems need to be more efficient in order to conserve water, which is a precious resource. The plants being treated and the amount of water and fertilizer they require should not be the main consideration in the design of an irrigation system. However, there are numerous other factors to consider, such as the local climate, existing and future weather conditions, groundwater levels, and the stage of development at which the plants are now. The project takes place in a small region Sohagpur block of Shahdol (MP); in Sohagpur block 46 SLIS has been installed which is impacting 30 villages with 250 families with a total of more than 200 acres of cultivated area. Before this intervention farmers usually used the T.C. Connection pump or diesel pump for irrigation, but it was costly and not feasible after this intervention there was a huge change in their life and farming.

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II. RESEARCH METHODOLOGY

Research has been conducted to know the impact of SLIS system on farmers life in Sohagpur Block Shahdol District (MP) to analyze impact primary and secondary research has been conducted and findings and method is explained below.

2.1 Primary Research

To know impact of SLIS Data has been collected Through the conversation with farmers and collecting information on a questionnaire designed by me so that a detailed evaluation can be done of how the SLIS is impacting their life and livelihood. I personally visited every village where SLIS has installed and collected all the required data to analyze and conclude its impact



assessment.

2.2 Secondary Research

Secondary data has been collected from organization they have done survey and collected required data for installing SLIS and geographical information of location and possibilities of its impact.

2.3 Data Collection

The data was collected through both primary and secondary sources for finding and fulfilling the given objectives. The source of the primary data was the information collected by me visiting every beneficiary personally and gathering all required information for further findings and secondary data was given by the organisation to complete the assessment. The collection of primary data was done by visiting 18 villages where SLIS has been installed through a questionnaire prepared to evaluate it. Some of the farmers have not to take any crop through this intervention now they are planning from this season so it was very hard to gather all required information but some of the farmers are using it on regular basis and getting more than expectations because it has been installed before 4-5 months only.

III. FINDINGS

3.1 IRRIGATION METHOD BEFORE AND AFTER

As demonstrated in this document, the numbering for sections upper case Arabic numerals, then upper case Arabic numerals, separated by periods. Initial paragraphs after the section title are not indented. Only the initial, introductory paragraph has a drop cap.

3.2 LAND TYPE

Visited sites have 3 types of soils with the following percentage Black Soil 82.6%, Bhuri soil 6.5%, and a mix of Bhuri soil and Black soil was 10.9%. As we know black soil is very productive soil so through this intervention farmers are nowadays utilising it with 100% of capability by getting different crops that they were not able to get before this intervention.

3.3 CROP PATTERN

Before SLIS all farmers practice crop rotation pattern of farming but now after this system, everyone changed from their older pattern now 68.2% of the farmer use intercropping patterns, and 31.8% use mixed cropping patterns as their cropping pattern changes it impacted their livelihood and income increase in it can be seen.

3.4 INCOME INCREASED

As per collected data I have found that the highest increase in income was ₹ 50000 p.a. and the lowest hike was ₹ 15000 p.a., so by analyzing the collected information, I was able to calculate the average increase

in income, and it was almost ₹ 25341. This data is only for one and two seasons crops only because SLIS was installed 4-5 months ago only. So, with the help of this, we can interpret that the average increase in income can be approx. ₹ 50000 p.a.

3.5 OTHER USES

From the collected data, it has been found that 6.5% of the selected farmers are using SLIS for their additional income purpose also i.e., Clay Brick Manufacturing and 93.5% of farmers are using this system for only agriculture purposes in view of this is a great initiative by farmers that if they have water availability then they can do this type of work also in their free time to increase their livelihood and income. You can see in graph 3 out of 46 are using this for extra income also.

IV. FEEDBACKS FROM THE VILLAGERS

- I. Some of them also want a Solar LI System.
- II. Some Are Planning to Switch over to their traditional irrigation methods from SLIS.
- III. Some want to learn about its operational process.
- IV. Some are waiting for this type of scheme.
- V. More than 90% are willing to install it but due to its cost, they are looking for support.
- VI. Those who are irrigating crops at night want to ease irrigation.
- VII. Looking for a battery-operated also for irrigation at night.

V. CONCLUSION

The present model presented an interesting deployment technique that could boost the accessibility and cost of irrigation to small-scale farmers if encouraged through an appealing incentive system. However, in the absence of any formal backing, the financial cost of the approach is substantial, needing an external agency to finance the endeavour. Despite extensive support, the cost of irrigation is still not competitive with grid electricity-powered irrigation. The increased expense of irrigation is also not conducive to irrigation-market creation since some farmers still regard rainfed farming to be economically more sensible than irrigated farming. External financial dependency and the absence of any alternate finance mechanism restrict scaling out this strategy unless systematic CSR and government backing are available. Thus, making the arrangement less viable for farmers if the equipment is not hired regularly. By employing the autonomous irrigation system, it optimises the consumption of water by reducing wastage and minimising the human intervention for farmers. The excess energy produced by solar panels may also be provided to the grid with small modifications in the system circuit which can be a source of the farmer's money, thus



encouraging farming and at the same time supplying a solution for the energy crisis. Solar pumps also offer clean solutions with no possibility of borehole contamination.

VI. RECOMMENDATIONS

This are my personal recommendation which I got to know by different sources like some articles, reports and study through internet and few experts, one of my friend is working in solar square in Bhopal, has given some information of solar working and all, on the basis of that information I am recommending this.

- Techniques that are both cost-effective and do not require a soil-specific calibration should be used because they are finding it difficult to adopt.
- The design and assembly of an automated irrigation system were completed successfully. It helps to cut down on water consumption, human monitoring time, and labour costs associated with traditional approaches.
- Integrating a technology that can be used to activate the LED and alarm showing "Empty" regarding the status of the pump whenever the water tank and reservoir are empty.
- A Monitoring meeting / survey should be helped to know the performance of the intervention. • Some modification should be done like the battery option should be there so that farmers can be irrigated at night. It will be more comfortable and can make new ways to improve livelihood and income for farmers.

VII. END SECTIONS

7.1 Appendices

Appendixes, Questionnaire for collection of data which was used during field visit. It is designed to know the impact of SLIS on farmers' livelihood and Income.

1. Beneficiary Name
2. Motor Capacity
3. Village Name
4. Farmer Name
5. Age
6. Installation On
7. Crops
8. Irrigation Method
 - a. Before
 - b. After
9. Land in Acre
10. Land Type
11. Change in Cropping Pattern
 - a. Before
 - b. After
12. Water Availability
13. Water Source
14. Battery System

15. Motor Type
16. Flow Rate Problem
17. Pipe Size
18. Impact on Earning
19. Motor Work (In Hours)
20. Income Increased (Rs.)
21. Sharing Water Within Group
22. Getting Sufficient Water
23. Other Uses
24. Remark

7.2 Acknowledgements

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