

Study on New Social and Economic Activities after Getting Electricity Connection in the Newly Covered Area in Bangladesh

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Abstract— This study attempted to examine the role of service quality in measuring socio-economic impact after getting electricity in selected Rural Electrification Cooperatives (RECs) in Bangladesh. Empirical in nature, the study focused on the distribution of electricity to the customers of selected RECs. The survey took place in selected RECs and data were captured from 40 customers. The study revealed that the overall consumer participation in this study was 40 from 8 RECs. Overall socio-economic impact means it was 4.51 on a scale of 5.00. Standard point was 4.00. Electricity is the mother of civilization when someone gets electricity its hugely influence in economics as well as society. It impacts on revenue, education, sanitation, and empowerment. Electricity impacts on macro and micro economics in positive manner which positively contribute to society. Socioeconomics (also known as social economics) is the social science that studies how economic activity affects and is shaped by social processes. In general it analyzes how modern societies progress, stagnate, or regress because of their local or regional economy, or the global economy. Societies are divided into three groups: social, cultural and economic. It also refers to the ways that social and economic factors influence the environment.

Index Terms— This research paper mostly contain the following contents: Introduction, Literature Review, Research Design, & Methodology, Findings & Analysis and Finally Recommendation & Conclusion. That content reflects Customer (power & energy) category and their feedback, Data collection & analysis, Different testing Hypothesis, Overview of power sector in Bangladesh & also an overview of REC/REC, Socio-economic impact of rural electrification.

1 INTRODUCTION

1.1 THE CONCEPT OF SOCIO-ECONOMIC ACTIVITIES & IMPACT

1.1.1 DEFINING SOCIO-ECONOMIC ACTIVITIES & IMPACT

Socioeconomics (also known as social economics) is the social science that studies how economic activity affects and is shaped by social processes. In general it analyzes how modern societies progress, stagnate, or regress because of their local or regional economy, or the global economy. Societies are divided into three groups: social, cultural and economic. It also refers to the ways that social and economic factors influence the environment.

"Socioeconomics" is sometimes used as an umbrella term for various areas of inquiry. The term "social economics" may refer broadly to the "use of economics in the study of society". More narrowly, contemporary practice considers behavioral interactions of individuals and groups through social capital and social "markets" (not excluding, for example, sorting by marriage) and the formation of norms. It creates the relations of economics with social values.

A distinct supplemental usage describes social economics as "a discipline studying the reciprocal relationship between economic science on the one hand and social

philosophy, ethics, and human dignity on the other" toward social reconstruction and improvement[4] or as also emphasizing multidisciplinary methods from such fields as sociology, history, and science. In criticizing mainstream economics for its alleged faulty philosophical premises (for example the pursuit of self-interest) and neglect of dysfunctional economic relationships, such advocates tend to classify social economics as heterodox.

1.1.2 IMPORTANCE OF SOCIO-ECONOMIC ACTIVITIES THROUGH RURAL ELECTRIFICATION

A socio-economic impact assessment is a structured way of a showing a proposal's advantages and disadvantages for society as a whole and for various parties. ... As far as possible, the analysis includes the consequences for all participants in society and all kinds of impacts, for example: Social impacts.

Socioeconomics (also known as social economics) is the social science that studies how economic activity affects and is shaped by social processes. ... Societies are divided into three groups: social, cultural and economic. It also refers to the ways that social and economic factors influence the environment.

Socio-economic factors include occupation, education, income, wealth and where someone lives.

Socio-economic impact studies measure and monetize the economic, social, environmental and financial costs and benefits, for all stakeholders, of a project or public policy over its lifetime. Socioeconomic refers to society related economic factors. These factors relate to and influence one another. For example, Government allows to subsidy in electricity rate, consumer taking opportunity. In this way, SME and other business get opportunity to flourish.

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Key Takeaways:

- Social economics is a branch of economics—and a social science—that focuses on the relationship between social behavior and economics.
- The theories of social economics often consider factors that are outside the focus of mainstream economics, including the effect of the environment and ecology on consumption and wealth.
- Social economics may attempt to explain how a particular social group or socioeconomic class behaves within a society, including their actions as consumers.

1.2 THE CONCEPT OF SOCIO-ECONOMIC ACTIVITIES THROUGH ELECTRICITY

1.2.1 DEFINING SOCIO-ECONOMIC

Social economics is a branch of economics—and a social science—that focuses on the relationship between social behavior and economics. Social economics consists of two broad perspectives that, though opposite in their approach, can be thought of as complementary. The first, pioneered by Novelist Gary Becker, applies the basic theoretical and applied tools of neoclassical microeconomics to areas of human behavior not traditionally considered as part of economics proper, such as crime and punishment, drug abuse, marriage, and family decisions.

Socio-economic relationship through Electricity:

Electricity is the mother of civilization when someone gets electricity it's hugely influence in economics as well as society. It impacts on revenue, education, sanitation, and empowerment. Electricity impact on macro and micro economics in positive manner which positively contribute to society.

1.2.2 SOCIAL AND ECONOMIC BENEFITS OF RURAL ELECTRIFICATION

- Allow activities to occur after daylight hours, including education. In impoverished and undeveloped areas, small amounts of electricity can save large amounts of human time and labor. In the poorest areas, people carry water and fuel by hand, their food storage may be limited, and their activity is limited to daylight hours.
- Reduce isolation through telecoms.
- Improve safety with the implementation of street lighting, lit road signs.
- Improve healthcare by electrifying remote rural clinics.
- Reduces the need for candles and kerosene lamps with their inherent fire safety risks and improves indoor air quality.
- Improve productivity, through the use of electricity for irrigation, crop processing, and other activities.

1.3 RELATIONSHIP BETWEEN SOCIO-ECONOMIC IMPACT AND NEW ELECTRIFICATION

Due to the strong positive correlation between energy and economic growth, any negative shocks to energy, such as a

rise in energy prices or the impact of energy conservation policies, will have a negative impact on GDP. If there is insufficient energy relative to demand, it will lead to a fall in GDP.

Access to modern energy services is fundamental to fulfilling basic social needs, driving economic growth and fueling human development. This is because energy services have an effect on productivity, health, education, safe water and communication services.

1.4 POWER SECTOR

1.4.1 UNDERSTANDING POWER INDUSTRY

Power generation is a complex process, and delivering electricity to a household or a business firm is dependent on sophisticated distribution systems. Electricity can be produced at a nuclear, or fossil-fueled, or a hydroelectric generation station. From the generating stations, large amounts of electricity are transported on high-voltage transmission lines to local substations. Afterwards, substations convert the transmission line voltage to lower levels that are appropriate for use in local communities. Substations also control the flow of electricity and protect the lines and equipment from damage. Distribution power lines, which can be installed above ground or underground, carry between 4,000 and 25,000 volts of electricity. A transformer converts the distribution level voltage to the levels that can be used inside one's home or business (240 to 440 volts). Voltage is carefully measured to meet the customer's needs. Transformers can be mounted on poles or placed on the ground. This voltage is carried from the transformer through an underground or overhead power line—also referred to as a service drop to individual meters.

1.4.2 BRIEF SCENARIO OF POWER INDUSTRY IN BANGLADESH

Since independence in 1971, there has been only one player, known as Bangladesh Power Development Board (BPDB), in the electricity sector of Bangladesh. Reforms in the power sector started with the creation of the Bangladesh Rural Electrification Board (BREB) in 1977. However, intensive reforms took place in this sector by creating public limited companies in 1996 and onwards. In this process, a number of companies have been currently operating in the country at three different stages/levels of power supply including power generation, power transmission and power distribution. Within the area of power generation, the companies in operation are Ashuganj Power Generation Company Ltd. (APGCL), Energy Generation Company of Bangladesh (EGCB), Rural Power Company Limited (RPCL), BPDB- RPCL Power Generation Company Limited (B-R PGCL) and North West Power Generation Company (NWPGC). The only company engaged in power transmission is Power Grid Company of Bangladesh (PGCB) and for power distribution, Dhaka Electric Supply Company Ltd. (DESCO), Dhaka Power Distribution Company Ltd. (DPDC), West Zone Power Distribution Company Ltd. (WZPDC), Northern Electricity Supply Company Limited (NESCO) and Bangladesh Rural Electrification Board (BREB).

1.4.3 OVERVIEW OF BREB/PBS AND ITS ACTIVITIES

Development plans of Bangladesh has identified rural electrification as one of the major components of overall infrastructure, implementation of which, it is held, can accelerate the pace of economic growth, employment generation, alleviation of poverty and improve living standard. A well planned and organizational rural electrification program was however, not existed till 1970s. The electrification program as carried out by the Bangladesh Power Development Board (BPDB) was mainly limited to urban centers and at best to their peripheries. At that time, the Government of Bangladesh engaged two consulting firms of USA to carry out a comprehensive feasibility study on rural electrification in Bangladesh. The firms studied all related issues in depth and put forward recommendation towards a sustainable and viable rural electrification program. In addition to the new institutional framework, the study emphasized for Area Coverage and Co-operative concept. It is against this backdrop, Rural Electrification (REB) was created by the Government of Bangladesh (GOB) in late 1970's through REB ordinance Lof 1977. The Board is a statutory Government organization primarily responsible for implementing countrywide rural electrification. (Source: http://reb.brebms.com/documents/about_breb/about_REB.pdf)

BREB has 80 Rural Electrification Co-operatives(PBSs) in 61 district in Bangladesh and included 461 upazillas and 84, 800 villages which already 100% Electrified. BREB constructed 5,27,625 KM of electric lines, 1073 Number of 33/11KV Substation of capacity 13,495 MVA. System loss of FY2019-20 (80 PBSs) is 9.96%, Monthly Sales Tk 1900 Crore and Peak demand is 7000 MW. BREB has total 2,88,37,095 nos consumers.

(Ref: MIS June, 2020 & Line Construction Report June, 2020)
(Source: <http://www.reb.gov.bd/site/page/c08b56bd-c300-4d08-8ea2-c25eedffbfdb/->)

1.5 RATIONALE OF THE STUDY

The proposed study has been planned to evaluate Socio-economic impact through quality electricity in the selected Rural Electrification Cooperatives (PBSs) in Bangladesh.

1.6 SCOPE OF THE STUDY

The proposed study will focus only on the distribution of electricity to customers for capture their perception of electricity supply of PBSs and resulting Socio-economic impact.

1.7 OBJECTIVES OF THE STUDY

Following objectives have been determined to be achieved from the study:

1. To realize the socio- economic benefit through electrification in newly area of PBSs which contribute socio-economic aspects? Study also analysis customer expectation and customer perception.
2. To analysis customer satisfaction from PBS performance which contribute to Micro level.

1.8 HYPOTHESES OF THE STUDY

The following hypotheses have been developed for the purpose of testing to attain the above- mentioned objectives of the study:

1. There is no difference between the expectation and perception of customers regarding PBS's service quality.

1.9 LIMITATIONS OF THE STUDY

The limitations of the study are pin-pointed as follows:

1. The present study has examined customer economic and social change by using statistical formulas.

2.0 INTRODUCTION

The following discussion accentuates on the conceptual aspects of Socio-Economic impact through newly energized and service quality in general; and takes a look at different empirical studies in the area of Socio-Economic impact and service quality in different service settings including power sector.

2.1 SOCIO-ECONOMIC IMPACT

A socio-economic impact assessment weighs the socio-economic cost against the socio-economic benefit. As far as possible, the analysis includes the consequences for all participants in society and all kinds of impacts, for example: Social impacts (e.g. health) Economic impacts (can include effects on employment)

A distinct supplemental usage describes social economics as "a discipline studying the reciprocal relationship between economic science on the one hand and social philosophy, ethics, and human dignity on the other" toward social reconstruction and improvement or as also emphasizing multidisciplinary methods from such fields as sociology, history, and political science. In criticizing mainstream economics for its alleged faulty philosophical premises (for example the pursuit of self-interest) and neglect of dysfunctional economic relationships, such advocates tend to classify social economics as heterodox.

2.2 ELECTRIFICATION IN NEWLY COVERED AREA:

BREB is current operating 100% electrification throughout the country. Every new place is energized through PBSs. Everyday year consumer getting electricity. Electricity set up new window in economic zone. In this way, society is developing immensely.

2.3 CHANGES OCCURRED IN SOCIAL AND ECONOMIC AREA

Electricity allows us to improve food production and conservation; it means purified water and deeper wells; and better medical care. Electricity enables education, security, women empowerment. Electricity set up new window in economics which contribute to society as well.

3.0 RESEARCH CHRONOLOGY

The present research is conducted as per the following chronology. The following figure indicates research process followed in the present study:

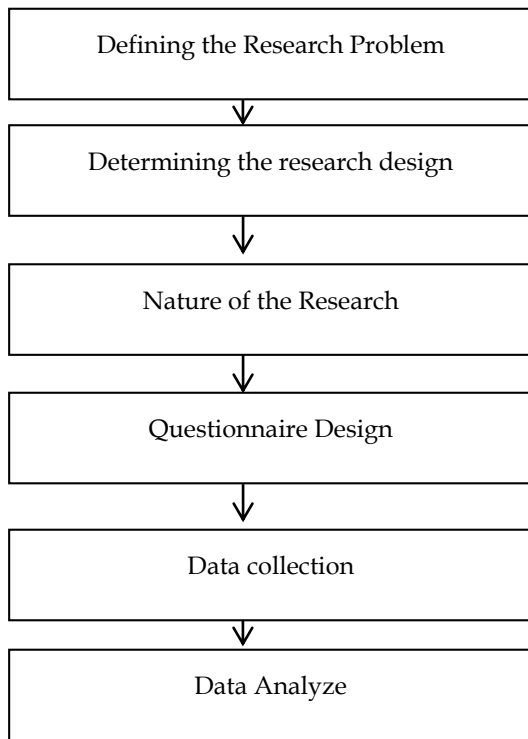


Figure: Research process

3.1 DEFINING THE RESEARCH PROBLEM

The present study carefully reviewing the literature and conducting pilot study followed by experience survey, the objectives and hypotheses of the study are finalized.

3.2 DETERMINING THE RESEARCH DESIGN

The present study has followed the survey approach since data are collected through a questionnaire.

3.3 NATURE OF THE RESEARCH

From the different aspects, the nature of the present study can be categorized as follows:

3.4 QUESTIONNAIRE DESIGN

The present study has all three features. In the beginning, descriptive study is carried out through extensive literature survey. Afterwards, nature of the power sector of Bangladesh in particular explore through secondary sources of information. Then, a formal and conclusive study is conducted to test the hypotheses to arrive at a conclusion with necessary implications.

3.4.1 PURPOSE OF STUDY

The study can be considered a study to evaluate customer satisfaction through service quality in the selected PBSs.

3.4.2 NATURE OF DATA

The present study is a qualitative study since the data captured in the study are all attitudinal as well as subjective in nature. However, necessary quantifications are made for the purpose of understanding and decision-making.

3.4.3 STRUCTURE OF THE QUESTIONNAIRE

The questionnaire has 10 questions. These questions ask to 40 consumers in 8 different PBSs to understand what impact happened after getting electricity.

3.4.4 VALIDITY OF THE QUESTIONNAIRE

The present study uses a questionnaire which is divided into two sections. First one is impact on society and second one is in economy. Finally, the content validity of the questionnaire has been approved and confirmed by a panel of experts.

3.5 DATA COLLECTION

For the current study, secondary data have been collected through extensive review of literature, websites, published and unpublished master's theses, and BREB/PBS reports and publications—have been used to collect data relevant to the research objectives. Primary data are collected by a questionnaire of 40 respondents of PBS utility services.

3.6. DATA ANALYSIS

Data collected from the sample respondents of PBS customers are analyzed on the basis of both descriptive and quantitative.

4.0 INTRODUCTION

The objective of the study is to evaluate customer satisfaction through service quality in the power sector of Bangladesh with focus on PBS services. Primarily, the analyses section highlights the demographic and personal information of the respondents and then traces the gaps in expectations and perceptions of customers regarding PBS services. In addition, the level of PBS customers' satisfaction is measured and the relationship between the customers' perception of PBS services and the level of satisfaction is investigated.

4.1 DEMOGRAPHIC AND PERSONAL INFORMATION OF THE RESPONDENTS

The demographic and personal information of the 40 respondents of PBS utility service as collected from the field survey.

4.1.1 SEX

Sex	Number of Respondents	Percentage
Male	35	95%
Female	05	05%
Total	40	100%

4.1.2 AGE

21-30 years	31-40 years	41-50 years	51-60 years	60+ years	Total
04	09	10	12	05	40
10%	22.5%	35%	20%	12.5%	100%

4.1.3 EDUCATION

Primary	SSC	HSC	Bachelor's	PG	Others	Total
07	05	11	14	02	01	40
17.5%	12.5%	27.5%	30%	10%	2.5%	100

4.1.4 OCCUPATION

Business	Service	Others	Total
18	12	10	40
40%	35%	25%	100%

4.1.5 CONSUMER CATEGORY

Domestic	Commercial	SME	Industry	Irrigation	Others	Total
13	07	02	11	03	04	40
31.5%	18.5%	05%	20.5%	12.5%	10%	100%

4.1.6 ACCOMMODATION TYPES

Own Kacha	Own/Rented Semi Paka	Own/Rented Building	Total
04	14	22	40
11%	40%	49%	100%

4.1.7 NUMBER OF YEARS RESPONDENTS RECEIVING PBS UTILITY SERVICES

1 Year	2 Years	3 Years	4 Years	5 Years & Above	Total
02	02	03	11	22	40
10%	05%	7.5%	22.5%	55%	100%

4.2 IMPACT ANALYSIS OF ELECTRIFICATION IN SOCIO-ECONOMIC FIELD BASED ON SURVEY

A field level survey was performed in 8 PBSs. About 40 consumers participated in that study. They asked 10 questions related to socio-economic field. Scoring based on scaling. Standard score was 4.00. Result is showing below:

4.2.1 EXPECTATION AND PERCEPTION OF PBS SERVICE QUALITY

SI	Statement	Very Low Expectation	Moderately Low Expectation	Low Expectation	Moderately High Expectation	High Expectation	Mean
		1	2	3	4	5	
1	How much your income increased after getting electricity line?			2	14	24	4.47
2	How much time increased of your children study time after getting electricity line?			1	15	24	4.575
3	Measure the Impact in life after using electric equipment like TV, freeze, & fan etc.			1	15	24	4.50
4	How electricity creates recreation in your life?			1	12	27	4.65
5	Are you free from panic being robbed after getting electricity line?			3	17	20	4.425
6	How electricity impact on Agriculture sector?			3	12	25	4.550
7	How much fuel cost saves after getting electricity line?			1	15	24	4.57
8	Does Electricity create opportunity on internal communication like E-mail and e-banking??				14	26	4.650
9	How much women empowerment and working hours increased after getting electricity line??			4	22	14	4.250
10	How much healthy awareness increased after getting electricity line?			1	17	22	4.525
Overall Mean							4.51

Source: Results derived from the field survey

4.2.2 GAP ANALYSIS BETWEEN PUBLIC OPINION'S RESULT AND STANDARD

Sl	Statement	Mean from survey	Standard marks	Positivity/Negativity
1	How much your income increased after getting electricity line?	4.47	4.00	+0.47
2	How much time increased of your children study time after getting electricity line?	4.575	4.00	+0.57
3	Measure the Impact in life after using electric equipment like TV, freeze & fan etc.	4.50	4.00	+0.50
4	How electricity creates recreation in your life?	4.65	4.00	+0.65
5	Are you free from panic being robbed after getting electricity line?	4.425	4.00	+0.42
6	How electricity impact on Agriculture sector?	4.550	4.00	+0.55
7	How much fuel cost saves after getting electricity line?	4.57	4.00	+0.57
8	Does Electricity create opportunity on internal communication like E- mail and e- banking??	4.650	4.00	+0.65
9	How much women empowerment and working hours increased after getting electricity line??	4.250	4.00	+0.25
10	How much healthy awareness increased after getting electricity line?	4.525	4.00	+0.52
Overall Total		4.533	4.00	.533

Source: Results derived from the field survey

4.3 TESTING OF HYPOTHESES

Objective 1: To discover how impact happened in the socio-economic field after getting electricity line in newly covered area. To achieve the first objective of the study, the following hypothesis is developed for testing purpose.

Hypothesis 1: There is no difference between the expectation and perception of PBS's service quality

	Mean	N	Std. Deviation
Socio- Economic impact after getting electricity	4.51	40	0.49

The above table shows the actual impact on socio- economic after getting electricity newly. The impact score is (M = 4.51). Standard Deviation is only 0.49. Before this research set standard was 4.00 and standard deviation was 1.00. After

interviewing 40 consumers from different geographical areas, impact score is 4.51 which far high from expectation. Based on research, it can be said new consumers seriously impact on Socio- economic field.

4.4 OVERALL SATISFACTION

The fundamental objective of the present study is to identify the Socio-economic impact through new consumers of PBSs. The following section exhibits the overall development of socio-economic condition as revealed from the study:

Standard satisfaction (mark)	Socio economic impact (Mean result)	Standard deviation	Verdict
4.00	4.51	0.49	Moderate development

The above table shows the socio-economic mean development is 4.51 on a 5-point scale, which indicates 'Moderate development' with PBS's service.

4.5 COMPARISON TABLE:

Table 14.8: Infrastructure and Facilities Available in 2019 and 2014 (No)

Institutions/Ser vices/Facilities	2019		2014		Rate of Increase (%)
	Mean	N	Mean	N	
Pre-primary school/ kindergarten	1.42	842	1.16	842	22.4
Primary school	1.42	842	1.39	842	2.2
High school	0.56	842	0.53	842	5.7
Technical institutes	0.06	842	0.03	842	100.0
College/ university colleges	0.13	842	0.11	842	18.2
Bus stop	0.22	842	0.22	842	0
Private clinics	0.27	842	0.17	842	58.8
Govt hospitals/clinics	0.24	842	0.26	842	-9.2
Health care centers	0.51	842	0.44	842	15.9
Dispensary/ pharmacie s	4.29	842	2.83	842	51.6
Market	3.28	842	2.10	842	56.2
Milk collection centers	0.54	842	0.23	842	134.8
Bank branches	0.50	842	0.37	842	35.1
NGOs/ Microfinance institutions	1.11	842	0.81	842	37.0
Police station/ service points	0.07	842	0.05	842	40.0
Post office	0.29	842	0.27	842	7.4
Internet cafe	0.39	842	0.18	842	116.7
Agri extension office	0.07	842	0.07	842	0
Rice mill	0.95	842	0.83	842	14.5
Saw mill	0.80	842	0.60	842	33.3
Mobile charging/ repairing service	1.86	842	1.13	842	64.6
Mobile money agents	9.62	842	4.19	842	129.6
Restaurants	3.37	842	2.10	842	60.5
Mosque/ temple/ church	5.53	842	4.62	842	19.7
Electricity utility office	0.10	842	0.08	842	25.0

5.0 RECOMMENDATION

- a) The rural electrification should be expedited to cover more villages and areas.
- b) The village market should be brought under rural electrification with utmost priority to provide incentives for establishing small and cottage industries.
- c) The quality of supply should be improved and load shedding should be brought under minimum levels without increasing the tariff.
- d) Local agro-based industries should be encouraged to generate more in commend employment in the country, and thereby facilitate the process of minimizing forced rural to-urban migration.
- e) In order to accelerate the process of economic growth, strengthening pro-poor orientation in growth process and to further human development in Bangladesh, access to electricity of the households and social and economic institutions should be expanded within shortest possible time.
- f) Vigorous efforts are needed to devise appropriate strategies (means and ways) to increase the coverage of the non-electrified households in the electrified villages in to the scheme of the rural electrification.
- g) Special policies and strategies should be designed and implemented to accelerate the process of poor peoples' access to electricity
- h) Analyses of numerous and diverse impacts of rural electrification provide adequate logical basis to argue that rural electrification should be given top most priority as a catalyst for ensuring accelerated human development, poverty reduction and economic growth in Bangladesh

5.1 CONCLUSION

Rural electrification in Bangladesh shows us how a cost effective electric energy supply has been changing everyday life style in about 98 percent areas of Bangladesh. It's a journey from darkness to light of conflict between desire and hope after the liberation war. Socio- economic impacts of rural electrification are multidimensional. These impacts are related to social cultural aspects of life, which include areas as education, health, women's status, modernization, economic and reflected in enhanced income and employment. Electricity saves large amount of human time and labor. It improves safety with the implementation of street lighting and healthcare by electrifying remote rural areas. It reduces the need for candles and kerosene lamps and improves indoor air quality. It also improves productivity, through the use of irrigations, crop processing, and other activities.

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