

Socio-economic Impact Study of the Rural Electrification Development Project (REDP)

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Matiur Rahman, Shafique uz Zaman
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Human Development Research Centre
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Prepared for



NRECA International Ltd.

Dhaka: February 2011



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Prepared by

Abul Barkat¹
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Matiur Rahman³, Shafique uz Zaman⁴
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¹ Professor and Chair, Department of Economics, University of Dhaka; Chief Advisor (Hon.), HDRC & Study Team Leader

² Senior Consultant, HDRC

³ Professor, Department of Statistics, University of Dhaka

⁴ Professor, Department of Economics, University of Dhaka

⁵ Consultant, HDRC

⁶ Senior Research Associate, HDRC

⁷ Research Associate, HDRC

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Electricity is not just light, it entails enlightenment. In this backdrop, to increase the provision of electricity in rural and peri-rural areas of Bangladesh a project was launched. The project is known as *Rural Electrification Development Project (REDP)*. To evaluate the socio-economic impacts of rural electrification through REDP, it was necessary to have a sound research. Considering the need of such a study NRECA awarded HDRC with the assignment, which consisted of two Parts: *Baseline Survey* and *Impact Study*. Baseline Survey was conducted by HDRC in 2008. In the socio-economic impact phase, in 2010, the same households (interviewed at the baseline phase) have been interviewed to assess the impact of electrification through REDP.

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Prof. Abul Barkat, Ph.D.
Team Leader of the Study
&
Chief Advisor (Hon.), HDRC

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Abbreviations

| | |
|--------|--|
| AIDS | Acquired Immune Deficiency Syndrome |
| ANC | Ante-Natal Care |
| ARI | Acute Respiratory Infection |
| BBS | Bangladesh Bureau of Statistics |
| BDHS | Bangladesh Demographic and Health Survey |
| CBN | Cost of Basic Need |
| CBO | Community Based Organization |
| CPR | Contraceptive Prevalence Rate |
| DCI | Data Collection Instrument |
| DCI | Direct Calorie Intake |
| DFID | Department for International Development |
| EOC | Emergency Obstetric Care |
| FAO | Food and Agriculture Organization |
| FGD | Focus Group Discussion |
| FP | Family Planning |
| GoB | Government of Bangladesh |
| HDRC | Human Development Research Centre |
| HH | Household |
| HIES | Household Income Expenditure Survey |
| HIV | Human Immunodeficiency Virus |
| IGA | Income Generation Activities |
| JMP | Joint Monitoring Programme |
| KII | Key Informant Interview |
| MCP | Medically Competent Person |
| MDG | Millennium Development Goal |
| MICS | Multiple Indicator Cluster Survey |
| NGO | Non-Government Organization |
| NRECA | National Rural Electrification Cooperative Association |
| NRR | Net Reproductive Rate |
| ORS | Oral Rehydration Salts |
| PBS | Palli Bidyut Samity |
| PNC | Post-Natal Care |
| PPP | Purchasing Power Parity |
| PPS | Probability Proportional to Size |
| RE | Rural Electrification |
| REB | Rural Electrification Board |
| REDP | Rural Electrification Development Project |
| REP | Rural Electrification Program |
| SSP | Social Safety net Program |
| STD | Sexually Transmitted Diseases |
| TFR | Total Fertility Rate |
| TT | Tetanus Toxoid |
| TTBA | Trained Traditional Birth Attendant |
| UNICEF | United Nations Children's Fund |
| USAID | United States Agency for International Development |
| UTTBA | Untrained Traditional Birth Attendant |
| VAW | Violence Against Women |
| WHO | World Health Organization |

Executive Summary

Background and Objectives

Electricity is not just light, it entails enlightenment. In this backdrop DFID of the United Kingdom committed up to £50 million to increase the provision of electricity in rural and peri-rural areas of Bangladesh. The Government of Bangladesh committed to contribute £ 122 million through the Annual Development Program. The Program is known as *Rural Electrification Development Project* (REDP). The project accomplished 23,000 km electric line, created 1.3 million electric connections, and provided microcredit for electrification to 2,200 households. To evaluate the socio-economic impacts of rural electrification through REDP, it was necessary to have a sound research. Considering the need of such a study, NRECA awarded Human Development Research Centre (HDRC) with the assignment followed by a competency assessment jointly done by NRECA, REB, DFID and USAID. The assignment consisted of two Parts: *Baseline Survey* and *Impact Study*. Baseline Survey was conducted by HDRC in 2008. The overall objective of the assignment was to examine the social and economic impact of the REDP with emphasis on poor and women being top priority. It is to note that although the micro-credit mediated electrification component was initially intended to cover all 9 REDP poverty thrust PBS; it was only implemented in Brahmanbaria PBS.

Methodology

In socio-economic impact phase, same households and other units of observation (not electrified at baseline) have been interviewed to assess impact of electrification through REDP- in a framework of a catch-up panel analysis. The observation measurement units are: 1) Household; 2) Commercial units; 3) Industrial units; 4) Irrigation units, and 5) Social/human development units (i.e., school and health centre). In the socio-economic impact phase, in 2010, the same households (interviewed at the baseline phase) have been interviewed to assess the impact of electrification through REDP. The data and information has been collected from 15 sample PBSs (from 9 REDP Poverty Reduction Thrust PBSs and 6 REDP non-thrust PBSs). Baseline data has been used as archive data to estimate the changes. The gross and net impacts of REDP have also been estimated in applicable cases. For measuring gross impact of REDP, baseline data of a specific indicator has deducted from electrified unit (of impact). To get the net impact of REDP, gross changes in control (from 2008 to 2010) has been deducted from the gross impact of REDP. The data and information have been disaggregated for the poor and female-headed households in applicable areas of analysis. Among the total sample households (i.e., 4,975)- 3,385 are experimental and 1,509 are control. Among the experimental 1,288 are currently electrified (38% of experimental). The survey has been administered in 134 villages (112 experimental villages and 22 control villages).

Household Background Characteristics

Regarding the household background characteristics, no substantial changes have been found while comparing the impact phase data with baseline data. Household size has been increased a bit among both experimental and control households compared to baseline (from 4.7 to 5.0). Among the experimental households, currently 92% household heads are male (92% in baseline). This pattern is similar in both experimental and control households. A 63% of the

electrified household members have minimum one year of schooling, whereas about 53% members of the non-electrified households in the experimental category have education. The baseline figure was 56% against this indicator. No major changes have been found in the occupational pattern of members belonging to both experimental and control households in last two years. The dependency ratio for the population of experimental households is estimated at 71.2 while for population of control households, it is 74.8.

Household's Assets Ownership

The landlessness scenario has been improved in last two years. In the baseline, 72.4% experimental households were landless, which has been decreased to 62.5% in the currently electrified households. An average space of dwelling room in a sample household has been increased by around 162 sq.ft. in last two years among the experimental households (Baseline: 310 sq. ft.; Impact: 471.8 sq. ft.). In last two years, the tendency of using better quality housing material has been increased. If this trend is compared with the control households- then, it is indicative that REDP has a positive financial impact over the experimental household which has led to go for better housing material. After household electrification, addition of new household assets has been evident in experimental households. Mostly, the items which run by electricity have been added to the *household assets possession basket* within this time period between baseline (2008) and impact (2010). Among the experimental households, currently 39% household possesses TV which was only 6.4 % at baseline. Currently 74 % households are having electric fan. All the households now possess electric bulb. A 36 % households do possess charger light, which was nil at baseline. In some households- though not frequently- camera, refrigerator, rice-cooker, iron etc.- has been added within this time period. It has also been found that currently 69 % household own cell phone, which was 28 % at baseline. Compared to the baseline (2008), the total valuation of household assets (movable) among the experimental households has been increased by 1.63 times (from Tk. 49,748.4 to. 81,134.2). In the impact phase, among the experimental households, male-headed household possess assets worth Tk. 83,230 which is 1.46 times higher than the valuation of households assets in a female-headed household (Tk.56,727). In the impact phase, for an average experimental household of above upper poverty line, the valuation of household assets is TK 93,225 (which is 2.04 times higher than the household of below lower poverty line) while it is much less among the poor households (Tk. 45,564) for households in below upper poverty line and Tk. 54,923 for a household of below lower poverty line.

Attitude towards Household Electrification

As 61% of the surveyed households have not been electrified, 88% of them want electricity connections. Financial incapability is reportedly the prime reason for the households for not having electricity. About 41% households do not have electricity for this reason. The other reasons are related to REDP's procedural and bureaucratic limitations. Those who do not have electricity opined that making the connection procedure easy would be of help for them to avail connection. A 36% of the households in the experimental and 38% in the control households reported that they require financial support (e.g., micro-credit) to avail electricity connection.

Nearly three-fourths (73.4%) of the households are satisfied with the electricity service followed by an 11% of them who are found dissatisfied with the service. Frequent power cuts, intolerable load shadings and consequently additional costs on other fuels have been

mentioned as the major reasons for dissatisfaction with the service. An average household spends Tk. 133 on electricity bill and Tk. 51 for other fuels consumed during load-shading. The average energy expenditure in the households has increased by Tk. 60, and there are some variations depending on the sex of the head of the households as well as their poverty status. About 53% of the subscribers view electricity price as satisfactory, while 36% has reported it as expensive. However, more than 7% of the respondents replied that they would like to pay even a higher price if reliable supply of electricity could be ensured. The most voiced suggestion for improving the electricity service was lowering the current load-shading rate.

Household Income, Savings, and Credit

The gross impact of electrification on REDP-mediated-household's annual net income is 63% (nearly two-thirds), while the net impact is 8%. At present, average annual net income of electrified REDP household is around Tk. 133,000, and the same during baseline was Tk. 81,000. For control households, the average annual net income at present is Tk.105,000. Average gross impact of electricity attributable to annual net income generation is about Tk. 1,275 and net impact is Tk. 1,195. Income disparity among electrified and control households shows a moderate trend. The Gini's concentration ratio of net annual income for electrified households is 0.41 and for control is 0.38, which during the baseline was 0.39. The net increase in net annual income among those living below upper poverty line is 27% and for those living below lower poverty line it is 19%. Average household annual net income of both male and female-headed households is close at both the study points. The share of income from agriculture related sources is declining, wage, business and remittance is gradually increasing. The amount of savings of average electrified household increased substantially to Tk. 22,000 from Tk. 16,000 and for control household it is currently Tk. 14,000. The amount of availed credit during 2 years period from the study for electrified households increased to Tk. 31,000 from Tk.19,000 and for the control household the current amount is Tk. 16,000.

Household Food Consumption

Although an increase in daily per person total food intake among electrified (785 gm at the time of impact vs. 705 gm during baseline) and control households (766 gm at the time of impact vs. 697 gm during baseline) have been observed during the impact study compared to their respective baseline, it is still well below 934 gm (the recommended level). A gross food intake increase of 80 gm has taken place, while the net increase is 11 gm. An increase in daily per person food energy intake has taken place both in REDP electrified households (1960 kcal against 1872 kcal) and control households compared to their baseline (1,955 kcal against 1,910 kcal). However, it is below the absolute poverty level. The estimated gross increase in per person daily food-energy intake is about 88 kcal, while the net increase is 43 kcal. Per person calorie intake of households living below poverty lines (lower and upper) has notably increased compared to those who live above upper poverty line compared to their baseline. Food-energy intake pattern among both the categories of households (male and female-headed households) across experimental and control households are almost similar.

Household Expenditure

For electrified households, annual average expenditure is Tk. 95,000 (Tk. 94,000 during the baseline at current price). Food expenditure, for electrified households constitutes the major part of the expenditure both at the time of impact and baseline studies (Tk. 58,943 and Tk.

64,422 at current price respectively). Households living below upper poverty line are relatively more capable of spending compared to those who are above upper poverty line. Likewise the baseline, the male-headed households are in a position to spend more compared to female-headed households. The pattern is similar irrespective of electrified and control households.

Household Poverty Status

In terms of Direct Calorie Intake (DCI) measure the poverty situation among the households has been improved in last two years. Hardcore poverty of the experimental has been decreased by 14.5 percentage-points (from 44.9% to 30.4%), while among the control households the hardcore poverty has been decreased by 15.9 percentage-points (from 46.2% to 30.4%). Thus, regarding the hardcore poverty situation- significant improvement has been found, while the extent of betterment is bit higher among the control households (Gross impact: -14.5 percentage-points; Net impact: 1.4 percentage-points). In terms of CBN measure, the poverty situation among the households has been improved significantly in last two years. The status of below lower poverty line has been improved remarkably (in experimental households 10.9% are currently living below lower poverty line compared to 35.7% in baseline; in control the corresponding figures are 19.4% and 44.5%). The gross impact of REDP regarding below lower poverty line is -24.8 percentage-points and the net impact of it is 0.3 percentage-points (which indicates poverty situation improvement rate is slightly higher in the control households). The poverty reduction rate using CBN method is remarkably high among the electrified households than the non-electrified households in the experimental villages- which is an indication of positive impact of electrification through REDP.

Estimates based on international poverty line of US PPP \$1.25 a day per person shows that 56.9% of the experimental households were poor in baseline, which has been decreased by 3.5 percentage-points (53.4%); the poverty rate with US PPP \$ 2 a day per person was 88.2% in the baseline which has been decreased by 10.2 percentage-points (78%). The gross impact of REDP on the poverty line of US PPP \$1.25 a day per person is estimated to -3.5 percentage-points and net impact is -1.4 percentage-points. It is interesting to observe that poverty status (using both the international poverty lines) has been improved to a higher extent among the experimental households than that in the control households- which is an indication of positive impact of electrification through REDP.

A 26.6% of the experimental households have reported facing crisis in last two years, which was 37.2% in baseline- which indicates around 10 percentage-points reduction of crisis. A 17.8% household has faced loss due to loss of crops, which was 20.3% in baseline. The major strategy for crisis coping has been reported as loan in 44% cases, in both the phases of the assignments (i.e., baseline and impact) among the experimental households, somewhat indicates towards loan taking tendency. The second mostly used strategy for crisis coping is utilization of savings (among the experimental, it is 26.9% in impact which was 28.4% in baseline). This trend is similar in control households. It has been found that among the female-headed households in the experimental, the use of utilizing savings for coping of crisis is on an increasing swing (from 31% to 42%); loan has been found as decreasing in this case (from 40% to 32%).

Health, Hygiene, and Sanitation: Knowledge and Practice

As compared to baseline, notable improvement of awareness has been observed in 9 out of 20 crucial public health issues. Improvement is more pronounced in electrified households than the households without electricity. Compared to baseline (44%), currently health seeking behavior with medically competent persons (MCP) has been increased (48%) in electrified households. Gross improvement of health seeking behavior with medically competent persons is 4% however net improvement is 3%. Current practice of assistance at child delivery (last birth) by medically competent persons (MCP) is 11% in electrified and 7% in non-electrified households. Compared to baseline, the gross change towards assistance by medically competent persons is 3.48% points and so by trained persons is 12.3% points in electrified households. The corresponding net changes are 1.4% and 3.3% respectively and can be attributed to household electricity. ANC checkup is higher in electrified than in non-electrified households by 12% points. The gross and net rise of ANC checkup that can be attributed to household electricity are 11% and 6.5% respectively. The current practice of PNC checkup at last delivery has been increased in both electrified (22%) and non-electrified (15%) households against baseline practices of 15% in experimental and 12% in control households. Where, estimated gross and net impacts of electricity are 7% points and 4% points in order. The tetanus toxoid (TT) coverage of the pregnant women in last delivery is higher in electrified (67%) and non-electrified (64%) households as compared to the coverage in experimental (63%) and control (62%) households at baseline. Gross benefit in TT coverage that can be attributed to household electricity is 4% points and that of net benefit is 2% points. The current contraceptive prevalence rates in electrified and non-electrified households are 63.7% and 62.4% and higher as compared to baseline status in experimental (55.2%) and control (52.8%) households. Full immunization coverage of the children aged 12-23 months for all basic vaccinations is 84.8% in electrified and 83.9% in non-electrified households. Corresponding baseline coverage were 73.4% and 76.9%. Regardless of baseline and impact study, tube-well is the foremost (99%) source of drinking water in electrified as well as non-electrified households. Currently 70% in electrified and 65% in non-electrified households use tube-wells that are free from arsenic as compared to 60% and 55% at baseline. Impact study shows that as compared to baseline, the current use of hygienic latrine has increased both in electrified (14% to 46%) and non-electrified (9% to 30%) households. Possible gross impact of electricity for increasing use of hygienic latrine is 32% points, where net impact is 11% points.

Education: Literacy, Enrolment, and Quality

It has been found that literacy rate for population of all ages has been increased by 3.6 percentage-points due to REDP. The net impact of REDP on enrolment ratio (primary and secondary combined) is not identical between boys and girls (0.7 percentage-points vs. 3.9 percentage-points). Because of the net impact of REDP intervention (among experimental households) while average score obtained by boys has been increased by 5.7 percentage-points, average score obtained by girls has been reduced by 1.8 percentage-points. Among the experimental households, the net impact of REDP is insignificant on the school attendance rate of boys; while the net impact on girls' school attendance rate is 1.6 percentage-points. The net impact of electrification on experimental household in terms of fall in drop-out rate is quite noteworthy for boys (in primary level 2.3 percentage-points and in secondary level 2.7 percentage-points).

Household Time Allocation

The pattern of activities in day time for members in the experimental households has been changed in last two years. It has been found that while in the baseline, an average adult male had 921 minutes in a day (from waking up to sleep), now, the figure has been increased by 98 minutes; the net impact of REDP in this regard is 44 minutes. Except for sleeping-time at night, on average, an adult female gets 947 minutes in a day (around 16 hours in 24 hour day), which was 917 minutes in baseline. A child (school going) in experimental households is involved with various activities in his/her everyday life. On average, a child sleeps for around 9 hours a day (which was around 10 hours a day). The main reason for this expanded day-time is delayed period for going to sleep. The time spent for leisure and personal task has been increased among the adult male and female household members. This is indeed an indicator of development, where people will enjoy more time for leisure compared to before. It has been reported that most of the household work is done by female. It is very important to observe that the time period allotted for study and school has been increased noticeably among the school going children in the experimental households. Before electrification, the school going children spent 441 minutes in a day for study and school- which has been increased to 511 minutes in the impact phase. The gross impact of REDP in this regards is 47 minutes and net impact is 36 minutes.

Women Empowerment and Gender Issues

The overall scenario of women empowerment in Bangladesh due to REDP at present has been observed with a positive change in the electrified households than the baseline state without electricity at households. The net impact of REDP at present is around 0.6 meaning – the overall situation of women empowerment has slightly changed in the experimental households due to REDP. While the data has been disaggregated by ‘poverty issue’ it was found that, most of the women from the households above the poverty line are having the opportunities of the women empowerment issues. When the data has been disaggregated by ‘head of households’, it was observed that, the women from the female-headed households are capable enough in dealing with all the issues of women empowerment than the male-headed households. The entire portrayal of women’s independent decision making issues due to REDP at present has been observed with a slightly positive change in the experimental households than the baseline situation without electricity. The total representation of women’s mobility due to REDP has been observed as having a bit of positive change at present in the experimental households than the baseline period without electricity. The situation of the ‘domestic violence against women’ has been observed with a visible change in the experimental households at present due to REDP. This time, the change is negative because of the scoring scale (where 100 is the worst situation and 0 is the ideal status). The whole image of ‘women’s knowledge about gender equality’ issues in the experimental households due to REDP has been observed with a positive change at present than the baseline situation. The net impact of REDP is 4.5; which denotes that, there is a positive change in the experimental households and thus the net impact is higher than the gross impact. There is an upward tendency in the state of women’s credit taking status. The average amount of credit taken in last year by the women shows a visible increment that is Tk. 17,170, which was Tk. 5,455 in the baseline. About 30.1% of the women took credit in the range between Tk. 5,001 and Tk. 10,001 of which, most were observed to have taken this range of amount from the households below the upper poverty line and from the male-headed households.

Migration

Incidence of out-migration among electrified households has not been changed (increased) considerably in last two years. The net impact of REDP intervention is only 0.2 percentage-points among the electrified households. Because of the REDP intervention (net impact) while out-migration among the electrified households living below upper poverty line has been increased by 1.3 percentage-points, out-migration among the households living above upper poverty line has been decreased by 1 percentage-point. Out-migration due to search of job and education has been reduced significantly (by 13.3 percentage-points and 3.5 percentage-points respectively) in REDP intervened households as compared with that of non-electrified control households. In comparing with the in-migration scenario of control households, the net impact of REDP on the incidence of in-migration among electrified households is not notable. Considering non-electrified households (control) the net impact of REDP intervention is quite noteworthy on job placement related in-migration (7.8 percentage-points).

Access to Information, Awareness and Knowledge

The exposure to TV as compared to radio is much more pronounced in experimental electrified household than that of control household (non-electrified). After the electrification, not only that more people watch TV but also their frequency of watching TV and average time spent (in minute/day) on watching TV have been increased noticeably. After the REDP intervention, TV has become the major source of news of national importance among electrified households. Because of the REDP intervention significance of elites and Hat/bazaar in providing regional news has been decreased and TV has taken places that position of elites and Hat/bazaar. REDP intervention has noteworthy net impact on reducing percentage of respondents not having access to educative information (13 percentage-points).

Key Findings from Other Observation Measurement Units

In socio-economic impact phase, in-addition to households, other four units of observation have been interviewed to assess impact of electrification through REDP. These are: 1) Commercial units; 2) Industrial units; 3) Irrigation units, and 4) Social/human development units (i.e., school and health centre).

Among the 305 commercial units surveyed in impact, 218 were in experimental and 87 in control. Out of the 218 units surveyed in experimental in the impact study, only 63 units were electrified (29%).

The average distances of the sample commercial units are estimated as 1.2 km in baseline and 1.9 km in impact among the experimental group; these are estimated as 1.7 km in baseline and 1.6 km in impact, among control group. Grocery constitutes the bulk of the units, in both experimental and control group, and in both baseline and impact - 60% in baseline and 65% in impact among experimental group; and 60% in baseline and 52% in impact among control. The other types of the units surveyed are – variety store, tea stall, pharmacy, ready made garments, saloon, furniture shop, jewelry shop, cloth store, hotel/restaurant, pan-biri shop, tailoring, petrol/diesel shop, shoe store, bicycle mechanics, etc. Almost all the sample units are retail shops. While about 33% respondents in experimental noticed some sort of changes in their respective business units during 2008-2010, about 32% noticed that the changes were due to electricity. Experimental units show more use of electrical equipments (electric bulb,

TV, telephone/mobile, and electric fan) than control units. Among the experimental group, the net increase in the use of electric bulb is 79% points, which can directly be attributable to REDP. The net increase due to REDP is 28% points in the use of TV and is 10% points each in the use of telephone/mobile and electric fan. The study also revealed a net increase of 0.6 hour in the length of business hour per unit per day in the experimental group. About 52% of the respondents in experimental group reported about increased sales of any goods while another 13% reported sale of new commodities due to electricity connection. The net increase in the sales turnover due to REDP is Tk. 18,725 per unit per month. The net increase in the sales turnover after sunset is Tk. 11,700 per month per unit. The respondents perceive these benefits are due to electricity connection: 100% reported about use of light, 56% reported increased business hour, 57% reported increased sales, 47% reported about use of electric fans, 40% reported about more customers, and 18% reported increased profit. About 67% expressed that they were satisfied with electricity connection in their business units. While about 12% were very much satisfied, another 12% were neither satisfied nor dissatisfied. About 8% were not satisfied and 2% were very dissatisfied.

It is to note that in other observation measurement units- the rate of electrification is extremely low, thus the changes been found are minimal. Out of the 265 irrigation units surveyed in the experimental group, only 13 units were electrified (5%). Considering such a low level of electrification, no statistically valid conclusion can be drawn about the impact of REDP on agriculture. Out of the 13 respondents-cum-owner of the irrigation units, all respondents (100%) mentioned that electricity is less costly than diesel. About 77% reported that the machine can be operated easily, 69 % reported about less cost of irrigation, 62% reported more reliability of electricity run-units, 46% reported about more productivity under electricity operated irrigation units, and 31 % reported its more longevity. However, 23% respondents mentioned about not receiving any extra benefits from the electricity run units. About 31 % respondents reported of being very satisfied and 31% reported satisfied with electricity connection. About 23% reported that they were neither satisfied nor dissatisfied. Another 8% reported that they were not satisfied.

Field survey revealed a very low level of electrification in the industrial units - out of 186 in the experimental group only 10 units were electrified (5%). Therefore, no statistically valid conclusion could be drawn with regard to the impact of REDP on promotion and development of industry in the survey areas.

In case of social and human development institutions- out of 13 health service provider institutions only one institution has been found electrified. In this regard, the health services scenario has not been changed a great deal among those institutions over the last two years due to non-availability of electricity. Non-electrified health service providers reported that they could operate their services for longer period of time of a day and patients would stay longer time in clinic, if the institutions had electricity and fan. In this context, electrification in the respective health service provider has brought some significant changes as patients are now feeling more comfortable at staying clinic for longer period of time. After the electrification, educational institutions are now capable of offering courses like computer education. Among the three newly electrified educational institutions (out of 14 units), one institution already has initiated computer courses successfully. It has been reported that in educational institutions, students' attendance rate and attentiveness in class has been increased quite remarkable because of the availability of fan and electric light. The same sort of impact of electrification is also visible on the performance of teachers. Because of the electrification, the electrified schools are now capable of organizing cultural activities at

night. Authority of one of the electrified schools reported that provision of electrification had created opportunity for them to arrange special coaching for the examinee at night.

Lessons Learned

Electricity brings some immediate, mid-term and long term impacts to households. In last two years, an overall development took place both in the electrified and non-electrified group of people, but the extent of positive changes in number of socio-economic indicators are significantly higher among the electrified group compared to their non-electrified counterparts.

It has also been revealed that electrification through the REDP has played a noteworthy role in the lives of the households in many spheres. The study reveals that the poorer section of the society has been benefitted through REDP relatively higher than the non-poor group.

It has also been identified that though in most cases female-headed households are still in a relatively backward position than the male-headed households, in number of cases, the changes overtime among the female-headed household is somewhat higher than the male-headed households-which is particularly evident in electrified households.

An increase in income, savings, food consumption and expenditure has been observed during the study period on a targeted group where the major portions of people are poor. The net household annual income has increased, while the directly attributable to electricity household net income has also been increased.

The poverty situation has improved in last two years. It is also very interesting to observe that the poverty reduction rate is remarkably high among the electrified households than the non-electrified households.

After household electrification, addition of new household assets has been evident in experimental households. Mostly, the items which run by electricity have been added to the household asset possession basket within this time period between baseline and impact.

The landlessness scenario has also been improved in last two years to a higher extent among the electrified households than their non-electrified counterparts.

Currently, a major portion of targeted population has TV in their house, and average daily TV-watching hour has increased noticeably, which, in turn, acts as a change-agent in increasing community awareness on different issues such as national and international socio-political developments, health-hygiene, newly innovated technology that increases productivity in the agriculture sector, environment related issues etc. It is observed that the dependency on the elites and rich people for getting national, regional and local information has reduced. Access to information, thus, has increased significantly because REDP.

In spite of long load-shedding hours by the day, people are still getting some comfort due to presence of electric fans when they availed electricity compared to the period when they were not connected. It is worthy to mention that the overall health condition, especially that of elderly people and children, has improved to a certain extent.

Despite limited hours of power supply, the daily routine of household members, especially those who are related with home making, has changed to a large extent. Many of the house-keeping activities those were previously done in day time has been shifted after the sunset and being performed using the electric light. A new pattern of elongation of study hours has been observed among the school going children. At present, more children study after sunset using the electric bulb instead of kerosene fired lantern or *kupi bati* (traditional kerosene lamps). Moreover, children also enjoy the comfort of electric fans during their study hours in times when power supply is not interrupted.

The overall knowledge, attitude on crucial public health (including primary healthcare, water, sanitation, and hygiene, and others) issues and their practice have meaningfully changed due to increased access to TV mediated world of mass communication.

Similarly, the women at present are more aware of their rights in the society and are performing more proactive role in gender related issues. Their access to TV has played impressive role in attaining changes.

With all the positive impacts reported above, it is revealed that major portion of the targeted households are still ignorant of basic fees and utility charges of electricity such as membership fee, connection fee, wiring charges, tariff of per unit electricity price for residential subscribers etc that a subscriber is supposed to know. It is learnt that PBSs have taken not much initiatives for making the connection holders aware about the issues as well as roles and responsibilities of the consumers.

It has also been reported that an increase of support and cooperation from PBSs could be very useful in scaling up the impacts of electrification through REDP.

A large number of households in the rural areas cannot avail electricity connection because of their financial incapability. This fact was evident as the prime hurdle for not taking electricity connection during the baseline as well as the impact study. This finding clearly put forward the issue of providing such poor households with financial support in appropriate form. At this backdrop, the microfinance component of REDP could be instrumental for the extreme poor households. There are also some supply side hurdles which are mainly procedural or bureaucratic limitations of the PBSs in providing electricity connections. Therefore, to get best output from the microfinance component, the PBSs would also need to increase their efficiency or ease the existing complicated procedure. However, the microfinance component

should also address the livelihood vulnerabilities of the extreme poor population. If it focuses only on the financial requirement to avail electricity connection and keeps the issue of livelihood vulnerability aside, the real goal of REDP, i.e., development through electrification, cannot be achieved.

It has been reported by a major portion of the households that the shorter duration of intervention has not provided the opportunity to capture many other impacts, which would be visible after a longer period of time. It is therefore, recommended to undertake another panel study (involving the same households, methodology and instruments) on impacts of REDP mediated electrification after providing the service at least for five years.