

Study on the Socio-Economic Impact of Rural Electrification in West Bengal

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Calcutta Resource Center



Objective of the Project

- To study the social and economic linkages to various components of the power sector reforms;
- To identify cross linkages of power sector with other sectors---like impact of rural electrification on social, environmental and economic fabric of villages, linkages of agricultural to water, irrigation and energy issues.



Presentation Outline:

- Sampling & the Rationale
- Parameters Analysed
- Findings & Impact of Electrification
- Issues & Recommendations

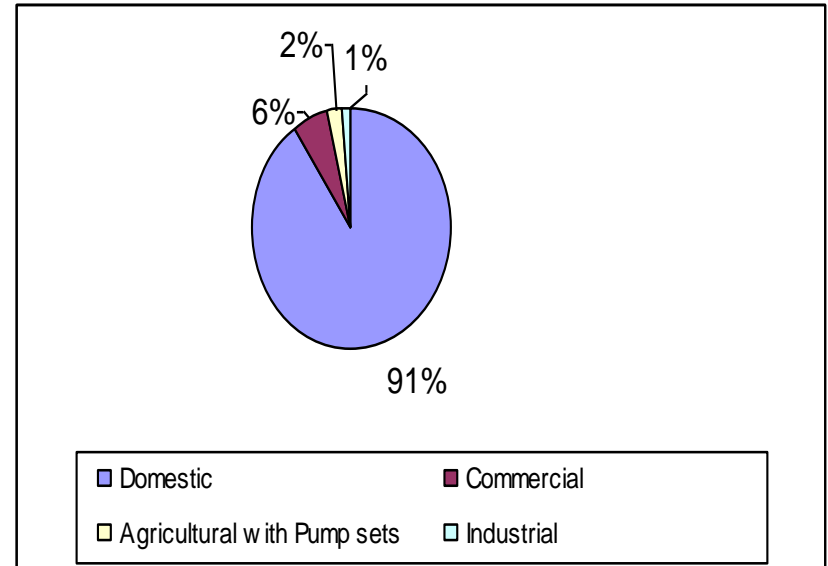
Sampling & the Rationale

- 6 districts out of 19 districts of West Bengal were chosen for the study.
- Districts were chosen on the basis of:
 - **HDI ranks.**

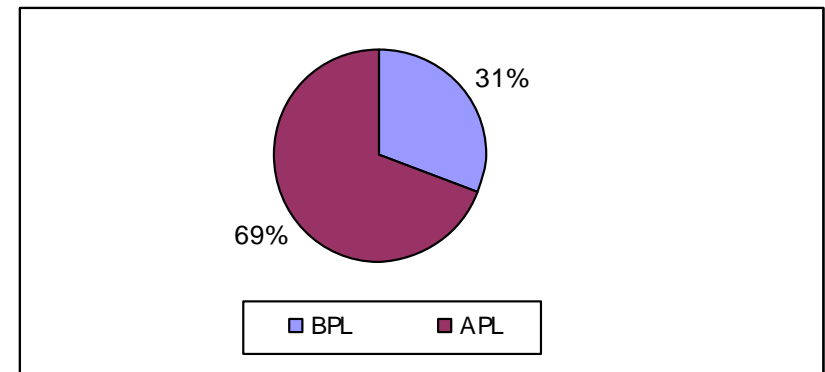
(3 districts with low HDI ranks, 2 districts with medium HDI ranks and one with high rank)
 - **Different Geographical location** (from North, West, East and South)
- From each district 200 households, both electrified & non-electrified, were surveyed
- Both APL & BPL households were surveyed

Beneficiary Households (Electrified)

| Total respondent (Beneficiary) | | |
|--------------------------------|--------|---------|
| | % | Numbers |
| Domestic | 90.2 | 861 |
| Commercial | 5.8 | 55 |
| Agricultural with Pump sets | 2.4 | 23 |
| Industrial | 1.4 | 13 |
| | 100.00 | 952 |



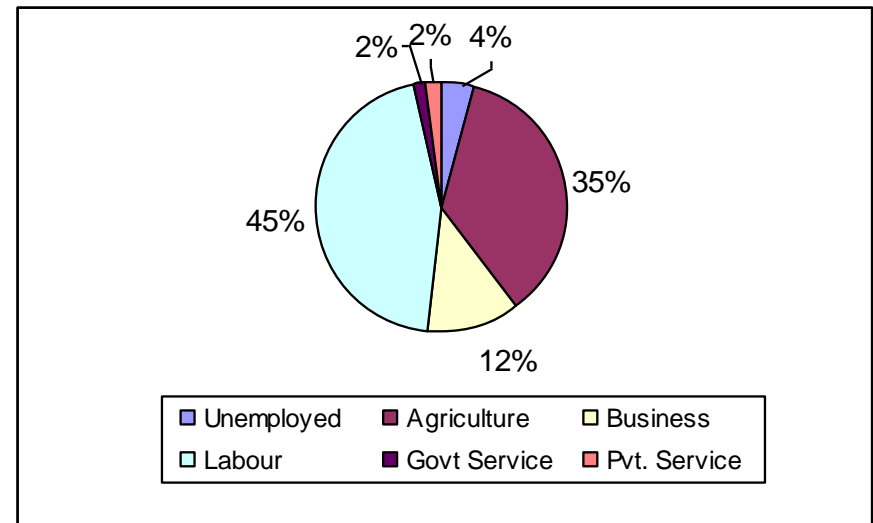
| | % | Numbers |
|-----|------|---------|
| BPL | 30.7 | 292 |
| APL | 69.3 | 660 |



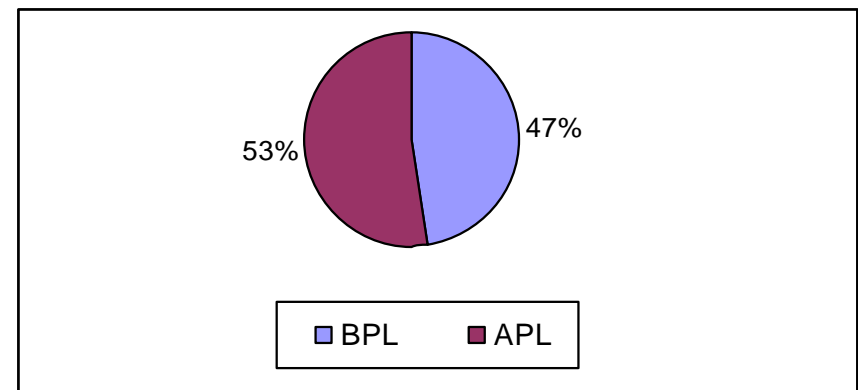
Non- Beneficiary Households (Non-Electrified)

Total respondents (Non Beneficiary)

| | % | Numbers |
|--------------|--------|---------|
| Unemployed | 4.4 | 11 |
| Agriculture | 34.9 | 87 |
| Business | 12.4 | 31 |
| Labour | 44.6 | 111 |
| Govt Service | 1.6 | 4 |
| Pvt. Service | 2 | 5 |
| Total | 100.00 | 249 |



| | % | Numbers |
|-----|------|---------|
| BPL | 47.4 | 118 |
| APL | 52.6 | 131 |



Parameters Analysed:

- Types of Connections & Purposes for which electricity is being used
- Impact on Income---both primary income & secondary income
- Impact on Households:
 - Expense on Kerosene
 - Quality of living---quality of sleep, leisure, entertainment
- Impact on Education & Health
- Impact on Sources & Quality of Drinking Water
- Impact on Agriculture & Irrigation
- Impact on Commercial/Business enterprises
- Impact on District specific Livelihood Enterprises/Activity
- Impact on access to general information and government schemes
- Quality of electricity issues
- Affordability of expenses towards electrification
- Use of Renewable/Non-conventional Energy



Findings and Impact of Electrification

Types of Connection & Purpose for which Electricity is used:

- The respondents chosen had mainly domestic connection (**90.2%**) . Few respondents had commercial (**5.8%**), agricultural (**2.4%**) & Industrial (**1.4%**) connections.
- Individually owned Agricultural connections were found in the districts of Murshidabad, Malda. The other two districts, Purulia & North 24 Parganas, mostly had connections that were put in place by the government (Deep/shallow tube well).
- Industrial connections mostly comprised of husking mills, ice cream factories, oil mills, etc.
- Households were principally found to be using electricity for lighting purposes.
- The entertainment factor has been an addition via TV, & VCDs in some of the households.
- Some of them did mention that they are using electricity for cooking purposes, but the percentage is very low.
- In many places, domestic connection is used for small household enterprise since getting a commercial connection will not be feasible, as opined by respondents.

Impact on Income (Of Electrified household)

Primary Livelihood

- Out of 952 beneficiary households, 162 beneficiary households use electricity for their primary livelihood
- And **90.12 %** (146) out of **these** 162 households using electricity for their primary livelihood (be it agriculture, commercial business or any other) have confirmed increase in their monthly income.



Secondary Income

- With availability of electricity many households, especially the women, have been able to engage in and start small household enterprises like *bidi* binding, small grocery shops, embroidery, etc. In addition to their primary source of income, they have been able to increase their income through secondary means
- The numbers of household enterprises and income from secondary sources have increased. The households get longer working hours because they are able to bring work home and work at night.
- Out of 952 respondents, 272 (**28%**) respondents have secondary sources of income and amongst them 95 respondents (**10%**) said that their annual income from secondary sources has increased after electrification.

Impact on Households:

- Almost all the households said that electricity has helped them lead a better life
- 61 % of respondents with access to electricity said that their kerosene expenses have reduced.
- Many of the respondents **(79.4%)** said that electricity has positively influenced their quality of sleep.
- Leisure and entertainment also seems to have gained importance in rural lives as expressed by respondents. Electricity has resulted in spare time in many cases and TV, VCDs, etc have meant better leisure hours.
- **48.5%** of the people said that there has been increase in leisure and entertainment factor in their lives
- **42%** of them own TVs.

Impact on Education & Health:

- Almost all electrified households said that the study hours for their children has increased.
- Out of 952 respondents, 653 have school going children and out of that **86.8%** (551) households said that study time for their children has increased after electrification.
- Some of the respondents opined that electrification has lead to lesser eye problems and breathing troubles, especially among children & the elderly. This they mainly attributed to less frequent use of the kerosene lamp (*lawmpho/kupi*).
- In some places midwives said that electrification and more specifically electric light has facilitated the child delivery process because now they find it more convenient & safer to undertake the necessary activities during night time deliveries.
- Medicines requiring refrigeration are being stored by local pharmacy shops in some of the places.

Impact on Sources & Quality of Drinking Water

- The principal sources for drinking water are tube well (**81.8%**), well (**8%**) Tap Water (**10.2%**). (After electrification)
- **16.9%** people opined that there has been improvement in the quality of drinking water.
- PHE water supply was found to be present in three maujas, one each in Malda (Dakshin Chandipur), Murshidabad (Mirjapur) and Midnapur (Udaiganj)

Impact on Agriculture & Irrigation

- Some small farmers said that they could start cultivating only after the electricity driven system lowered the costs. This is an observation from North 24 Parganas, where the government installed deep tube-well helped them start their cultivation.
- Some farmers said that they can now cultivate vegetables, which give them a higher profit than the traditional paddy.
- Those farmers who have access to electricity driven irrigation, either directly or indirectly, said that their irrigation expenses have been reduced due to such availability. It is roughly half that of diesel run irrigation. Also the labour cost for farmers has decreased.
- Some of the farmers said that agri-related programmes on the TV has helped them and that more such trainings at the field level is necessary.



Impact on Business & Commercial Activities

- Commercial activities & business has clearly received a boost after electrification
- Time of operation for most shops/businesses has increased by 3 hours on an average.
- **56%** of such households/respondents for whom business is primary source of income, reported that their income from business has increased after electrification.
- New business like photocopying shops, photo studios, etc. have also developed in some of the maujas after electrification.

Impact on some District-specific Livelihood Enterprises

- Sericulture activity in Malda has been benefitted by electricity. The silk worms need a specific temperature and sufficient light to be healthy and productive. This has been facilitated by electricity to a large extent since the farmers are using fans and incandescent bulbs to maintain these conditions.

“The silkworm is very sensitive and unless we maintain a specific temperature in the room, it will not grow to be productive”- silk farmer, Bawkjona, Malda

- Embroidery/ Zardosi work, leather bag making, etc. in North 24 Parganas have been benefitted by electricity because both these activities need sufficient light. Earlier the workers worked only in the day time while now they work till late in the night. This has led to an increase in available work hours and hence income. They are also getting orders from the city and catering to them by working at night.

“We now put on a music CD or the FM radio and work through out the night at times to finish assignments on time”- craftsman, leather purse making unit, Shimuldaha, North 24 Parganas

Impact on Access to General information and Government Schemes

- An encouraging fraction of the respondents said that electricity has facilitated their connection with the outer world and they are now more aware about the world in general. They now have access to information and news that was earlier inconceivable

“ We now know about things that happen around the world, be it the Mumbai terror, the economic downturn or the election of the new American president”- respondent, Patharkhairan, Malda

- Awareness and information about Government schemes however was not found to be satisfactory. Most of the respondents said that information and access to related schemes was hardly forthcoming.

Quality Issues:

- **52.6%** of the respondents said that they face on an average 2 hours of power cut each day. **40.2%** said the average hours for power cut ranges between 3- 5 hours.
- **84.1%** said they face voltage fluctuations and **34.9%** said that have faced breakdown issues.
- **75.7%** of the respondents said that they know where to complain and indicated the local supply office as the place to complain. However, almost none of them knew about the grievance redressal mechanism or of any other platforms for registering complaint beyond the local office.

Affordability of Expenses towards Electrification

- About **26.8%** of the respondents said they had to borrow money from relatives or other available sources (money lenders, etc) for household electrification purposes.
- It was also observed that for those localities where electricity has already reached, some of the households/clusters were out of its purview. The reason mostly was the fact that since the electricity lines were not near enough, electrification would entail extra costs for them in the form of poles, wires, etc. in addition to house-wiring. The concerned households are keen to get connections but can not afford this extra cost.

“ We at times face the ire of villagers who have not got connections even though their locality has been electrified, they complain that new lines are put in place but their cluster is being ignored”- secretary, SHG group engaged in bill reading, distributing and estimating for new connections, Baragram, Purulia

Renewable/non-conventional energy usage


- Use of renewable or non-conventional energy was hardly found in any of the maujas. The ones found few & far were mostly individual initiatives and no major awareness generation, promotion was reported to have been undertaken by any Government agency.
- The potential for such energy, especially bio-gas, was found to be encouraging.

Electrified & Non-electrified Households: Comparison

- **30%** of the respondents among the non-electrified are illiterate, while the figure is **11.1%** amongst electrified households.
- Electrified households show a higher incidence of secondary passed (**30.6%**) & graduate (**10.7%**) respondents which is lower, viz. **14.9%** & **2.8%** respectively for non-electrified .
- **90%** of the children (6-14 years) from both beneficiary and non-beneficiary households were school-going.

Reasons for not having electricity: Non-electrified Households

- Out of the total 249 non-electrified respondents interviewed, **80.7%** said that they were never approached for application of electricity.
- Out of the **19.3%** who were approached, roughly **45.8%** said that they cant afford the initial expense for getting electric connection.
- **47.4%** of these 249 respondents additionally said that they had never tried to get electricity
- Out of the rest **52.6%** (131) who said they had tried to get electric connections, **60.3%** (79)said that they cannot afford the initial cost.
- Many of the respondents also found other expenses like wiring, equipment cost, bills etc. to be unaffordable.
- Only **13.5%** said that they were happy with the present status.



Issues and Recommendations

Issues: Agriculture & Irrigation

- Small farmers are finding it difficult to take advantage of electricity driven irrigation since irrigation connection is quite expensive
- Big farmers are selling water to small farmers at a rate ranging between Rs. 1000- 1200/- per bigha for the entire season (mostly the boro rice)
- In some places (like Purulia), electricity driven irrigation is not available due to ground water issues, but farmers are not at all knowledgeable as to why they are not getting permission for new agricultural connection.
- In some places River Lift Irrigation system were put in place by the Government. However many of them have stopped functioning and no upgradation/ repair work has been undertaken. This becomes specially relevant for dry areas of the state, where permissions to bore for underground water is mostly not forthcoming due to ground water level issues.

Recommendations: Agriculture & Irrigation

- *Since the agriculture connection is expensive for small farmers to afford, scheme (s) via which they can form cooperative and apply jointly for the connection may be promoted and popularised.*
- *The subsidised scheme for shallow tube well was found to have been accessed in some places. However awareness about the scheme was found to be minimal . Larger dissemination and promotion of the scheme is necessary to help small farmers capitalize on this.*
- *Districts where ground water level is an issue, alternative irrigation support like RLI, should be more extensively developed. Existing RLI's which have gone defunct should be revived and better monitoring of such units needs to be ensured.*
- *There is a lot of information gap among farmers regarding availability of irrigation connections , the relevant authority to approach and the available schemes . Wider dissemination is very much necessary.*

Commercial & Business Activities

- Road & transport was opined as the chief problem hindering better commercialisation in almost all the districts.
 - Some existing schemes of the government are not being implemented properly. For e.g. the scheme from Sericulture department whereby the silk farmers get assistance to build concrete structures for the silk worms is not reaching the farmers.
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- *Better roadways and transport facilities are needed to boost economic growth.*
 - *Activities like sericulture, embroidery, needle work, leather bag making etc, will further be encouraged if specific product-based incentive schemes are developed, popularised and implemented by departments like sericulture, handloom, textile, self help department, etc. This may be in the form of credit facilities through micro financing, design development inputs/trainings for bag making, embroidery units, etc.*

Health & Drinking Water

- Local pharmacy shops who are storing drugs needing refrigeration are facing several hours of power cuts in most of the places and there are mostly no alternative arrangements for uninterrupted supply.
 - The sub-centres, which are the only health facilities the people have relatively easy access to, do not have electricity and hence storage facilities for life saving drugs/emergency medicines is a far cry.
 - All immunisation programmes at ICDS centres & sub-centres are carried on by supplying the vaccines in thermocol boxes that the nurses from Primary health centres carry with them.
 - Quality of drinking water was reported to have improved by only 16.9% of the respondents.
-
- *Health infrastructure needs to be improved and sub-centres need to be connected to electricity to be able to stock live savings drugs and medicines.*
 - *Safe drinking water is an issue which can probably be handled by putting in place water supply arrangement by the PHE department. The scope for such initiatives is very much there for all those maujas that have been electrified.*

Education

Very few of the schools were found to be having electric connection.
Almost none of the Primary schools have electricity.

“ It becomes very difficult to teach during the monsoon months. We need to close all windows and doors due to storm & rains and almost total darkness engulfs the classroom. The summers are also difficult for students because without fans, they have to withstand the intense heat of the summer sun.” –Teacher In-charge, Hargara Primary School, Purulia

Initiatives need to be taken to reach electricity to schools specially primary schools, almost none of which were found to have electricity. This may encourage higher attendance of school going students, scope for better and interactive modes of teaching, etc

Affordability of Connections & Scope for Renewable Energy

■ In many cases respondents expressed inability to get electricity connection due to affordability issues. Some of these cases are due to the fact that the clusters or localities that the respondents belong to are a little off the way of the electricity poles or were left out for some reason when the neighboring clusters were electrified. These respondents though they want to apply can not because the initial infrastructure costs are unaffordable.

■ Renewable energy usage was found to be minimal and no major awareness or promotion drive was reported to have been undertaken by the government or any of its agencies though bio-gas prospects are very much present in many of the places.

■ *Special Schemes may be thought or developed which will help these people to get electricity . This may be in form of bank loan which the cluster of house or communities can avail paying the initial expenses of poles , wires etc.*

■ *If renewable & non-conventional energy prospects are tapped through better and higher promotion of a scheme in these areas, it will help in lowering the stress on conventional electricity resources and consequently facilitate a greater share of renewable/ non conventional energy in the energy sector.*



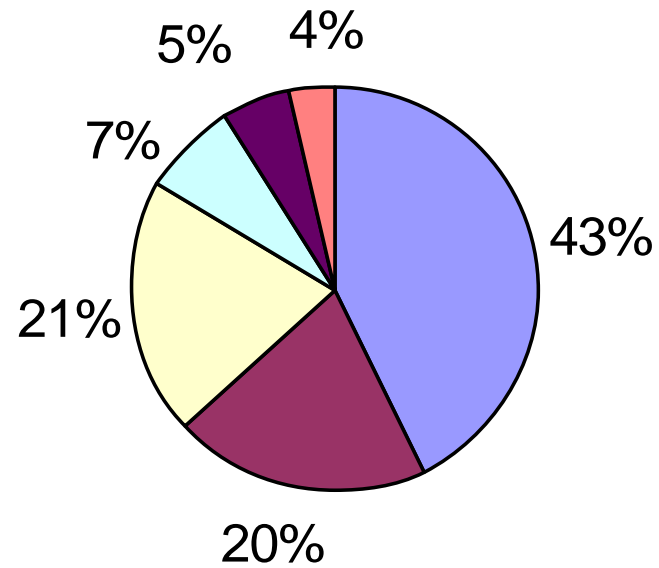
Thank You

Impact on Income



| Primary Livelihood | | | | | | |
|-------------------------|-----------------------|-------|---|-------|---|--|
| Primary Livelihood | Numbers of households | % | Households who use Electricity for Livelihood | % | Households who reported an increase in income by way of using electricity | Number of households who have confirmed increased in income as percentage of all households using electricity for livelihood |
| Agriculture and Related | 407 | 42.75 | 76 | 7.98 | 71 | 43.83 |
| Business | 193 | 20.27 | 64 | 6.72 | 60 | 37.04 |
| Labour | 195 | 20.48 | 14 | 1.47 | 11 | 6.79 |
| Govt. Service | 71 | 7.46 | 2 | 0.21 | 0 | 0 |
| Private Service | 50 | 5.25 | 3 | 0.32 | 2 | 1.23 |
| Others | 35 | 3.68 | 3 | 0.32 | 2 | 1.23 |
| Total | 952 | 100 | 162 | 17.02 | 146 | 90.12 |

Sources of Primary Livelihood



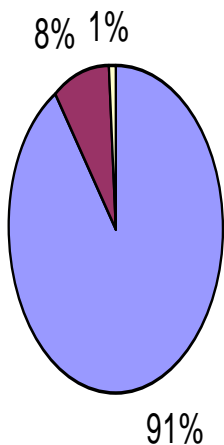
- Agriculture and Related
- Labour
- Private Service
- Business
- Govt. Service
- Others



| Name of District | HDI RANK |
|-------------------------|-----------------|
| 24 Parganas (North) | 3 |
| Medinipur | 7 |
| Nadia | 9 |
| Murshidabad | 15 |
| Purulia | 16 |
| Malda | 17 |

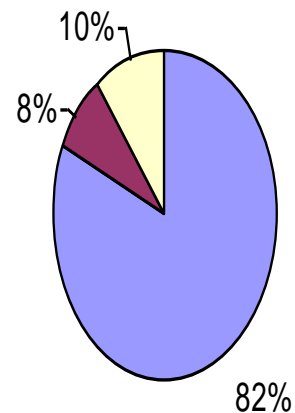


Sources of Drinking Water Before Electrification



■ Tubewell ■ Well ■ Tap

Sources of Drinking Water After Electrification



■ Tubewell ■ Well ■ Tap



Impediments of getting electricity connection

| | |
|----------------------------|----|
| Cannot Afford initial cost | 79 |
| Cannot afford Wiring | 79 |
| Cannot Afford bill | 70 |
| Cannot afford equipment | 72 |

Impediments of getting connections, as opined by the 131 non-electrified respondents who tried to get electricity connection, are listed in the table (left). More than one reason was cited by most of them

| | |
|----------------------------|----|
| Cannot Afford initial cost | 22 |
| Cannot afford Wiring | 24 |
| Cannot afford bill | 28 |
| Cannot afford equipment | 20 |

Impediments of getting connections, as opined by the 48 non-electrified respondents who were approached by the supply office/its representatives for connections, are listed in the table (left). More than one reason was cited by most of them

