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Harnessing Sunlight: A Probe into the PM-KUSUM Solar Initiative in Sangrampur Taluka

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ABSTRACT: The Indian government's revolutionary Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) Solar Yojana aims to redefine the agricultural landscape by promoting the widespread use of solar energy solutions. PM-KUSUM was introduced with the primary objective of supporting farmers' livelihoods and renewable energy. It is intended to meet the vital energy requirements of India's agriculture sector and further the country's renewable energy targets at the same time. Fundamentally, PM-KUSUM seeks to reduce farmers' energy costs, especially in the area of irrigation, by utilizing the nation's enormous solar resources. Historically, farmers have primarily relied on diesel-powered irrigation pumps, which not only have high running costs but also release carbon dioxide into the atmosphere. By encouraging farmers to switch to solar-powered irrigation pumps, PM-KUSUM hopes to lessen these obstacles and help them make the shift to a cleaner, more sustainable energy source.

The program includes a wide range of interventions designed to encourage farmers to use solar energy. This entails the installation of solar power projects on desolate areas, the solarization of current grid-connected pumps, and the replacement of diesel-powered pumps with solar ones. Through monetary rewards, guidance on technology, and legislative backing, PM-KUSUM aims to enable farmers to adopt solar technology and capitalize on its advantages for their farming enterprises. The goal of PM-KUSUM is to act as a catalyst for raising agricultural productivity and improving the socioeconomic standing of farmers nationwide. The program not only saves farmers' operating expenses by lowering their dependency on fuel for irrigation, but it also significantly reduces greenhouse gas emissions and environmental deterioration. Furthermore, by producing and selling excess electricity, the incorporation of solar energy into agriculture has the potential to open up new revenue streams for farmers. The government's commitment to supporting sustainable development, encouraging the use of renewable energy, and equipping farmers to prosper in a more resilient and environmentally friendly future is essentially embodied in the PM-KUSUM Solar Yojana. With its emphasis on inclusive growth and comprehensive approach, PM-KUSUM is well-positioned to usher in a new era of environmentally friendly and energy-efficient agriculture in India.

I. INTRODUCTION

An important step has been taken in India's pursuit of sustainable development and energy security with the launch of the Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) Solar Yojana, especially for the country's agricultural sector. PM-KUSUM is an innovative program that the Indian government launched with the purpose of using solar electricity to help farmers overcome a variety of problems and further the country's renewable energy targets.

The foundation of the Indian economy, agriculture, is mostly dependent on conventional energy sources for irrigation and other agricultural tasks. But the use of fossil fuels, like diesel, not only puts a heavy financial strain on farmers, but it also contributes to pollution in the environment and global warming. With a particular focus on solar power, PM-KUSUM was created to encourage the adoption of clean and renewable energy alternatives in recognition of the pressing need to alleviate these difficulties.

Fundamentally, PM-KUSUM wants to give farmers access to dependable and reasonably priced solar energy solutions in order to empower them. The plan includes a wide range of interventions, such as solar pump installation, solarization of grid-connected pumps already in place, and the construction of solar power plants on vacant land. Through the utilization of solar energy for irrigation and other agricultural functions, PM-KUSUM seeks to lessen farmers' reliance



on expensive and environmentally harmful fossil fuels, improving their financial stability and lowering their carbon footprint.

The government's dedication to encouraging equitable growth and sustainable development in rural India is demonstrated by the launch of PM-KUSUM. The program promotes farmers' socioeconomic empowerment while simultaneously helping to mitigate climate change and environmental degradation by encouraging the use of solar energy in the agriculture sector. With the help of financial incentives, technical support, and governmental backing, PM-KUSUM seeks to establish a climate that will encourage farmers to adopt solar technology and realize its potential to revolutionize their way of life.

In summary, the PM-KUSUM Solar Yojana heralds in a new era of clean, sustainable, and equitable growth by bringing about a paradigm shift in India's approach to agricultural energy solutions. PM-KUSUM opens the door to a more promising and successful future for farmers, towns, and the country at large by utilizing the power of the sun.

The PM KUSUM Solar Yojana Procedure:

Following steps have to be followed for availing the benefits under PM-KUSUM Solar Yojana.

1. **Registration:** In order to participate in PM-KUSUM, farmers must register using the official channels that the government has set up.
2. **Qualifications:-** Eligibility assessment Farmers are subjected to an eligibility assessment, which evaluates their fitness for different plan components based on factors such as location and land ownership.
3. **Subsidy Application:** To help defray the upfront expenses of installing a solar energy system, qualified farmers submit applications for financial aid and subsidies.
4. **Vendor Selection:** When purchasing and installing solar energy systems, farmers choose approved vendors or suppliers.
5. **Installation:** Skilled specialists install solar panels, solar pumps, inverters, and related equipment in accordance with the scheme's technical requirements and installation recommendations.
6. **Technical help:** To ensure successful implementation and operation, farmers receive technical help and training on system operation, maintenance procedures, and safety regulations.
7. **and Evaluation:** Mechanisms for ongoing observation and assessment keep tabs on the setup, functionality, and socioeconomic advantages of solar energy installations.
8. **Policy Compliance:** By operating inside the framework of policies and regulations set forth by the federal and state governments, PM-KUSUM guarantees compliance with directives, laws, and regulations.

II. THEORETICAL BACKGROUND

The investigator chose to do this study after becoming aware of the issues facing Sangrampur Taluka farmers through the PM KUSUM Yojana. These farmers feel uneasy when completing the PM KUSUM Yojana process and are unsure about the method. They are aware that putting a solar pump on their farm will save them time and effort, but they are not properly trained or educated to carry out this process. They feel extremely behind today's young and generations due to these issues and the difficulties they are facing in completing their job on the Solar Scheme. Solar Agri is the foundation of any growing farmer. Because agriculture uses solar pumps, people may do tasks faster and save money. They encounter significant obstacles and believe they are far behind today's kids due to these issues and their attempts to complete their job on the Solar Scheme. The foundation of any growing farmer is solar agriculture. People complete their tasks quickly and efficiently thanks to the usage of solar pumps in agriculture.

III. LITERATURE REVIEW

Many studies are found in the literature pertaining to mobile phone buying behaviors in females some of which are captured below:

Solar Energy: Current Status and Future Prospects" (2019) by Zhang, Y. et al.:

This review provides an overview of the current state of solar energy technologies, including photovoltaic (PV) and concentrating solar power (CSP). It discusses recent advancements, challenges, and future prospects for solar energy adoption.



A Review on Solar Energy Harnessing and its Future Prospects" (2020) by Sharma, A. et al.:

This paper offers a comprehensive review of various solar energy harvesting technologies, such as PV, CSP, and solar thermal systems. It covers topics such as efficiency improvement strategies, environmental impacts, and economic feasibility.

Recent Advances in Solar Energy Harvesting Materials and Devices" (2021) by Wang, J. et al.:

Focusing on materials science and device engineering, this review discusses recent advancements in solar energy harvesting, including emerging materials for PV cells, novel designs for solar panels, and integration with energy storage systems.

A Review of Solar Energy Utilization in Agriculture" (2018) by Wu, Z. et al.:

This review explores the applications of solar energy in agriculture, including solar-powered irrigation systems, greenhouse heating and solar drying technologies. It examines the benefits, challenges, and potential for integrating solar energy into agricultural practices.

Solar Energy Policies and Their Impacts: A Review" (2019) by Gupta, M. et al.:

Focusing on policy frameworks and regulatory mechanisms, this review examines the impacts of solar energy policies on deployment, investment, and technological innovation. It discusses case studies from various countries and evaluates the effectiveness of different policy approaches.

IV. RESEARCH METHODOLOGY

Objectives:

- To study PM KUSUM Yojana scheme problems faced by farmer at Sangrampur Taluka.
- To analysis the Farmer behavior towards Pm kusum Solar Yojana.
- To understand the factor influencing Pm kusum Solar Yojana faced by farmer at Sangrampur Taluka.
- To create an awareness among farmer towards PM KUSUM Solar.

Hypothesis:

- H0:-** Farmers in Sangrampur Taluka are not facing problems with PM KUSUM Solar Yojana.
- H1:-** Farmers in Sangrampur Taluka are facing problems with PM Kusum Solar Yojana.

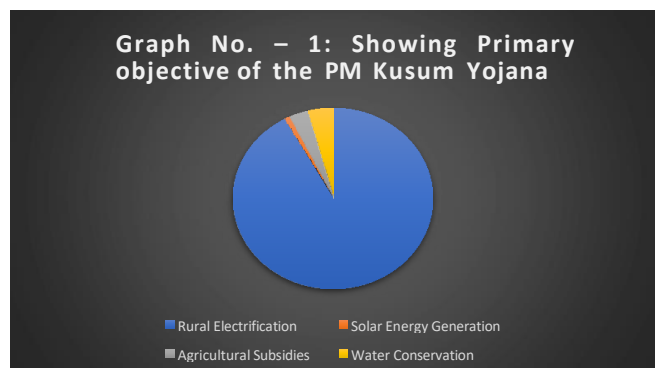
Research type:

- Descriptive type of research
- Sample size: 100 respondents
- Sampling technique: The sampling technique would be the Simple Random Sampling Technique.
- Collection of data: By using a printout of the questionnaire

V. ANALYSIS AND INTERPRETATION

1. Primary objective of the PM Kusum Yojana:

Table No. – 1: Showing Primary objective of the PM Kusum Yojana	
Primary Objectives of the Yojana	Response in %age
Rural Electrification	92
Solar Energy Generation	1
Agricultural Subsidies	3



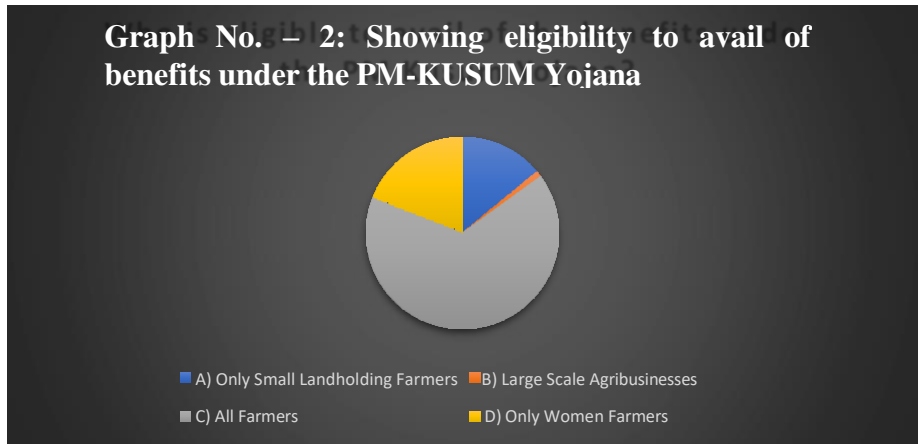


The above table and graph indicate that a significant portion of farmers experience that primary objective of PM-KUSUM solar yojana is rural electrification while 4% farmers feel water conservation. Majority is rural electrification.

2. Eligibility to avail of benefits under the PM-KUSUM Yojana:

Table No. – 2: Showing eligibility to avail of benefits under the PM-KUSUM Yojana

Eligibility to avail of benefits Yojana	Response in %age
Only Small Landholding Farmers	14
Large Scale Agribusinesses	1
All Farmers	66
Only Women Farmers	19

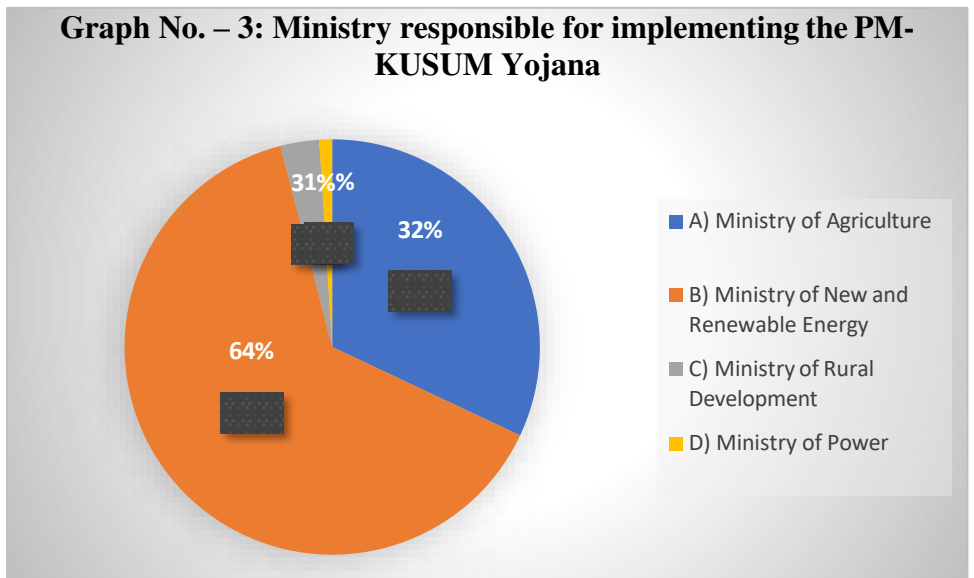


The results from above table and graph indicate that 66% of farmers feel that all farmers are eligible to avail of the benefits under the PM- KUSUM solar Yojana. The large scale agribusinesses are not eligible for the same.

3. Ministry responsible for implementing the PM-KUSUM Yojana:

Table No. – 3: Ministry responsible for implementing the PM-KUSUM Yojana

Ministry responsible for implementing the PM-KUSUM Yojana	Response in %age
Ministry of Agriculture	32
Ministry of New and Renewable Energy	64
Ministry of Rural Development	3
Ministry of Power	1



The results according to above table and graph indicate that farmers knowing that ministry of new and renewable energy responsible for PM-KUSUM solar yojana account for 64% while 32% feels it is under ministry of agriculture and the remaining 4% understands that it comes under ministry of rural development and ministry of power.

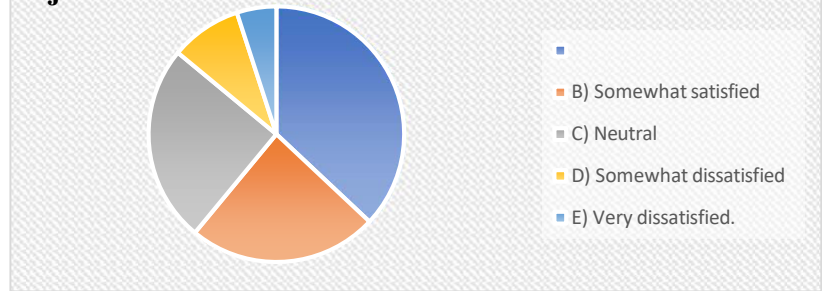


4. Satisfaction of farmers with overall implementation of PM-KUSUM Yojana:

Table No. – 4: Showing Satisfaction of farmers with overall implementation of PM-KUSUM Yojana

Satisfaction of farmers with overall implementation of Yojana	Response in %age
Very satisfied	37
Somewhat satisfied	24
Neutral	25
Somewhat dissatisfied	9
E) Very dissatisfied.	5

Graph No. – 4: Showing Satisfaction of farmers with overall implementation of PM-KUSUM Yojana



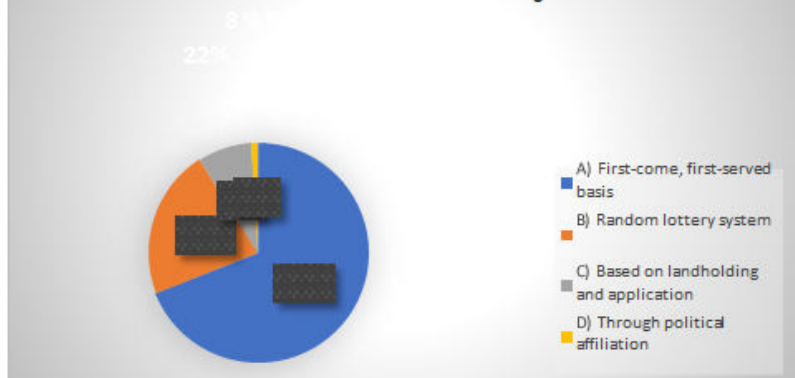
It can be seen from the above table and graph that very satisfied farmers with PM-KUSUM solar scheme account for 37% and somewhat satisfied is 24% while neutral is 25% of the. Hence most of the farmers feel satisfied with implementation of the scheme.

5. Selection of beneficiaries under PM-KUSUM Yojana:

Table No. – 5: Showing Selection of beneficiaries under PM-KUSUM Yojana

Response in %age	Response in %age
First-come, first-served basis	69
Random lottery system	22
Based on landholding and application	8
Through political affiliation	1

Graph No. – 5: Showing Selection of beneficiaries under PM-KUSUM Yojana



These results as shown above indicate that 69% beneficiaries selection process is on the basis of first come first served and 22% random lottery system while 9% is based on landholding and application and through political affiliation. Thus most of selection is based on first come first served basis.

VI. CONCLUSIONS

In conclusion, it may be said that more farmers face technical and physical difficulties in using PM-KUSUM Solar Scheme. Maximum farmers agree that they face barriers in PM KUSUM Solar Scheme however, these farmers are well aware about benefits of PM KUSUM Solar Scheme. From this study it may be conclude that farmers in sangrampur taluka are aware about PM KUSUM Solar Scheme but they face lot of difficulties coupled with lack of trust error in using PM-KUSUM Solar Scheme. The government needs to address these issues for effective implementation of this scheme. This is undoubtedly a very good scheme for providing sustainable energy in rural India.



REFERENCES

1. <https://kusum.mahaurja.com/solar/beneficiary/register/Kusum-Yojana-Component-B>
2. <https://mnre.gov.in/>
3. <https://pmkusum.mnre.gov.in/landing.html>
4. <https://www.mahaurja.com/meda/>
5. Government of India official portal which is the official website of the Government of India also has comprehensive information about PM-KUSUM Yojana, including guidelines, FAQs, and relevant announcements.
6. Shri Vijay kale, Project Executive Officer of Maharashtra Energy Development Agency, Akola was contacted by the investigator for collecting information about PM-KUSUM Solar Yojana
7. Ministry of New and Renewable Energy (MNRE) website: The MNRE is the nodal ministry responsible for the implementation of the PM-KUSUM Yojana. Their website provides official documents, notifications, and updates related to the scheme.
8. Reputed news sources and press releases from government agencies often provide insights into the latest developments, progress, and impacts of schemes like PM- KUSUM Yojana.
9. Reports and studies of Academic institutions, research organizations, and consultancy firms conducting studies or publishing reports analyzing effectiveness and outcomes of the PM-KUSUM Yojana. These reports offered valuable insights into the scheme's performance and its implications for farmers and the renewable energy sector.



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