



BASELINE STUDY OF
SOLAR PUMPS
IN WEST BENGAL





EXECUTIVE SUMMARY

A baseline study has been conducted in 4 districts of West Bengal to assess the existing socio-economic and environmental conditions of small and marginal farmers. This study seeks to identify the present situation related to agriculture in the selected districts and then provides recommendations for interventions to install solar water pumps.

Demographic Profile

1. **195 farmers were surveyed** across four districts of Purba Bardhaman (79), Hooghly (22), North 24 pargana (58), Nadia (36)
2. **56% of the respondents belong to the small and marginal farmer** category having land below 2 hectares.
3. **87% of the farmers have fragmented land** that requires continuous movement of pumps from one piece of land to another.
4. **75% of the respondents have alternative sources of livelihood** (Daily labour, Business)

Economic status

1. **22% of the respondents** belong to the income category of below INR 9000/month.
2. **49% of the farmers recorded** monthly expenses above INR 9000/month (Mostly spending on Agriculture raw material, food, health)

Irrigation practice

1. **77% of the respondents** in these regions use electric pumps.
2. **85% farmers are using 5HP or more than 5 HP pumps** currently this includes both electric and diesel pump users.
3. The average electricity available recorded by the respondent 20.9 hours with the median value of 22 hours.
4. Among the ones recording electricity pump usage, less than **10% recorded having separate electric connections** for agriculture. In this context, the majority of the farmers recording use of electric pumps stated that they do not have electricity connection sanctioned for agriculture, and use their residential connection, which are often hooked from other sources and not formally registered.

Willingness to buy Solar pump

1. **81% of the respondents have seen solar pumps** in their neighbourhood.
2. **95% of the respondents (186) are willing to buy solar pumps** under government subsidy to **reduce the dependency on electricity and lessen the cost.**

INTRODUCTION

Agriculture is the primary source of livelihood in West Bengal, especially in rural areas. **West Bengal constitutes 8% of India's population, and 7.29% (71,23,000 farmer families) are involved in agricultural activities. Agriculture's share in the GDP of West Bengal is 21% (2022-23).** Paddy is the staple food grown in West Bengal, for which the state is known to be the **Lead producer of Paddy**, both area-wise (5.46 million hectare) and quantity-wise (15.75 million tonnes). The next crucial production is Jute. **West Bengal fulfils the requirement of 66% of India's demand for Jute.**

Agriculture sector of West Bengal holds great potential; currently it generates more than **8% of India's food**. However, irrigation still remains a problem for a large part of the farmers population. The baseline study is undertaken with the intention to have an in-depth understanding regarding the extant socio-economic conditions, local resources, farming and market practices of marginal farmers of West Bengal. Our research drive is dedicated to improve socio-economic and environmental prospects around target groups by enabling community transition to renewable energy sources, like solar water pumps for conducting climate resilient agricultural practices. The baseline data, by shedding light on the extant practices, will help us in demystifying the present agricultural practices of marginal farmers of West Bengal and the challenges they face while conducting the same on a day-to-day basis. The findings of the baseline study will enable us to analyse and conclude on field-specific needs, which will subsequently help us in designing contextual interventions by taking into account requirements and specificities in the local context.



Objective

1. To understand the livelihoods options (farm based and non-farm based)
2. To understand the present practices of irrigation
3. To understand the main crops, cropping pattern and agricultural practices
4. To understand the awareness and willingness of the community to adopt solar pumps for irrigation.

www.indiatoday.in/education-today/qk-current-affairs/story/top-10-rice-producing-states-in-india-rice-production-and-area-under-cultivation-1343024-2018-09-18#:~:text=1.-,West%20Bengal,5.46%20million%20hectare%20cultivable%20area

RESEARCH METHODOLOGY



Research Framework

The baseline study has employed a theoretical research framework to capture the extant socio-economic situation and farm-based livelihood practices in the study area. It uses techniques of social science research to have a nuanced understanding of the economic and social indicators.

Research Design

The baseline study uses a cross sectional research design and employs household level surveys. A total of 195 surveys have been conducted across 4 districts in the identified Agro climatic zone. The study has captured information on asset ownership, land holding pattern, crops grown etc.

Research Methodology

Mixed research methodology has been used in the study to analyse emerging socio-economic patterns of the farmers. Focus group discussion has been conducted with 25 farmers to understand their view on solar pump and government subsidy. Survey has been conducted using a structured questionnaire to understand the current irrigation practice and socio-economic profile. The quantitative deliberations contributing to the findings of the study was an output of Ms-Excel based data analysis.

Sampling

The study has used non-probability purposive sampling to select households that represent small and marginal farmers. The data has been captured through the kobo toolbox (A platform developed by Harvard Humanitarian for collecting data in a challenging environment by providing facility to collect data in blended mode) for data collection.

Study Area

Total 195 participants (3 women and 192 men) were interviewed across 4 districts (Hooghly, Nadia, North 24 Parganas, Purba Bardhaman). All of these 4 districts fall under the Gangetic alluvial Agro climatic zone. This particular region is also considered the most fertile region of West Bengal.





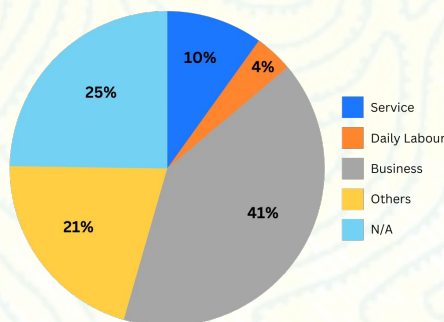


Ground level insight

The findings of the baseline study have been divided into various heads. The survey has been conducted in 4 districts. **Out of 195 respondents, 51% represented the General community, and 42% represented the SC community.**

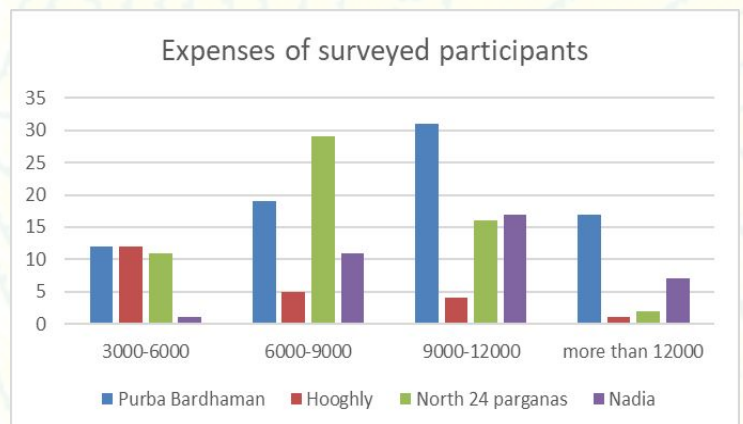
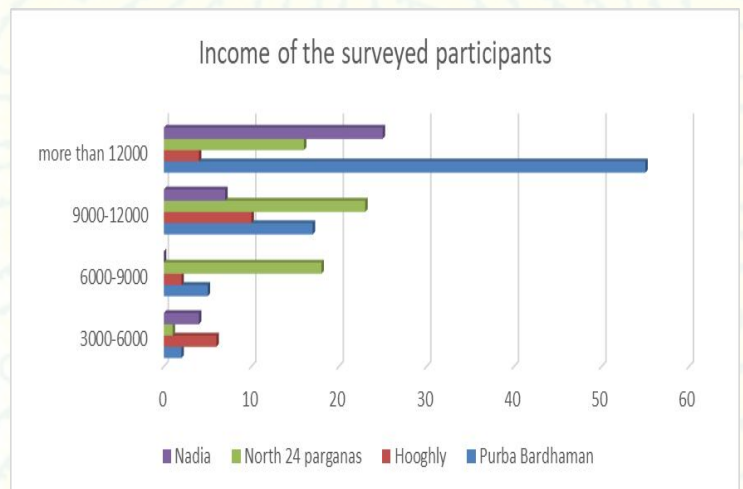
Existing Livelihood Options: Agriculture is the primary livelihood for the selected sample. A minuscule (3%) of the farmers practice subsistence farming. However, some (3%) have reported **daily wage labour** as a major alternate source of income mainly during the lean season while some of the respondents are entirely dependent on agriculture for their living. 41% also reported to be involved in small businesses as an alternate source of income. Of the total respondents interviewed, 21% farmers have other sources of livelihood options.

Other source of Livelihood



Income & Expenditure Status:

Information on the farmers' monthly income has been gathered for the study. It has been determined that almost 20% of the respondents have a monthly income of below Rs. 9000. The majority of farmers who have their incomes documented do so in the Purba Bardhaman district, specifically, and make more than Rs.12,000 per month. However, 49% of the farmers reported monthly expenses of more than INR 9000. (Mostly spending on Agriculture raw material, food, health)

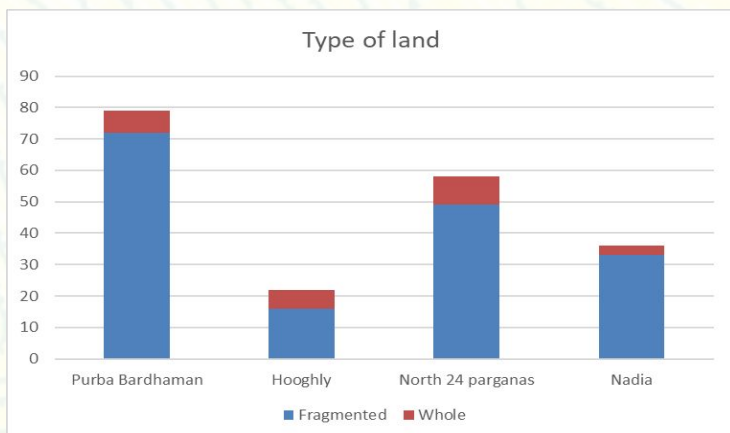
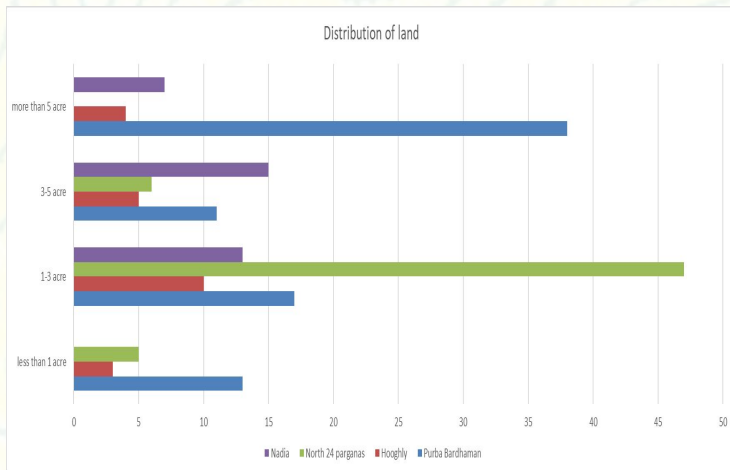






Landholding Size:

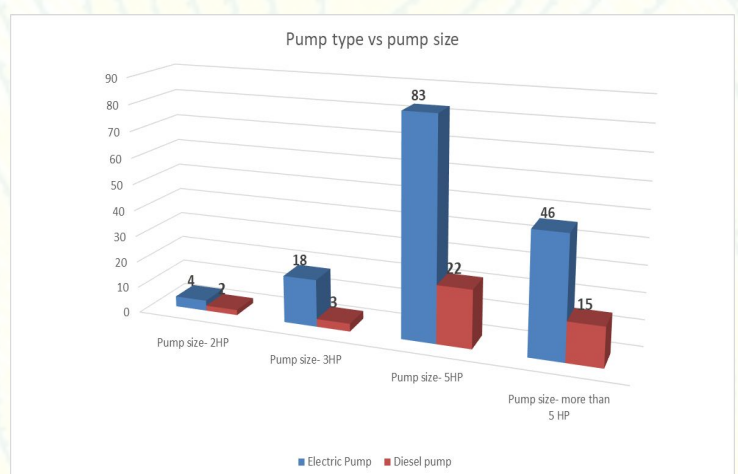
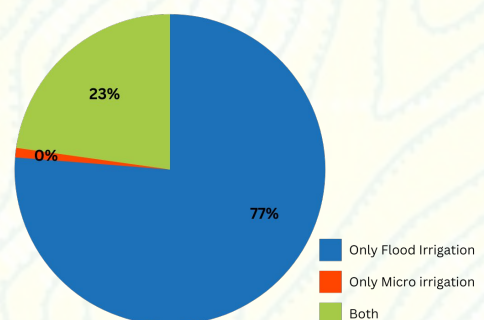
In terms of landholding size, it was discovered that roughly 56 percent of all farmers who were interviewed reported holdings of between one and three acres and less than one acre, while just 20 percent reported holdings of five acres or more. Consequently, it may be claimed that the majority of farmers are from small, marginal groups that have very little arable land. Additionally, farmers have reported that the scattered character (87 percent) of the cultivable fields under their ownership results in difficulties regarding time and resource involved around irrigation purpose. These farmers frequently have to enlist other family members in carrying out farming operations in the scattered expanses of land.



Pump Usage:

It is crucial to comprehend the current pump usage pattern and irrigation technology in order to comprehend the respondents' current irrigation practices. According to the study, about 151 respondents currently use electric pumps, ranging in size from 2 HP to 5 HP and higher. The more or less consistent availability of electricity may be the main cause of this preference around electric pumps. According to the respondents, there is 20.9 hours of available electricity on any average day. 42 farmers have reported utilising diesel pumps right now, whereas 2 farmers rely solely on natural resources and don't use any pumps. Around 77% of farmers presently use flood irrigation techniques, which raises the second query about contemporary irrigation practices. As groundwater is depleting at an alarming rate in eastern India providing solar pump could lead to indiscriminate use of groundwater.

IRRIGATION METHOD



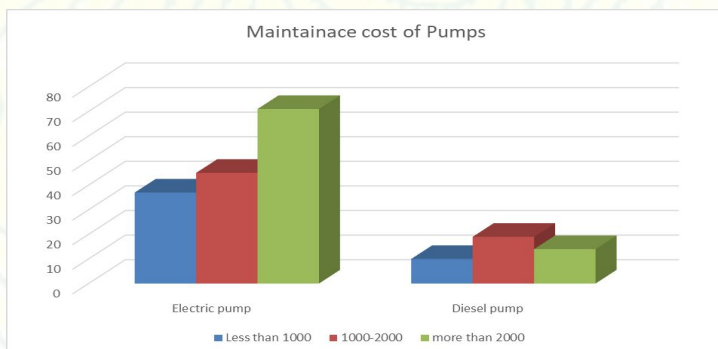


Cropping Seasons:

In order to understand the cropping pattern and season engagement, the study explored the questions on cropping seasons. It is interesting to note that **80% of the respondents grow crops during Zaid, Kharif & Ravi seasons and the remaining 20% of respondents aren't involved in Zaid cultivation.** The respondents recorded **multi-cropping practice, where they grow a variety of produce ranging from grains, vegetables and Paddy.**

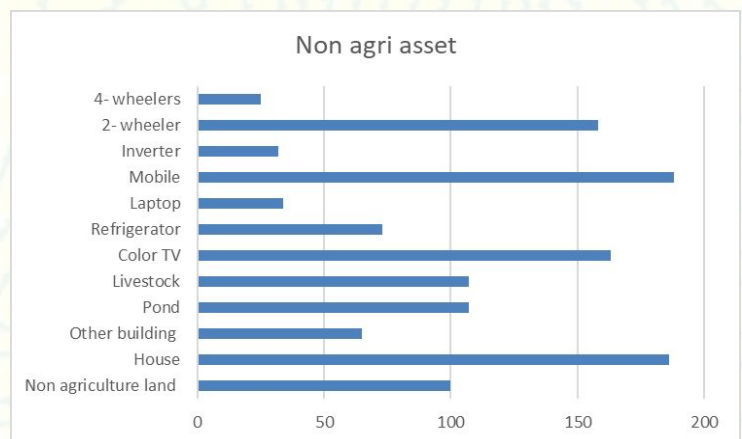
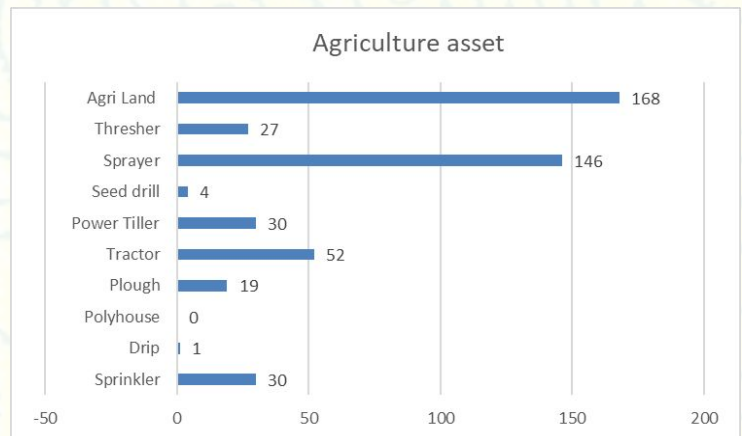
Pump maintenance cost:

Farmers have reported that maintenance cost of the pump varies as per the capacity (HP) and type of pump. For 5 HP and more than 5 HP electric pump it costs somewhere between 3000-5000. Whereas the maintenance cost for diesel pumps is significantly low.



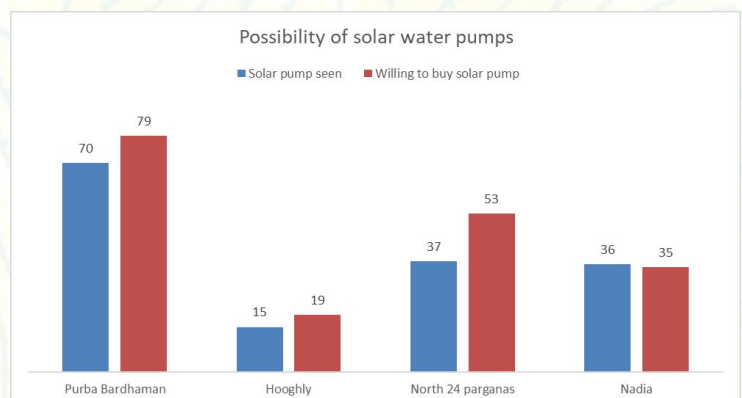
Asset (Agriculture & Non-Agriculture):

It is to be noted 168 farmers reported they have agricultural land at their name. However other agricultural assets like ploughs, Tractor, threshers are limited to few of the farmers.



Awareness regarding Solar Pump:

Awareness regarding solar water pump is significantly high (81% seen solar water pump) in 4 districts. One of the reasons could be that WBSEDCL is currently promoting its subsidy scheme (PM KUSUM) in this particular region. A significant number of pumps have been installed in this region under the PM KUSUM and FSSM scheme.



SWOT ANALYSIS:

This SWOT analysis was conducted with the intention of giving readers a brief overview of the opportunities and threats as per experience of farmers in West Bengal. Our SWOT analysis is informed by our field-level findings; however, we took the representational pattern from ISA, 2019.

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| <p style="text-align: center;">Strength</p> <ul style="list-style-type: none">• Vast area of fertile land• Community knowledge of agriculture methods• Commitment of government for sustainable socio-economic rural development• Sufficient energy generation capability to meet Agro requirements | <p style="text-align: center;">Weakness</p> <ul style="list-style-type: none">• Agricultural plan of farmers lacks scientific and operational approaches• Poor condition of existing rural infrastructure• Irrigation related challenges (degradation of infrastructure, inadequate irrigation management) |
| <p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none">• Public awareness regarding Govt schemes• Potential for undertaking micro-irrigation aspects• Application of small- and large-scale water harvesting technologies• Utilizing forward and backward linkages between agriculture and industry (value chains) | <p style="text-align: center;">Threats</p> <ul style="list-style-type: none">• Continuous deterioration of country's natural resource (groundwater) base• Climate change and variability in weather pattern (dry spell, drought, rainstorms, floods) affecting productivity• Soaring prices of Agri inputs• Irregularities in Govt. subsidy programme. |



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