

**LIGHTING UP THE LAST MILE: AN IMPACT STUDY OF THE
MICRO HYDRO PROJECTS OF CPU-AREC IN THREE
MOUNTAIN SETTLEMENTS OF SAN REMIGIO,
ANTIQUE**

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ABSTRACT

This study investigated the impact of the three micro hydro projects in three respective mountain settlements of San Remigio Antique. Specifically it measured the changes in the quality of life and in several socioeconomic indicators including house structures, average income per month, sources of income, livelihood, cost of energy, and appliances, gadgets or machineries among the beneficiaries. It utilized a mixed methodology by giving a survey instrument to all 45 beneficiaries of Bunacan Micro Hydro Project, 51 beneficiaries of Culabao Micro Hydro Project and 72 beneficiaries of Maruray Micro Hydro Project, and by conducting focused group discussions in the three settlements. Using descriptive analysis of the quantitative data, findings revealed improvements in the house structures, average income per month, and in the acquisition of appliances, gadgets or machineries among the beneficiaries. There is a significant reduction in energy cost despite increase in the utilization. The cheaper cost of electricity from the micro hydro power

plant compared to the cost of using kerosene resulted to a big cut on energy expenditures among the beneficiaries while enjoying the opportunity to consume more energy. Farming is retained as the main livelihood and source of income augmented by the presence of irrigation system and farm machineries. Thematic analysis of the qualitative data yielded three main themes across the categories. The impact of the micro hydro projects into the quality of life of their beneficiaries are happiness, empowerment and the perpetration of a cultural practice called “dagyaw.”

Keywords: impact, socio-economic indicators, livelihood, beneficiaries, irrigation system, “dagyaw”

INTRODUCTION

Twenty two kilometers of winding pre-war trails from the end of the Leon- Camandag road greeted the researchers. The settlements sit near the provincial boundary of Antique and Iloilo. The terrain is harsh and punitive but the engineers and students from CPU College of Engineering have ventured to light up the homes of the settlers. Three micro hydro power plants were put up to light up the last mile of San Remigio, Antique.

Rationale and Related Literature

Why is electricity important? Electricity is a strategic infrastructure in the rise and fall of civilizations, says Andrew Pickford. In his book, *Energy Security 2.0*, Pickford said that at present electrical power systems constitute strategic infrastructure. In Rome, it was the aqueducts. In Angkor Wat it was canals. All of these classes of strategic infrastructure compress time and space as well as improve the material well-being and health of the citizens. It is this strategic infrastructure that enabled the civilizations to flourish (Pickford, 2011).

Continuity and availability of electricity can determine change of governments and cause revolutions in developed as well as undeveloped nations (Pickford, 2011).

Assessing the cumulative impacts of projects helps in ensuring the balance between economic, social, environmental and trans-generational benefits (Takyi, 2014). This was the reason why large scale development projects required Social Impact Assessment (SIA). SIA is the process of assessing or

estimating in advance, the social consequences that are likely to follow from specific policy actions or project development particularly in the context of appropriate national, state, or provincial environmental policy legislation (Burde & Vanclay 1996 as cited by Takyi, 2014).

The applicable methods and approaches of SIA guided this study. For example, the social indicators (which serve as variables) include physical, demographic and economic characteristics, income levels and cost of living, changes in land use and infrastructure development, community and institutional structures, political and social resources, individual and family, and changes in community resources were used by the researchers or at least served as reference.

Impacts can be negative or positive. In the Social Impact study conducted by Mackenzie Valley Environmental Impact Review Board in 2005, they have identified positive impacts in socio-political and economic indicators. The negative impacts identified include potential effects on the environment and culture (Mackenzie Valley Environmental Impact Review Board 2005 as cited by Takyi, 2014).

In CPU, an impact study done by Romallosa, Patricio and Java (2016), on the CPU Integrated Outreach Activities for Brgy. Ilongbukid, San Rafael, Iloilo focused only on the improvements or positive changes. But In another impact study done by the author (Pamocol, Baliguat & Robite, 2017) to the beneficiaries of Agbobolo Micro Hydro Project in Agbobolo, Ajuy, Iloilo, both the positive and negative impacts were identified.

While it was always assumed that development projects improve people's lives it cannot be ascertained unless evaluated.

Significance of the Study

The result of this study was envisioned to benefit the Department of Energy, the CPU-URC, the College of Engineering, the project beneficiaries and the future researchers. This study serves as feedback to the aforementioned implementing agencies on mitigating negative impacts in future projects of the same nature. Furthermore, it ascertained the extent of success of the project. It has expanded the baseline data so that a long-term impact study can be more inclusive in the future. Future interventions can have sound basis also.

Objectives of the Study

The objectives of the study are: a) to determine the change in the socioeconomic indicators such as house structures, average income per month, and sources of income, livelihood, cost of energy and appliances, gadgets or machineries, b) to determine the impact in the quality of life resulting from the provision of electricity among the household beneficiaries of the three Micro-Hydro Projects, and c) to determine the technical status of the three Micro- Hydro Power Plants.

Scope and Limitations

This impact study was contained in the barangays Panpanan I and Panpanan II covering the three settlements of Bun-acan, Culabao and Maruray in the

municipality of San Remigio, Province of Antique. This study does not measure the effects of the micro hydro projects. Rather it measured the relationships of the socioeconomic indicators with the project. Qualitative data however probed on the impacts in the quality of life experiences by the beneficiaries.

METHODOLOGY

This study utilized mixed methodology where survey, focused group discussion and key informant participation were used as data gathering technique. The discussions of quantitative results only described the projects' impact based on the changes in the socioeconomic indicators. Emerging themes resulting from the focused-group discussions (FGD) were arrived at using thematic analysis procedures. Discussions of FGD results were also done to support the explanation of the gathered numerical and descriptive data.

The population of this study was the total beneficiaries of the three micro hydro projects. There were forty five (45) direct household connections in Bunacan, fifty one (51) in Culabao and seventy two (72) in Maruray.

In order to gather the data the team has embarked on a one-time, three-day visit in order to conduct interviews and focused group-discussions. An official of each organization was requested to gather the quantitative data. The accomplished questionnaires were retrieved at a later time.

On the actual visit, the team, aided by community elders held an assembly where all available beneficiaries attended. There were 25 adults attending the FGD in Bunacan 12 in Culabao and 17 in Maruray. Interviews were also done with the key informants to triangulate information that came out in the focused group discussions. Ocular visits on the power plants were made as well.

Three types of data were gathered in this study, the quantitative data from the socioeconomic indicators, emergent themes describing the impacts in the quality of life among the beneficiaries and the technical evaluation report of an expert. The quantitative data were treated using frequency, percentage and mean. They were tabulated appropriately to show comparison between the recollected data (labeled before) and the present data (labeled now). The qualitative data were treated using thematic analysis procedures stipulated by Braun and Clarke (2006). The technical evaluation was prepared by the research team's expert and concurred by the team members.

Results and Discussions

There were a total of 45 household beneficiaries in Bun-acan, 51 in Culabao and 72 in Maruray. The house structures of the household beneficiaries in the three settlements were upgraded. Concrete floors have emerged and almost all have upgraded their roofs to G.I. Some have upgraded their house walls from bamboo to wood. These upgrades are indicative of positive changes in the house structures as a socioeconomic indicator.

The average monthly incomes of the beneficiaries of the three micro hydro projects have increased. Maruray and Culabao, have even doubled their monthly income compared to the time when there was no MHP yet. Across the three settlements, there is a positive change in income as a socioeconomic indicator.

Farming remained to be the main source of income among the beneficiaries of the three micro hydro projects. But new sources of income had emerged. It includes among others, the operation of rice threshers, power tillers, business including but not limited to stores, professional employment and OFW employment. The micro hydro projects brought a positive change on this particular socioeconomic indicator among the beneficiaries.

Energy cost among the beneficiaries of the three micro hydro projects significantly went down when compared to using kerosene. In Bun-acan, energy cost was reduced threefold. Culabao, despite the persistent technical problems they encountered reduced their energy cost twofold. Maruray enjoyed a more than fourfold reduction of their monthly energy cost.

With the presence of micro hydro projects, the ownership of transistor radios reduced in both Bun-acan and Culabao but the reduction of transistor radios was offset by the increase of television units, meaning people are upgrading. In Maruray, when the MMHP was installed, thirty two percent of the beneficiaries eventually bought television sets. Other acquisitions include but not limited to farm machineries, refrigerators and a lot of rechargeable lamps.

Three emerging themes described the impact in the quality of life among the beneficiaries of the three micro hydro projects: happiness, empowerment and the occurrence of the ideal group phenomenon, “dagyaw”.

The Culabao Micro Hydro Power Plant however, needs to be rehabilitated.

Conclusions

Putting up of the Micro Hydro Projects of CPU-AREC is related to positive results or improvements in their beneficiaries' socioeconomic conditions. Furthermore, the impacts in the quality of life among the beneficiaries of the three micro hydro projects are happiness, empowerment, and the occurrence of the group phenomenon, “dagyaw”. Culabao Micro Hydro Power Plant needs to be rehabilitated.

Recommendations

In the light of the findings and conclusions, the researchers recommend that the “Dagyaw” phenomena should be studied in depth as a valuable non material piece of culture. Concerned agencies must help the people of Culabao rehabilitate their Micro Hydro Power Plant.

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Table 3A. Average Monthly Incomes among the Beneficiaries of the Three Micro Hydro Projects

Source of Income	Monthly Income (Before)	Ave.	Monthly Income (Now)	Ave.
Bunacan				
Main Livelihood	P13,700.00	P304.44	P22,400.00	P509.09
Other Livelihoods	P3,200.00	P71.11	P3,500.00	P77.78
Total	P16,900.00	P375.56	P25,900.00	P575.56
Culabao				
Main Livelihood	P22,900.00	P467.35	P57,450.00	P1,172.45
Other Livelihoods	P300.00	P5.88	P1,000.00	P19.61
Total	P23,200.00	P473.47	P58,450.00	P1,192.86
Maruray				
Main Livelihood	P32,950.00	P464.08	P91,550.00	P1,271.53
Other Livelihoods	P11,250.00	P156.25	P24,150.00	P335.42
Total	P44,200.00	P622.54	P115,700.00	P1,606.94

Bunacan N=45, Culabao N=51, Maruray N=72

Table 4. Main Source of Income among the Beneficiaries of the three Micro Hydro Projects

Main Source of Income	F (Before)	%	F Now	%
Bunacan				
Farming	43	95.56	43	95.56
Other Sources				
Brgy. Tanod			3	6.67
Brgy. Kagawad			1	2.22
Mini Rice Mill			1	2.22
Day Care			1	2.22
Worker	2	4.44	2	4.44
No source				
Culabao				
Farming	51	100	51	100
Business	2	3.92	6	11.76
OFW			1	1.96
Professional			2	3.92
Others (rice Mill)			1	1.96
Maruray				
Farming	22	30.56	70	97.22
Laborer	1	1.38	1	1.39
Business			1	1.39
Other Sources				
Professional			2	2.78
(Teacher)			3	4.17
Brgy. Official			1	1.39
MAPA			1	1.39
Secretary			1	1.39
Bible Woman			1	1.39
Parent Leader				
4Ps				

Bunacan N=45, Culabao N=51, Maruray N=72

Table 6A. Comparative Energy Costs among the Beneficiaries of the three Micro Hydro Projects

Sources of Cost	Energy Cost (Before)	Ave.	Energy Cost (Now)	Ave.
Bunacan				
Monthly Bill	P3,875.00	P86.11	P1,123.00	P26.12
Other Cost	-	-	-	-
Total	P3,875.00	P86.11	P1,123.00	P26.12
Culabao				
Monthly Bill	P9,270.00	P185.40	P1,115.00	P22.76
Other Cost	P300.00	P5.88	P2,880.00	P56.47
Total	P9,570.00	P191.40	P3,995.00	P79.90
Maruray				
Monthly Bill	P3,250.00	P45.77	P1,190.00	P16.53
Other Cost	P1,950.00	P27.08	P20.00	P0.28
Total	P5,200.00	P73.24	P1,210.00	P16.81

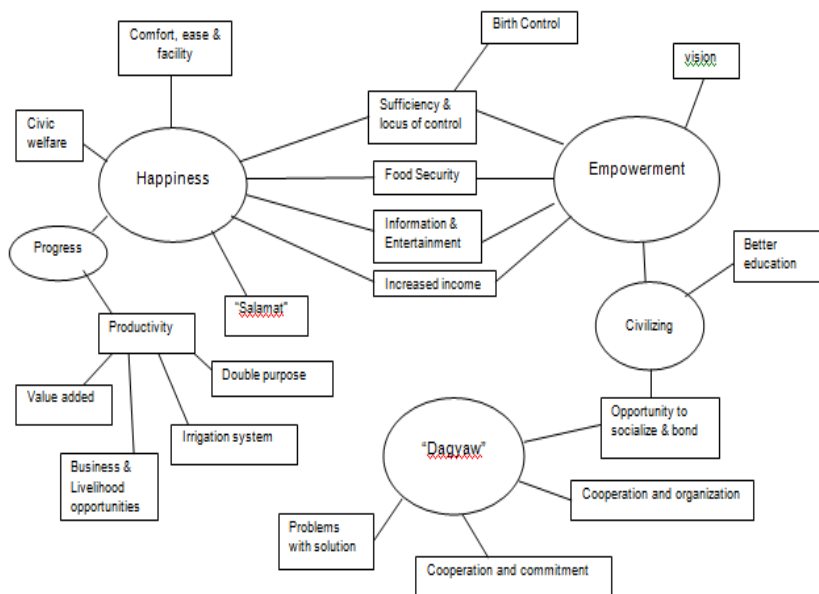


Figure 2. The Thematic Map showing the Main Themes