

Impacts of Solar Home Systems on Rural Livelihoods in the Southwest Coastal Region of Bangladesh

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This Research

- This presentation is prepared to share findings of my empirical research, conducted during the period of September 2016 to March 2017 under UIU Research Grant.
- My research title was: **Assessing Impacts of Solar Home Systems on Rural Livelihoods in the Southwest Coastal Region on Bangladesh**

Introduction

- Over 1.6 billion people lack access to electricity in the world. The vast majority of these people live in rural areas of developing countries.
- In Bangladesh, as of 2016, the total consumers connected to the grid are 21.8 million. Out of the 21.8 million 16 million (50%) are domestic connections (households). Another 15% of the households have access to off-grid electricity.
- The government plans to connect 98% of households mainly through grid extension by 2021 (Energypedia.info).

- Solar Home System is a basic system consists of a small solar panel, a battery, a charge controller, LED lights, and a universal outlet for charging cell other small appliances (Steve Dahlke, 2011).
- Solar home systems (SHS) are small systems designed to meet the electricity demand of a single household (Vervaart, 2000).
- Solar panel, battery, charge controller, lamps , and other accessories are the components of a complete Solar Home System.

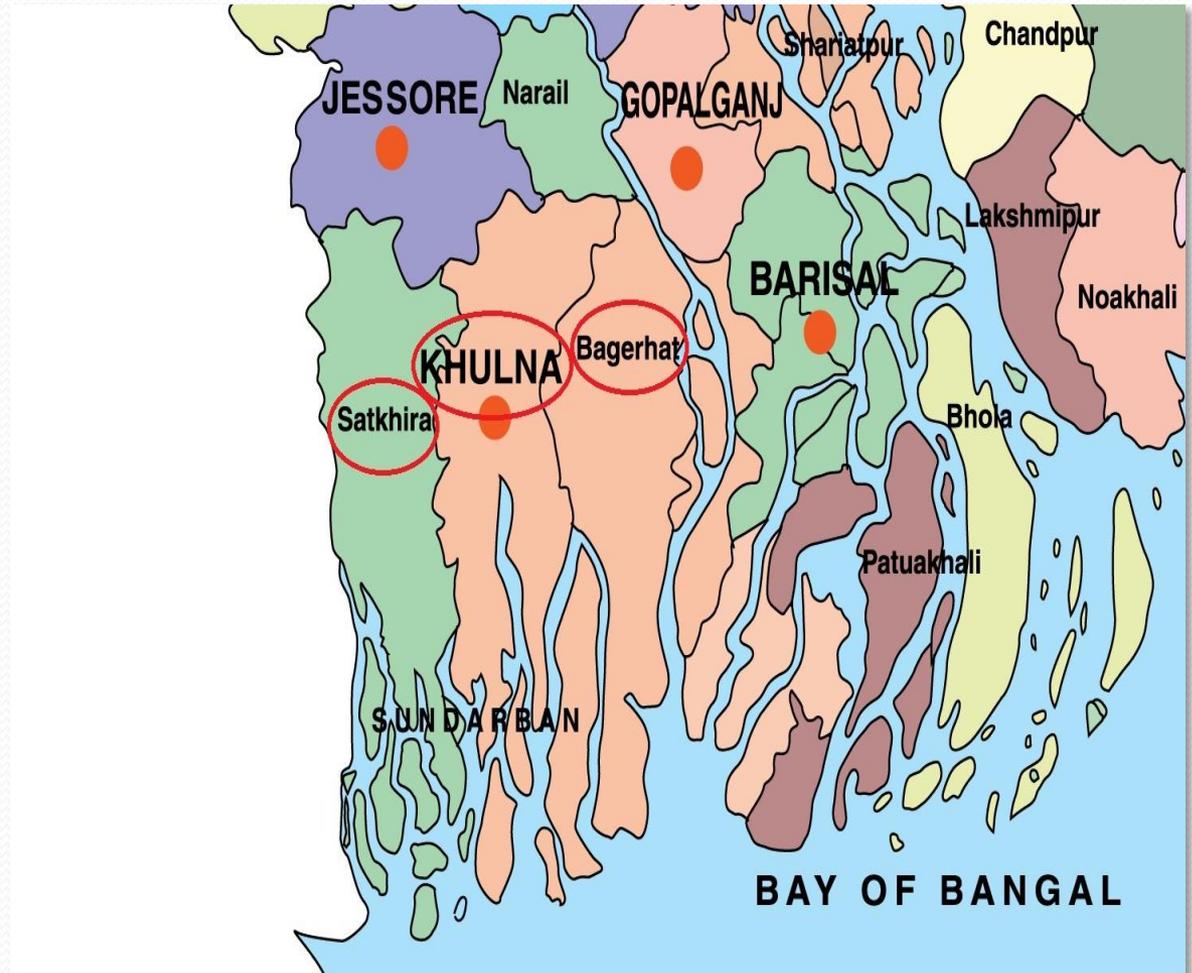
- About 4 million SHSs have already been installed under SHS program in the off-grid rural areas of Bangladesh till April 2016 (IDCOL, 2016).
- As a result, almost 18 million beneficiaries are getting solar electricity which is around 11% of the total population of Bangladesh. [IDCOL, 2016]

Objectives

- ❑ To assess the impact of SHS services on Sustainable Livelihoods
- ❑ To explore the potentialities of people's participation in sustainable operation of SHS
- ❑ To assess the effectiveness and importance of SHS services as climate change adaptation approach.

Study Area

- This research was conducted in Khulna, Bagerhat and Satkhira districts of southwest coastal region of Bangladesh.



- The occupation of the research area people are aquaculture/gher, rice cultivation, small business and fishing from both river and Sundarban.
- The average Income of the respondents: BDT 4000-8000
- The latest coverage of solar home systems are:
 - 87,518 in Khulna,
 - 77,732 in Bagerhat and
 - 98,262 in Satkhira districts [IDCOL Bangladesh, 2016].



Methodology

- Data was collected from both Primary and Secondary sources.



Primary Data

- In-depth Interview



- Questionnaire Survey



Primary Data

- In-Depth Interview:
 - 15 Respondents
 - Khulna: 1 Respondent
 - Bagerhat (Mongla): 1 Respondent
 - Satkhira: 13 Respondents
 - (Sotagram of Kaligonj: 3;
 - Munshigonj of Shayamnagar: 6 and
 - Gabura of Shyamnagar: 4



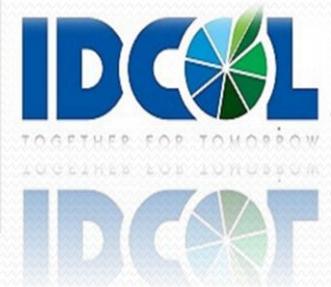
- Group Discussion: 2
- Satkhira (Gabura Union of Shyamnagar- 2) : Approx 10 Respondents in each group

- Questionnaire Survey:
120 Households
- Khulna: (Paikgacha 32;
Batiaghata 18): 50 Households
- Bagerhat (Mongla 30;
Morrelganj 10) : 40 Households
- Satkhira (Shyamnagar) :
30 Households



Secondary Data

- Website [IDCOL, BBS, World Bank, BREB]
- E-Journal Article [{Zubair, Tanvir and Hasan, 2013}; {Md. Abdulla Harun, 2015}; {Khan S.-A. & Azad A. K. M. A. M., 2014}; {Ekkehard Kürschner et al, 2009}]
- Government Reports [{BBS, 2011}, {BREB, 2016}]



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FINDINGS

Livelihood Assets

Sustainable livelihoods is a way of thinking about the objectives, scope and priorities for development, in order to enhance progress in poverty elimination. SL aims to help poor people achieve lasting improvements against the indicators of poverty that they define [Ashley, C and CARNEY, D., 1991].

I have used the DFID's Sustainable Livelihoods indicators to assess impacts of SHS on livelihoods. The livelihood framework refers to five core asset categories:

- Human Capital
- Social Capital
- Natural Capital
- Financial Capital
- Physical Capital

Human Capital

- Children of (73%) households are getting the benefit of evening study.
e.g., from 6 pm to 10 pm everyday total four hours are adding in study time by solar light.
- At the time of kerosene using students spent one and half hour to two hours daily. But most of the students were suffering from eye burning in that time.



- Household level awareness raising about health and different disease watching Television. For example- Knowing about diseases of children, water, air, virus, eye, heart, animal, diabetic, blood pressure, AIDS, cancer etc .
- Informed about better nutrition and trying to maintain in their life.



Example- BTV most of the time air health related program like *Sastho Kotha*.

- At least 20% students are continuing their study beyond high school for graduation.

Example- The students get the information about higher education from television. Interest is growing for higher education.

Social Capital

- Solar home systems increasing the scope of better livelihoods of coastal region people.
- The main benefit of solar is lighting room and it is increasing safety of the people, especially children and women.
- Women empowerment is growing in the coastal region through income generating activities by using solar energy.



- The people have a chance of entertaining by television and communicating with friends and family by using mobile.
- Solar home systems are creating access to information and making people aware through television and radio.

Example- In evening people are gathering in the local grocery shop and sharing their knowledge and information from television and mobile phone.



Natural Capital

- Fishermen are using solar for fishing from Sundarban after daylight.

Example- They are using 10 watt solar home systems in their boat.

- They also maintain their fishing work helping of solar light.

Example- They are using solar for shrimp fry collection, making net and cage in the night.

- Farmers use solar light in their crop field for safety purpose.

Example- They use solar light in the field so that thief, rats and other animals don't waste their field in dark.

- Farmers do rice husking work and threshing by solar light at the night.



Financial Capital

- Livelihoods of 36% households are depending on solar home systems and starting income generating activities at their households.

Example- The popular income generating activities are poultry farming, tailoring, grocery and tea shop keeping, computer shop, private tuition, electrician etc.

Other income generating activities are charging shops, computer learning center, TV and Radio center in the market.



- Solar home systems have economic benefit rather than kerosene and at the flow of time economically solar is more beneficial than kerosene.

Example- The monthly cost of five members of family was BDT 150 taka in five years ago. They were using 20 watt solar home system and the price of that package was BDT 12,000 taka. Already they used solar home systems in five years. If they used continuously kerosene in these years, they need one more year to balance this money. But every year the price of kerosene is increasing highly. So, at this point there need some less time to balance the money.

Physical Capital

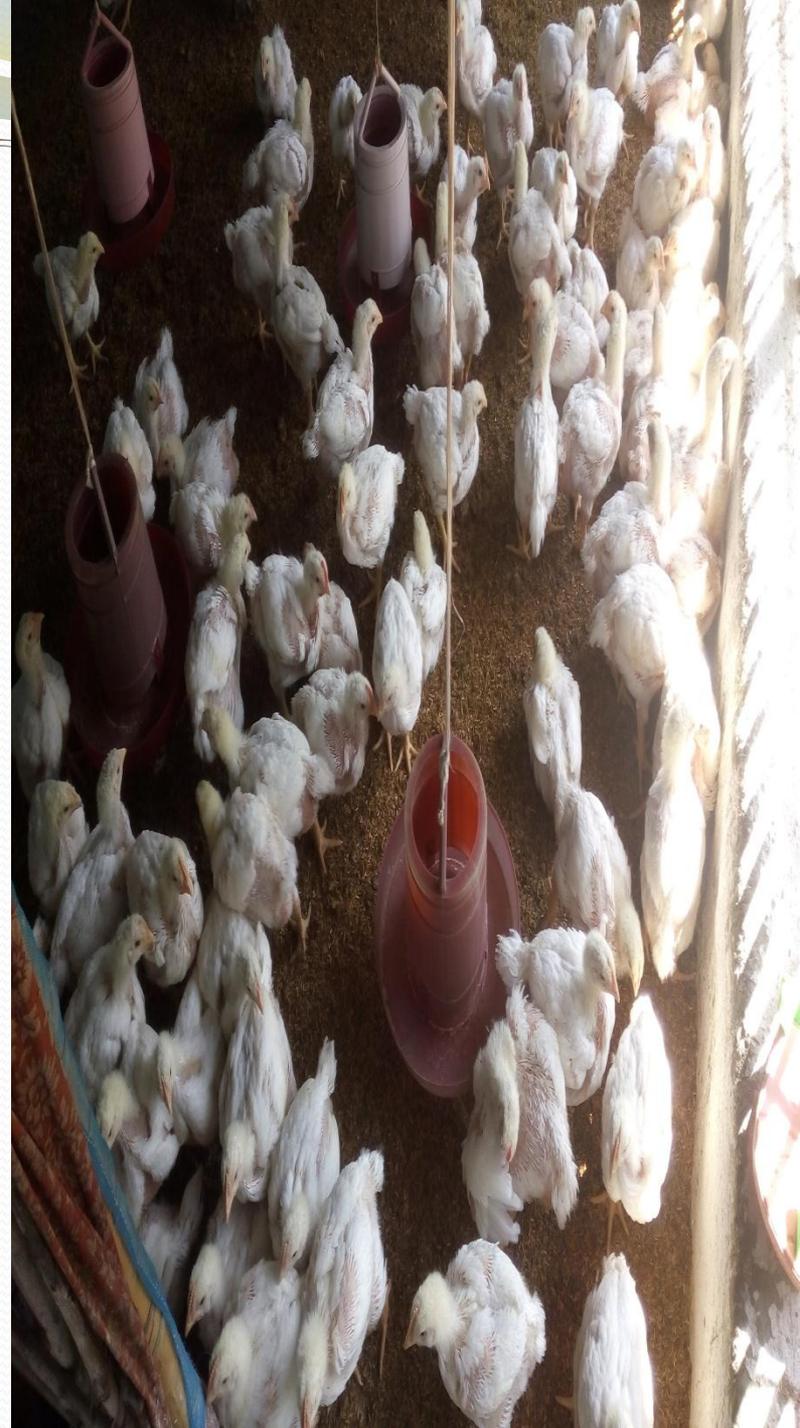
- Solar home system is helping the people of coastal region to maintain their physical capitals save.

Examples-

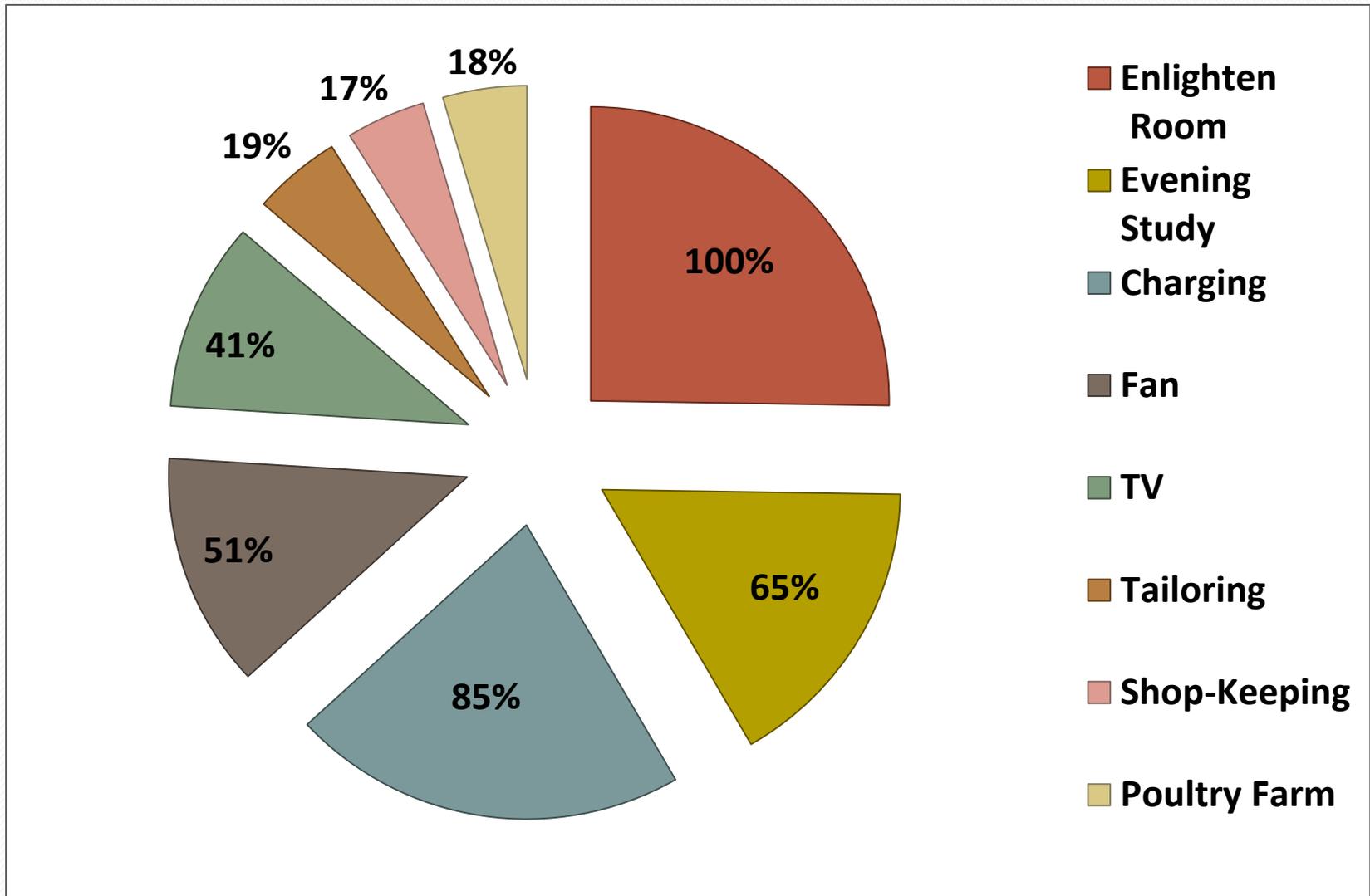
- Fishermen are repairing their net, boat and troller by using solar light after sunset.
- The carpenters are making furniture of using solar light after.
- Computer shop are running because of using solar home system.



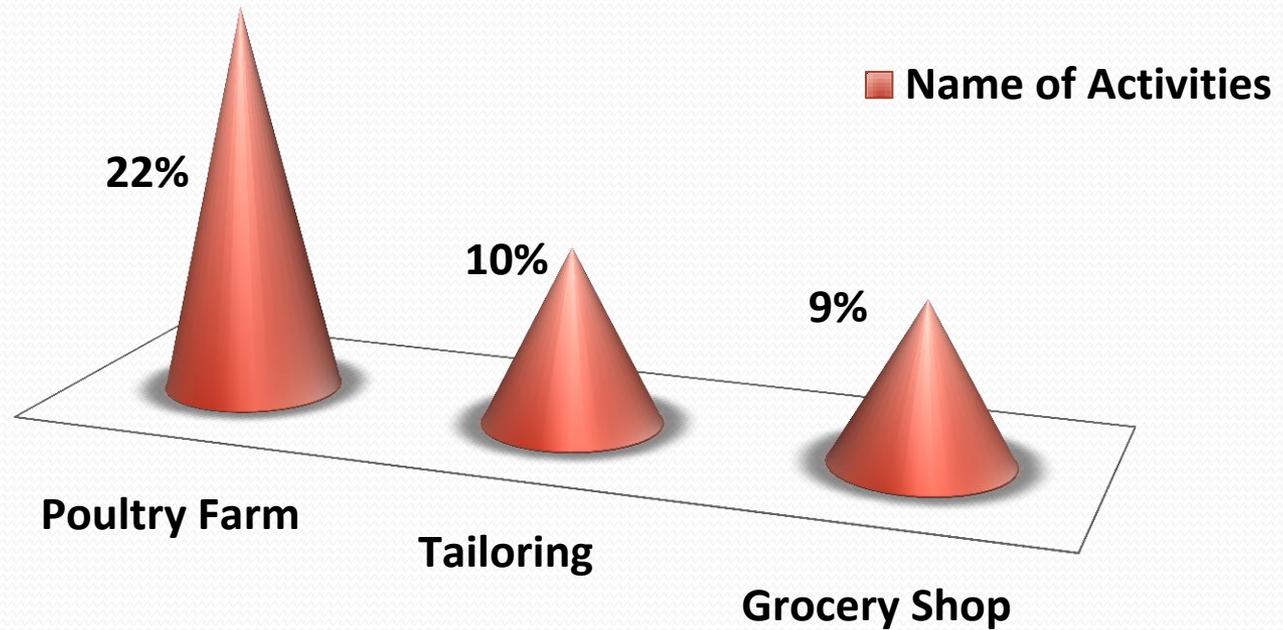
- Using solar energy the home and shops becomes lightening, clean and safe. Before using solar there is a huge chance of firing and it becomes dirty and oily.
- Television, mobile phone, fan are using through the electricity of solar home systems.
- The easy bike and motor van are charging by solar home systems.
- The pond and gher are becoming safety from the stealing by using solar light at night.
- The dairy farm and poultry farm are running well by using solar light and fan.



Uses of Solar



Possibilities



Governance of SHS

- Battery Damage
- Spoiled cell of battery
- Rotten of bulb
- Controller Damage
- Rotten bulb of controller
- Switch-board Damage
- Spoiled of wire
- Panel Damage
- Defects before warranty period



- Facilities of repair service during warranty period is poor
- Lack of facilities of repair service after warranty period.
- Lack of facilities of service center
- Less power in rainy season
- Difficult in running bulb, television and fan together
- Promises of warranty not followed
- Quality of services falling down
- Employees sell the best package to nearest people and average SHS near local customers
- Collecting interests against package money in not Transparent.

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সোলার হোম সিস্টেম প্রোগ্রাম

প্রধান কার্যালয়: আরডিএফ টাওয়ার, পুলিশ লাইন সড়ক, বরগুনা-৮৭০০।
ত্রিপুরা অফিস: আরডিএফ ভবন, শার্ভা # ১১, পোতা # ১২, রক # ৭, দিলকলচার হাউসিং সোসাইটি, আদাবর, ঢাকা-১২০০।

কিস্তি আদায় কার্ড

গ্রাহকের নাম: **শ্রীঃ হাফিজুদ্দিন তরমাহার**

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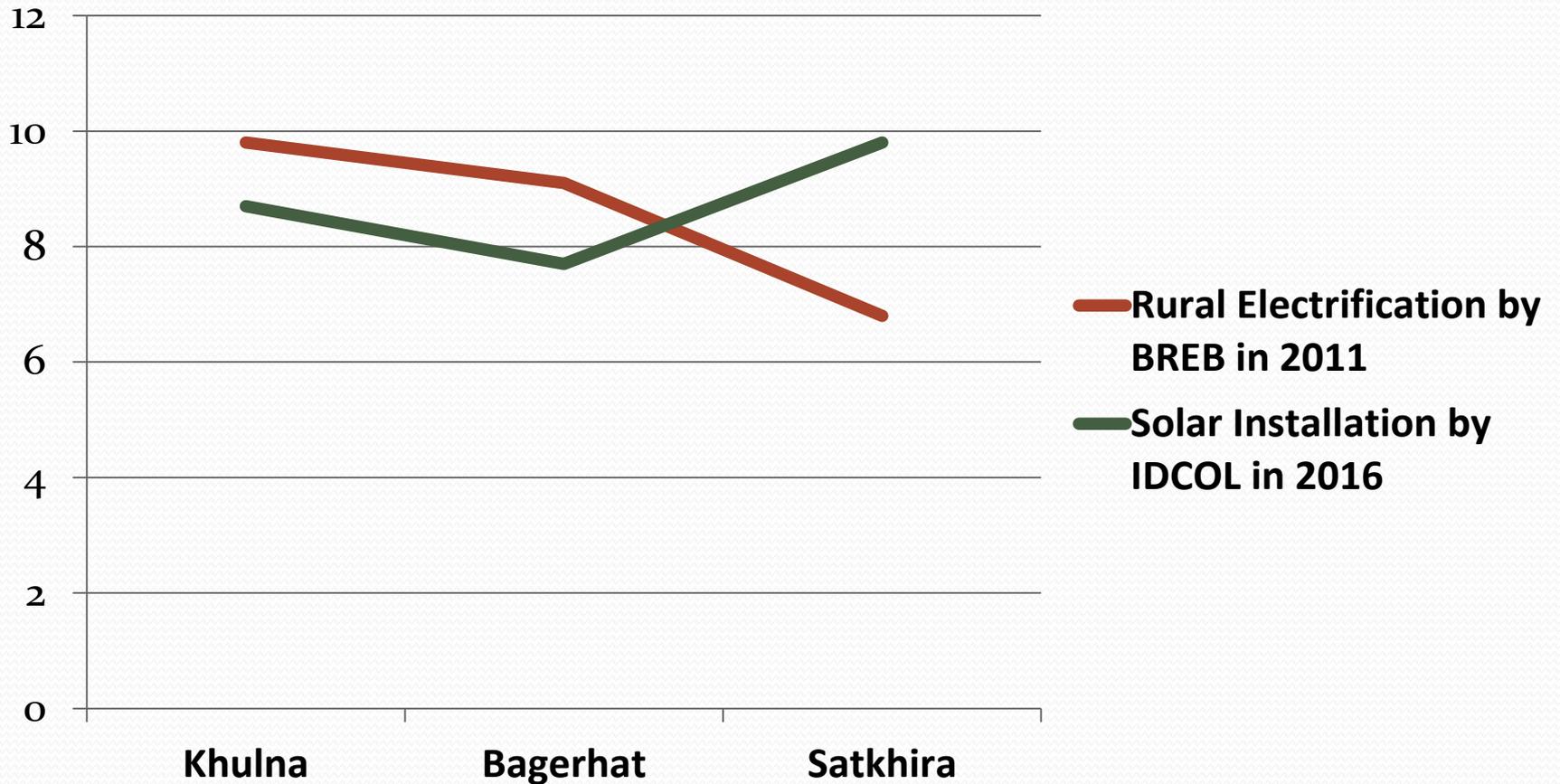
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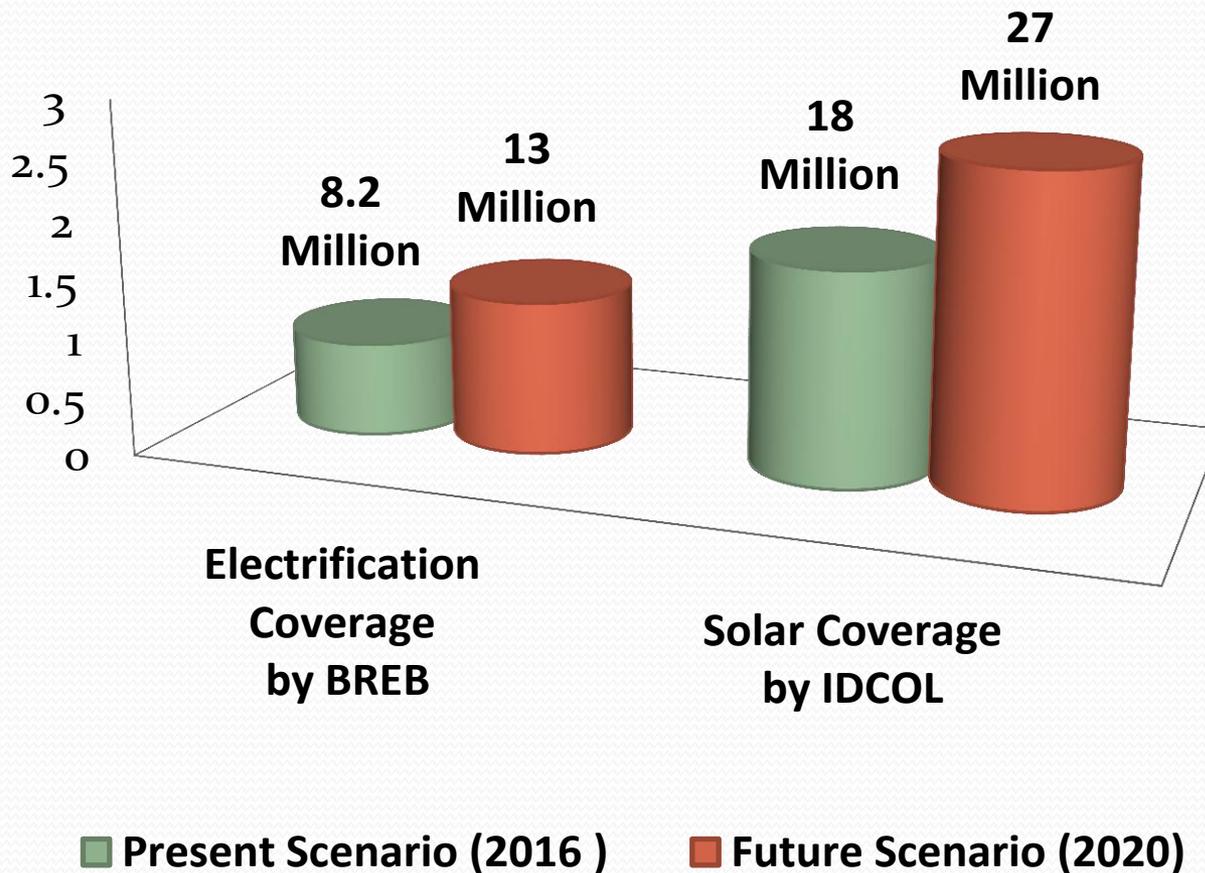
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Comparison



Comparison



Conclusion

Solar home system contributes in increasing social and physical assets of the customers.

It also contributes in increasing financial assets of the customers.

There is need and demand of using solar power for economic activities of the customers for which further study is needed.

SHS contributes in increasing resilience of climate change adaptation. Further study is required to document it explicitly.

Reference

- Bangladesh: IDCOL Solar Home Systems Project, The World Bank,
<http://documents.worldbank.org/curated/en/122961467997888816/pdf/405010PID01IDCOL1.pdf>
- https://www.researchgate.net/publication/286912705_Off-Grid_Hybrid_Energy_System_Incorporating_Renewable_Energy_The_Case_of_Remote_Coastal_Area_of_Bangladesh
- <http://idcol.org/home/solar>
- <http://203.112.218.65/WebTestApplication/userfiles/Image/District%20Statistics/Bagerhat.pdf>

- <http://203.112.218.65/WebTestApplication/userfiles/Image/District%20Statistics/Khulna.pdf>
- <http://203.112.218.65/WebTestApplication/userfiles/Image/District%20Statistics/Satkhira.pdf>
- <http://documents.worldbank.org/curated/en/122961467997888816/pdf/405010PID01IDCOL1.pdf>
- <http://dspace.bracu.ac.bd/xmlui/bitstream/handle/10361/5049/Abdullah%20Harun.pdf?sequence=1&isAllowed=y>
- <http://iafor.org/archives/journals/sustain-journal/IJSEEv1n1a2.pdf>
- <http://edoc.hu-berlin.de/series/sle/238/PDF/238.pdf>

- http://www.reb.gov.bd/documents/Power_cell/7_yrs_Achievement_31_03_2016.pdf
- http://www.reb.gov.bd/documents/breb_Achievement/7_year_achivement_29_09_2016.pdf
- <http://www.reb.gov.bd/index.php/abreb/stat>
- [https://energypedia.info/wiki/Solar_Home_Systems_\(SHS\)](https://energypedia.info/wiki/Solar_Home_Systems_(SHS))
- http://www.librarything.com/wiki/images/a/aa/Ashley_Sustainable_livelihood_lessons_learned.pdf
- <https://www.csbsju.edu/Documents/CSB%20Sustainability/Solar%20Paper.pdf>

Thank you
so much

