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IMPACTS OF SOLAR ENERGY RURAL ELECTRIFICATION IN BAYOMEN-CAMEROON

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ABSTRACT

The impacts of solar energy in Bayomen-Cameroon are enormous**,** the implementation of a concentrated solar photovoltaic system as a source of power in the Bayomen village, Centre Region of Cameroon has rapidly transformed the area. In our methodology, we used qualitative data collection and analysis. Techniques like; in-depth interviews, focus group discussions, photographs and direct observations were explored with the inhabitants of the Bayomen village to understand the effects brought about by solar energy in Bayomen. The results show improvements and significant impact on education, infrastructure, trade and commerce, entertainment, health; as a result of supply of power from solar photovoltaic power plants. The environmental advantages of the system are also worth considering. A great potential for dissemination of solar technology in non-electrified rural areas exists, however, a clear and pragmatic government policy supporting solar power utilization is needed for a sustainable development of solar technology. Consequently, the introduction of solar energy in the village has elevated its status to that of a business center in the Kon-Yambettar Subdivision. Another area of study could be done on the resistances to rural electrification through solar energy in Bayomen-Cameroon.

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INTRODUCTION

Based on the 2010 census, the population of Cameroon is 20 million, of whom 46 % live in rural areas. Many of these rural residents lacked access to modern services that can be found in the urban areas. The results of the census revealed that, out of the 13,104 localities identified in Cameroon, only 2,400 have access to electricity. About 511 localities exist without access to electricity with an average population size of above 10,000 inhabitants. In Cameroon, traditional energy sources, primarily firewood, dominate the country's energy consumption, accounting for over 60% of the total energy consumption. Electricity represents about 14% of total energy consumption. The electricity supply is mainly from hydropower and is provided by the three major hydroelectric plants that are in Edea, Song Loulou and Lagdo. The current production of hydropower, which represents only 3% of the hydropower potential remains below the country's energy needs, Ntsama (2007).

Wider coverage of the population in terms of electrification is therefore a challenge for this country. Despite the government's recognition of the crucial role of reliable energy access in enhancing human and economic development, investments in the

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energy sector have largely focused on fossil fuels and dams, rather than other renewable sources. Global Village Cameroon (GVC), a country-based NGO, has been committed to the idea that increasing investment in the renewable energy sector is a more viable option to improve the access to electricity in rural areas. With a World Bank's Lighting Africa Development Market Place award, GVC implemented in 2009-2011 a pilot mini-solar power plant project in Ngan-ha locality (Adamaoua Region of Cameroon). This paper summarizes the key lessons learned from this project and prospects for sustainable development of solar technology in Cameroon.

LITERATURE REVIEW

Impacts of Rural Electrification

In 2008, the World Bank Independent Evaluation Group published a report on the state of affairs in terms of knowledge about the impacts of electrification and noted that "the evidence remains weak for many of the claimed benefits of rural electrification". In this section, we provide a brief review of the growing body of literature, represented by the seminal papers that have been published in recent years and that are frequently cited as empirical substance to justify investments in rural electrification. One of the most influential papers is the one by Dinkelman (2011).

She examines midterm effects of electricity network roll-out on rural employment growth and particularly female labor market participation in South Africa. She observes positive effects on female labor supply in the wake of electrification. The mechanism at work, Dinkelman argues, is a shift away from cooking with wood, which releases female time from home work for market work. In addition, she expects home business activities to increase. Dinkelman does not find evidence for an increase in labor demand.

Consequently, female wages do not increase in her data. One issue with this study is that South Africa is a very particular country with post-apartheid electrification being a very particular policy intervention. Hence, transferring these findings to other settings in Sub-Sahara Africa is only possible to a limited extent. Two recent studies examine the long-term effects of electrification, both using data from India. Rud (2012) uses a 20-years-panel of Indian states, of which many receive access to the electricity network in the course of the observed period. He uses groundwater availability as predictor for network expansion (since water pumps played an important role in the green revolution) and hence as source of exogenous variation. He finds considerable positive effects of electricity access on the states' manufacturing output. Rud ascribes this result to an increase of business activities of existing firms, but also to the creation of new firms.

Van de Walle et al. (2013) examine long-run effects at both regional and household level for the Indian grid roll-out program. Using data sets from 1982 and 1999 on a study population in which the connection status increased substantially in between these two surveys, they find long-term effects on both connected households and positive spill over effects on non-connected households in connected communities. Consumption increases as well as school enrolment rates and years of schooling improve for girls. Moreover, both men and women supply more labour.

According to Van de Walle et al. (2013), men shift leisure time from daytime to evening hours and offer more regular work during daytime. Women, in contrast, offer more casual work, which might as well include unpaid domestic work. Wages do not increase significantly in their sample. Lipscomb et al. (2012) investigate the long-run effects of the expansion of the electricity network in Brazil on economic development on the county level between 1960 and 2000. Similar to Dinkelman (2011), they use an exogenous program placement instrument to identify the impacts. They find large effects on the counties' Human Development Index and average housing value as a proxy for improvements in living and working condition in a county. As the relevant mechanism behind this they identify positive effects of electricity access on employment and income as well as literacy and school enrolment.

Using household data from Nicaragua and an instrumental variables approach, Grogan et Sadanand (2012) explore rural electrification's effect on labor market participation. They find that agricultural activities decrease significantly, whereas non-farm salary work increases. In particular, women in rural areas are more likely to take up work outside their homes. Khandker et al. (2013) study a World Bank rural electrification program in Vietnam implemented between 2000 and 2005. Using a two-period household panel data set with an electrification intervention that affected parts of the sample in between the two surveys, they examine income related and educational outcomes with a fixed effects model.

They find that various income measures are positively affected: farm and non-farm income, wages, and expenditures. For both boys and girls, school enrolment and total years of schooling increase. The latter comes as a surprise given the short period the newly connected communities have been using electricity. The authors themselves emphasize the particularity of Vietnam as a very fast growing country that might bear better potentials for economic development following to electrification than others.

Khandker et al. (2012) use a large cross-sectional household survey in Bangladesh and an instrumental variables approach to study effects of electricity access on income, expenditures and investments into education. They observe a quite substantial increase in income and expenditures as well as completed schooling years for both boys and girls. Another indicator they examine is the study time of school kids at home, which is frequently, mentioned as an early indicator for investments into education triggered by electrification.

The transmission channel is the facilitation of reading after nightfall through improved lighting. In fact, they find that school boys study around 22 minutes more and girls around 12 minutes more per day. School kids' home study time is also investigated, Barron et Torero (2014), who exploit exogenous variation introduced by randomly assigned vouchers on connection fees in ElSalvador. They find an increase in total study time per day for both school boys and girls of around 10 minutes. For adults, they observe an increased engagement of males et Torero also analyse the effect of electrification on respiratory diseases. The transmission channel here is that, in the absence of electricity, most households in El Salvador use kerosene for their lighting needs, which in turn leads to emissions of soot that is harmful for the exposed people.2 In fact, in their sample the electrification treatment leads to a concentration of harmful pollutants that is 63 % lower than in the control group, which furthermore translates into a reduction of respiratory infections.

METHODS

In this work, we deployed the qualitative research methodology, which allows the researcher to capture the meanings in the lives of individuals, Lincoln et Denzin (2000:3). It shows and demonstrates the meaning in a specific socio-cultural setting, Neuman (2011: 174). A quantitative research measures attitudes, opinions, behaviours, and other defined variables and generalises results from a larger sample population as stated by Given (2000). Therefore in seeking to amplify the understanding about the impacts solar of energy in Bayomen village, we made used of qualitative techniques like Focus Group Discussion, In-depth individual interview, direct observation and photographs which permitted us to collect our data, on how solar energy has transformed the lives of users the in this cultural context.

We employed purposive sampling and snowball sampling techniques to gather data for our study. Purposive sampling was focalised, which involves choosing informants who can offer closely guarded information, because not all members of the village were able to give the required information. The aim was to include those who were knowledgeable about the village and have something to say concerning dynamics in sources of energy in the village (for at least 2 years). A total of 50 informants 29 men and 21women were involved in the study.

In-depth interviews with open questions were conducted to collect data as this was an appropriate way to find out what

people feel and think about their world at Rubin (2004). We organised one focus group discussion with informants coming from a diverse background and from the different regions of the country, made up of users and non-users of solar energy. Their voices were recorded from the interview and focus group discussions, free listing was capitalised to get their stand point on the benefits of solar energy in Bayomen. One focus group discussion was organised between the users and the non-users of solar energy, it was made up of youths as well as the old. This focus group discussion was composed of four men and four women, giving a total of eight participants. Free listing was capitalised to get their stand point on ethnography of sources of energy in the Bayomen village.

Content Analysis

The practice of data analysis simply denotes a researcher's intention to make sense out of the raw text, audio, and visual resources collected from diverse sources Creswell (2009, p.183). The voluminous data was abridged by summarizing, reconstructing, and categorizing for a cogent interpretation Miles and Huberman (1994). Qualitative content analysis approach in conjunction with the energy technology sustainability framework is employed for data analysis of this study. Content analysis according to several authors has been defined as:

1. "A method for describing the meaning of qualitative material in a systematic way" Schreier (2012, p.1).
2. "A research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" Hsieh and Shannon (2005, p.1278)
3. "Any qualitative data reduction and sense-making effort that takes a volume of qualitative material like; (interview transcripts, diaries, or documents) and attempt to identify core consistencies and meanings" Patton (2015, p.541).

"A process designed to condense raw data into categories or themes based on valid inference and interpretation" Zhang et Wildemuth (2009).

RESULTS AND DISCUSSION

The study involved the participation of 50 users and non-users of solar energy, and a thematic analysis of the data extracted from their responses revealed four main themes related to the impacts of solar energy in the Bayomen region. The identified themes were the social impacts of solar energy, cultural impacts of solar energy, and economic impacts of solar energy in Bayomen.

Presentation of Research area

Bayomen is one of the twelve villages found under Kon-Yambetta Subdivision in the Centre Region of Cameroon. It is Located somewhere around Bafia, along the national route No 4, that is the road linking Bafoussam and Yaoundé; some 75miles (120 km) North-West of Yaoundé. Bayomen is one of the villages under the Mbam-and-Inoubou division found in the Centre Region of Cameroon. It is situated at about 148km from Yaounde. Bayomen shares boundary with the following villages; to the East by Bamoko, to the South by Kon and Dii, to the West by Babetta, and finally to the North by Deuk. The surface area of Bayomen is approximately 534m. Given the complexity of the context, it may be challenging for individuals without knowledge of Cameroon to visualize the scenario. To provide a more tangible representation, a satellite image would serve as a useful tool.

Social impacts of solar energy in Bayomen

A good number of our informant confirmed that the introduction of solar energy in Bayomen has brought development and a change in their lifestyles, as this can been seen in the number of cold stores in the rise, which permit them to consume fresh products like *"folere"* , yoghurt and soft drinks.

> "Our lifestyle has changed. In fact, I can say that it has brought development in the sense that there are people that before they were not selling things like yoghurt, cold water and cool drinks even "*folere*". Before to preserved perishable items like fish was difficult, in this Bayomen. So, I can say that it has brought a change here because at first,

they were not selling them due to the lack of lack of electricity. (solar energy consumer, 67 years).

Yes, before in the evening you will see people moving around with bush lamps, but now we don't need them again to light ourselves because there is electricity from streetlights everywhere. (FGD)

"It has changed the lifestyles of the inhabitants of the Bayomen community because bars have been opened thanks to electricity. There is serious interaction and mobility of people, there is everything here. In fact we can enjoy a variety of products attributed to this solar energy that has been installed here". (none solar energy consumer, 30 years).

"We can iron our dresses before wearing them something that was very difficult to be done in the past. We are living here as if we are in the town because there is everything is found here". (FDG)

Figure 1. A cold store where fresh products like; "*folere*" yoghurt and soft drinks are sold

This interviewee added that the introduction of solar energy in their village has permitted them to be able to use some gadgets to animate and entertained themselves when need arises:

"The lifestyle has changed, you can see how the population is happy because there is electricity and people can stay in their home and carry out their activities. We can watch TV, listen to radio, and entertained ourselves with music, make calls and use fridge. (solar energy consumer ". (43 years).

"We can relax anytime we want, and all of this is due to the fact that there is electricity here. There is music playing everywhere, it is because of this solar energy that we have this animation". (FDG)

Some of interviewees are of the opinion that the introduction of solar energy in their village has stopped them from travelling to Bafia and other towns for medical attention:

"There is a change in the health sector as we now have clinics that are already functioning because of the solar energy. These clinics carry out operations, pregnancy and delivery cases are equally handled here with no problem. Medical tests are conducted in these clinics, these clinics have good equipment that can permit them to do their job well, and function on a daily basis. In the past, it was very difficult for us as we were obliged to travel to Bafia for medical consultation and attention. So, we are happy with this solar energy (solar consumer". (57 years).

"We have clinics they use electricity to operate because a clinic cannot function in the darkness. If they want to work on a patient in the night how will that be possible? In the past, patient used to go but to Bafia or Yaoundé to do consultation, operation and if possible get drugs. So, all our medical problems

are handled here". (none consumer of solar energy, 63 years).

"The inhabitants of Bayomen hardly suffer from respiratory tract infections because they have clean energy". (FDG)

"There is a big change in the health sector for example clinics, if you are working in night, and a patient is rushed in with an urgent case and there is no electricity how will you cope with the situation? They will need electricity to see well. How will you receive the person? It may be an injury that needs to be stitch. In the past they were holding touches but today there is electricity, you can work with your patient without any problem because of electricity. Also, there are some products that needed to be stored in a refrigerator which requires electricity. Before we arrived here, there were some laboratory tests that were to be conducted and there was no electricity, but today we have electricity meaning our health problems are over. I can say that things have changed so greatly". (none solar energy consumer 40years).

Furthermore, our informants affirmed that the advent of solar energy in Bayomen has done a lot in the domain of education:

"Our students are now schooling well because they have electricity from solar energy more than before. Pupils are succeeding are excelling in their end of year examinations, whereas in the past they were failing because there was no electricity. Now, pupils can study well. In the past it was very difficult for them to study during night hours because at times the kerosene will get finish from the bush lamp, and there was need to refill it which was difficult in the night. But today, pupils and students can do their assignment, read their books anytime they want whenever they come back from school". (solar energy consumer, 65 years).

Another interviewee reiterated that solar electricity has come and replaced candles and bush lamps for home lighting and that is it is facilitating education for their children:

"There is a big change in the domain of education. As I speak, we left Bafia because there was no electricity but when we arrived here, we were using but candles and bush lamps for home lighting. It was difficult for the children to learn, it was not easy for them to study but now with the coming of electricity the children are free to work without any problem, it has really help us". (solar energy consumer, 50 years).

In addition, another solar energy consumer said that:

"The light from the bulb can cover a large area making it possible for so many children to use the electricity at the same time without them necessarily been nearer it like bush lamps or candles which usually gives up eye problems". (FGD)

"There is a change at the level of education because in the past children complained that they don't have money to buy kerosene and fuel their bush lamps, but today there is electricity and they are able to study at any time. In fact there is an improvement in the results this year because children passed their FSLC in their numbers compared to the past years". (solar energy consumer, 56 years).

Contrary to the views of other informants, this individual maintains that solar energy represents a source of distraction for students, impeding their learning and academic progress. According to her perspective, the availability of solar power encourages students to spend more time outside of their homes socializing with peers, thus reducing their opportunities for focused study and academic engagement:

"In the past, when there was no electricity places were very dark especially in the night as people were afraid to go out of their homes. With electricity, students nowadays go to school and come back in the evening; they cannot sit in the homes and study or read their books in preparation for the next day classes. When they come back from school, they will be moving around from one place to another. You

will find them in drinking spots, bear parlour, snacks, and, night club at the market square. They spent all their time manipulating android phones, browsing on WhatsApp and Facebook. They will pass the whole night out of their homes and when they go to school the next day, they will be sleeping in class and when the teacher asks a question on the previous lesson they won't be able to answer because they don't have time to study given that they have electricity". (solar energy consumer, 50 years).

Also, some informant mentioned that the numerous infrastructures in Bayomen are attributed to the coming of solar energy:

"In the past there were only two bars in this village but today we have so many bars. We also have mobile money transaction like orange money and MTN money, micro finance. There is a Gander Marie, a forestry and wildlife office and Sub divisional office here to handle problems and maintain law and order. You can see that this energy has brought about development in our community". (solar energy consumer, 47 years).

"We have so many churches and some of them are using electrical appliances for worshiping like guitars, pianos and musical sets. (FGD)

As far as infrastructures are concerned, so much has been done here. Building material stores have also been established facilitating the purchase and supply of these materials to new comers who wants to construct their houses. We no longer go to Bafia for building materials". (solar energy consumer, 42 years).

This informant stressed that:

"It has made this place to be open pulling people from other areas are coming to settle here. I have some of my friends who have relocated here because of the presence of solar energy that is making them feel excited". (FGD)

Cultural impacts of solar energy in Bayomen

For a variety of reasons, economists have avoided getting too closely involved with the concept of culture and its relationship to economic development. There is a general acceptance that culture must have a role in guiding a population along a particular path, but as Landes (1998) points out, a discomfort with what a particular culture has discouraged broader public discourse. As a result of globalization "citizens are more exposed to successful behaviours elsewhere" Porter (1990 p.26). Geography and climate have access to new technologies as the key drivers of productivity and economic growth. Majority of users and non-users of solar energy agree that the culture of Bayomen has changed because of the introduction of solar energy in their village:

"The culture of Bayomen has changed because there are people we met here that were idling, but now a good number are struggling to do something to earn a living. Bayomen is a bus stop, coupled with the fact that so many people travel along this road site village they are forced to buy one thing or the other. There are some "Buyam sellams" that leave Yaoundé, Douala who come here and buy farm products. Behind you is a bag of vegetables am just coming back after selling some. That is when they harvest them, they will be kept because they are strangers that will come to the village and buy no matter the time. It has pushed many people especially the indigenes to start cultivating these vegetables". (solar energy consumer, 66 years).

This informant attested that:

"I can say that our culture has changed because the small traditional dances that usually come out and dance in the night with bush lamps are no more". (FGD)

Yes, there is a change. Whenever, so many tribes are grouped together, culture inter-play because there are people from different cultures setting here in Bayomen. You will notice here that there are Anglophones and Francophone coming from different tribes. Here there are the Etons, Beti, the Bulus and the Bamelike are also settled here. When we join with people from different ethnic groups, we share

together with these tribes. So, the culture of the Bayomen has also changed". (solar energy consumer, 38 years).

The next informant indicated that:

"The only thing that i have noticed here is that they don't pirate with bush lamp as they used to do in the past. Their culture has changed because when they come back from the farm, they move straight to the market square and relaxed there because there is electricity and the junction is equally booming". (solar energy consumer, 59 years).

"The culture of Bayomen has also changed because of the coming of solar energy with the establishment of bars, snacks, hotels and motels as people usually visit these places which has been causing marital crisis due to cheating and infidelity". (FGD)

Economic impacts of solar energy in Bayomen

Khandker et al. (2009), assess the economic impacts of rural electrification in Vietnam using panel data estimation techniques. They find that electrification leads to a twenty-five percent increase in household income, most of which comes from increases in farm income. Dinkleman (2011) evaluated grid electrification in South Africa and found positive impacts on female employment, likely due to less time spent doing housework, but found no increase in wages due to no change in labor demand. In Peru Fernandez at Dasso et al. (2015) find that electrification led to economic improvements for both men and women. After electrification, men work more hours, but are less likely to have a second job. Below are some extracts from our informants based on the economic impacts of solar energy in Bayomen:

"Ah! I can say that this solar energy has brought about so many people here. Bars have opened and increased because when a bottle of a drink like Top is conserved inside the fridge, instead of the normal 600 FCFA or 650 FCFA it become 700 FCFA and you are obliged to pay for it. So, it has increased the income of the Bayomen village. Now, there are some people here that have their fridge, when we sell our items and there are leftovers like meat, fish we will preserve in those fridges and they pay between 300-500 FCFA. This money must be paid before the items are stored to avoid perishable products from getting bad". (solar energy consumer, 27 years).

Our informant is of the opinion that:

"Bayomen has become a business center because of this solar energy, businessmen come here at daily basis and it is a big advantage for us, as they usually buy our farm products like Okra which are in high demand". (FGD)

This none solar user attested that:

People are making money through the charging of phones which usually cost 100 FCFA. Barbing shops have also been opened and multiplied. In the past, if one was to shave, he/she was supposed to travel to Bafia but now I can shave here". (FGD)

"There are also graining mills that have been operating here using electricity from solar energy, we don't use graining stones like in the past. We grain things like; "Myoundo", maize, groundnuts, pumpkin seeds, and species within few minutes. Small retail shops have been established and they have been extending their business hours late at night, instead of the normal 8:00 pm that they used to close, they are now closing at 10:00 pm or 11:00 pm". (solar energy consumer, 38 years).

Another informant emphasized that:

"On the other hand, we have businesses like restaurant, cafeteria and cyber cafe, are functioning very well with no problem." (FGD)

The introduction of solar energy in Bayomen has brought about so many businesses that couldn't have functioning here without electricity like provisional stores, bakery and other petite business like roasted fish and meat. So solar has increased the population of Bayomen

"There are so many businesses that have been established here like bakery, people have also opened provisional shops and they are functioning well. Look across the road you will see

people selling soya, in the evening there are women selling roast fish and meat, people are feeling free here. As I told you there are some guys that have come here and established their businesses are making a living out of it". (solar energy consumer, 38 years).

There are secretariat services, photocopy and printing machines here. We don't need to go to Bafia to have these services". (FGD)

"There is an increased in the circulation of money with the coming of financial money transaction agents like orange money and MTN mobile money, they have greatly boosted the economic sector of our village since people can send and receive money here with relative ease thanks to solar energy". (none solar energy consumer, 47 years).

Furthermore, this none solar user proceeded by adding that:

"Also, second hand dresses are sold here in the night with the help of street lights, we sale these dresses up to about 9:00 pm". (FGD)

"It has greatly changed the Bayomen village. We can now use blenders to blend our spices whenever we want and how we want it to be. Also, using our blender, it helps us to save money which could have been paid for if we were to use a graining mill. We are grateful for having this solar energy". (solar energy consumer, 32 years).

In addition, one of our informants accepted that solar energy has created jobs in Bayomen:

"The coming of solar energy here has created so many jobs and has also made some individuals to be entrepreneurs like wildering, salon, electricians, technicians, barbers, provisional stores, snacks just to name but a few". (FGD)

Another informant says that:

Solar energy has been alleviating poverty amongst the inhabitants of Bayomen, they don't spend much on electricity bills, we do charge peoples phones and they pay us 100FCFA. Their products don't get bad easily because of the presence of electricity and we are privilege to enjoy variety of perishable product at affordable prices. We have a steady market because the population has increased". (solar energy consumer, 50 years).

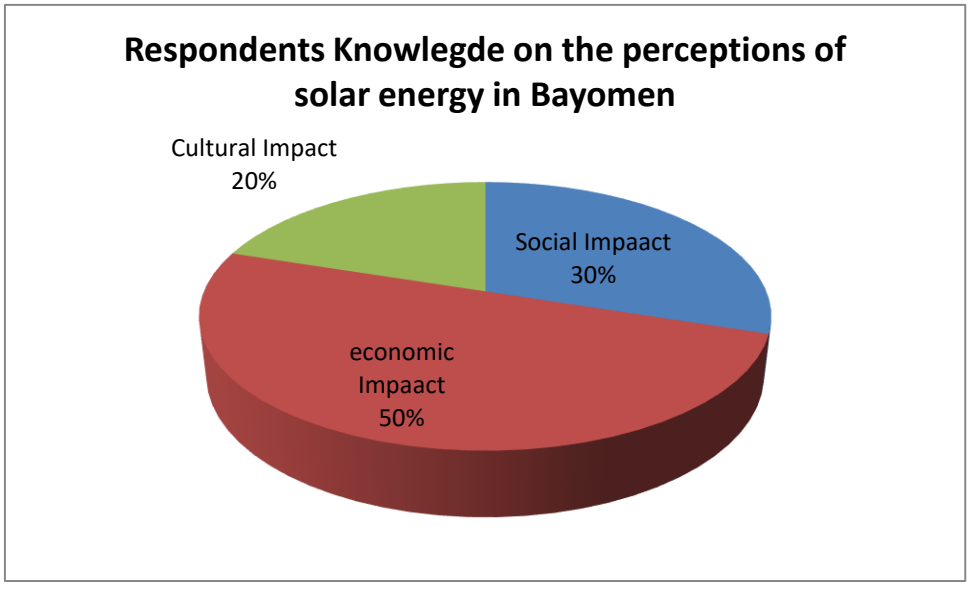

Figure 2. Percentages of Perceptions on the Impacts of Solar Energy in Bayomen

According to the responses furniture in **Figure 2** to us by the interviewees in the field, 15 of the interviewees think that the introduction of solar energy in Bayomen has greatly improved their social live contributing to 30%. That is why you can fine so many social infrastructures like; hotels, clinics and health centres, bars, snacks, churches, and

schools etc. Hence, 25 interviewees are of the opinion that the coming of solar energy has rapidly boosted the economic sector of their community. That is why you have so many businesses and commerce been established here registering 50%. Finally, 10 of the interviewees indicated that their culture is dying out because of the advent of rural electrification through solar energy in Bayomen given us 20%. A key informant told u that:

> "We don't carry out some rites and rituals that we usually perform in the night like the initiation and sacrifices of new members into the brotherhood. This was done with the help fire lights but today you have lights everywhere around the community and our streets are equally lighted making it difficult for those activities to be perform especially during night hours for fear of identification and exposure of the activities of the brotherhood". (key informan) .

Discussion

According to Barnes (2007), communities located in proximity to existing roads and district headquarters are presumed to have higher population densities and lower per household costs for the construction of infrastructure and transmission of electricity in grid electrification projects.Wealth is also a major driver of electrification, as households whose dwellings are constructed from brick and whose head is employed in a personal business or wage-earning activity are more likely to connect to the grid. Households already adopting environment, health and infrastructure technology, like improved water sources, are also more likely to connect. Solar energy has greatly impacted the lives of the inhabitants of Bayomen socially by fostering interaction and communication through social media and this is done with the help of telephones.

This source of energy has been helping some students to read and study at night with no problem, even though some are misusing it negatively. A recent systematic review of the drivers of improved cook stove adoption finds that adoption is positively related to education and income, Lewis & Pattanayak (2012). The inhabitants of Bayomen hardly suffer from respiratory infection due to clean energy unlike in the past when they were using bush lamps and candles. Their living conditions has also changed as they have electricity which permits them to iron dresses, watch TV, listen to news about what is happening in the country and around the world. There are so many infrastructures in Bayomen like schools, churches, mirco-finance, new buildings of different shapes and form. Building material stores have been established here like bars, snack, and hotels have also been opened and these people visit them either for leisure or relaxation.

The culture of Bayomen has transited in the sense that the indigenes have cultivated the spirit of hard work because the population has increased meaning a potential source of market both for the inhabitants and the visitors or passengers. Solar electricity has come and pushes the inhabitants to abandon their old sources of energy for home lighting like bush lamps, touches and fire during the night whenever they are performing rituals and rites. They have also nurtured the habit of always going to the market square every evening whenever they comes back from the farm because the place is booming and there is music everywhere with bars and snacks. There is marital crisis in many homes in Bayomen resulting from the fact that married spouse are having intimate relationships with their partners around because they are spending so much time out of their homes, making strange calls and keeping late night meetings.

Solar energy has been noted for alleviating poverty amongst its consumers. The electric bills they pay are relatively cheaper compared to eneo depending on the type of appliance they are using. So many petite businesses have surfaced in Bayomen that are using solar energy like motor mechanics, electrical repairs, hotels, micro-finance just to name but a few are helping them to earn a living. The living conditions of the Bayomen has been improved with the introduction of solar energy, graining mills are operating here and the inhabitants are graining items whatever they deems it necessary like; maize, Cassava, pumpkins

seeds, spices. Businessmen have been extending their business hours late at night and at times day dawn for some businesses like bars and snacks. Although electricity has been introduced in Bayomen in the form of solar, not everyone is using it. Another area of study could be conducted on the resistances to the use of solar energy by some indigenes of the village.

CONCLUSION

Nowadays, the momentum, dynamics and sustainability of a civilization depend on energy. Hence, a country can be considered as civilized one if it has sufficient access to energy as required for the industrial, agricultural and economic growth. The use of solar electricity in household productive work, community health clinics, schools, union-information centers and flood/cyclone center in the remote and hard to reach areas, would not only enhance quality of life and productivity in the rural areas but also contribute to more rapidly achieve the Sustainable Development Goals (SDGs).

The rural electrification through solar energy is a welcomed initiative which has been registering success. The impacts of solar energy in Bayomen are real and visible and this has made the village to gain the appellation of a business centers with businessmen coming here daily to either buy both cash and food crops. Bayomen was a village living in darkness for so many years but solar energy has gradually transformed the area with some infrastructures and facilities which prevent the inhabitants from go to Bafia for services.

There is an increased in the population of Bayomen, some of these people are coming from neighboring villages and others transferring from different regions of the country. The reason behind this population increased is because the electricity has been provided to the area and the place is virgin in terms of job opportunities.This is precisely why many individuals seek to establish themselves here, as they subscribe to the belief that where access to electricity is available, development is sure to follow.

Author's declaration

Authors' contributions and responsibilities

The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation and discussion of results. The authors read and approved the final manuscript.

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All data are available from the authors.

Competing interests

The authors declare no competing interest.

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