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Livelihood Impacts of Kulekhani Hydropower Station-II Project on Surrounding Community

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Abstract

This research article tries to analyse the livelihood impact of the Kulekhani Hydropower project for the local people. From the use of questioner survey method of the sample area population information were captured. This information had analysed through the descriptive and infernal statistical methods by the help of SPSS software for information gathering. After analysis the information through the descriptive statistics shows the positive impact of the KHS-II project for the local people. Like same, the overall statistics of the regression model result is significant in the 5% degree of freedom indicate that the project has positive economic impact for the likelihood of the surrounding community people.Theresearch concluded that KHS-II project have positive impact on the likelihood situation to the surrounding community people.

Key word : livelihood, impacts, hydropower, surrounding, community

1. Introduction

Nepal is a geographical diversified and natural buttes country. From the top of Himalayas have about 6000 rivers and rivulets heaving towards India with hug potentiality of hydropower generation. Being a small country but rich in hydropower resources Nepal bragged its first hydropower plant in a way back in 1911 considering the geographical situation in Nepal. Nepal has 83000 MW is estimated and 43000 MW of economically as well as technically feasible hydropower potential (Shrestha, 1966). While the World, even our neighboring countries, has made a rapid headway in generating power. Current this time Nepal has been able to developed only 2330.70 MWhydroelectricity power (NEA 2021). Nepal's electricity generation is controlled by hydropower through is the complete Centerior of energy use of a country. The electricity is a tiny segment, only little percentage of energy requirements is rewarded by electricity. Government of Nepal is trying hard in fulfilling the continuously increasing demand of electricity predominantly in real area.

In Nepal Pharping micro-hydro of (500KW) was the first hydro plant well-known system back in 1911. But after a long time of the first hydroelectricity project Nepal had not construct other projects. After 23 years long time two hydro plants namely sundarija l900KW (640 KW after interchanging of frequently from 50 Hz to 60 Hz) and panauti 2.4

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MWcome in to operation the demand of electricity increased manly on wards from 60s bigger hydro-power increased almost 20 times (Ghimire 2007).

After the political changes in 1990 the government of Nepal formulates the new hydropower policy 2001 and to promote the private sector investment in the area of hydropower development which aims to expand the electrification with in the country and export (www. Welcomenepal.com).Nepal's ten five year plan (2002 to 2007) aims to extend the verifications within country and export to India for mutual benefit.

Micro-hydro is an indigenous and foundation of energy for which the possible occur in the almost the Himalayan Region countries which includes Afghanistan, Bhutan, China, Myanmar, Nepal and Pakistan. MHP is commonly is express as regionalized small scale Water power plant less than 100KW.In the context of power generation up to 100kw MHP have gained massive acceptance in developing countries during the last for decades (Koirala 2017). MHP can provided electricity facilities through micro-hydro generation is a cost effective and law impact for power generation that effects a possible result for rural electrification in Nepal (parish 2002).

Low level of economic development is also revealed in the level of per capita energy consumption in Nepal. The per capital energy consumption in Nepal is 15 GJ. There is excessive inequality in the energy consumption outlook ambition and life style. When sources of energy are divided into three parts namely by traditional, commercial and renewable, volume of energy uses are not equal. Among them, traditional energy occupied 87 percent, commercial energy 11.5 percent and renewable energy o.4 percent of the total energy consumption in MOELGON (2012). In the present situation of Nepal energy plays vital role of satisfaction of capitals. It is the primary need for all is not a sustainable used connect to various method such as lighting bulbs, charging battery is burning fuel and propelling machines.

Nepal has adequate water resources to generate hydropower for domestic consumption and power trade. However, with changes in the climate and its consequent impact on snow-fed river, the design of power plant, investment requirement, and annual energy output and relative price of hydro energy will have impacts in the long term. Similarly, with increasing domestic economic, economics activities and raised living standard of the people, the estimated surplus for power export will significantly diminish in future.

Kulekhani-II Hydropower Station is cascades hydroelectricity project of Kulekhani-I reserve-wire hydroelectricity project in Nepal with installed capacity of 32 MW and annual design generation of 104.6 GWh. This project located at Bhimphedi Rural Municipality-4, Nibuwatar, Makunpur district in Bagmatiprovience of Nepal. It was commissioned in 1986 AD and developed by the financial assistance of Government of Nepal and the Overseas Economic Cooperation Fund (OECF) of Japan at the cost of NRs. 1240 million. The plant is designed and developed power utilizing the water from the tailrace of KL-I HPS, further adding the water of Mandu River and through Rapti pumping station. Rapti pumping station is operated as per requirement in dry season.

Research question and Objective

Nepal has a huge hydropower potential. Nepal has approximately 43,000 MW of economically feasible hydropower potential. However, the present situation is that Nepal has developed only 2330.70 MW of hydropower (NEA, 2021). If Nepal developed their full-capacity of hydro-power it fulfills internal energy demand easily and exports other country also. It helps to increase per-capita income of Nepal. Majority of Nepalese people live in the rural areas. However, the national electrification rate is just 39.4 percent. Huge number of population of Nepal is derived of the electrical energy. The energy plays a vital role in daily activities and the fuel woods are the major energy sources in the rural Nepal. Thus, absence of electricity implies more dependence on fuel wood and consequently has relationship with deforestation. Large hydro-project helps for electrification in rural and urban area from the hug capacity of hydro-electricity power generation then Small and Medium hydro-project.

The KHS-II also had other benefits for the local people. It can help to accelerate the local economy by the utilization of local resources. The use of electric lights over the traditional kerosene lamps has a positive health impact, especially for the women and children. Besides, it can also help to develop local human resource. Based on the above discussion, the following research questions arise: What are the economic impacts of KHS-II in the local livelihood?

The main objective of this research article is to analysis the livelihood impacts of KHS-II project on the rural people of the surrounding area.

3. Research Methodology

A number of steps were followed to accomplish the present research article.

3.1. Research Design

This paper aims to analyze the livelihood impacts to the respondents with the help of some determinant variable: impacts of electricity, impact in education, saving money, saving time and other economic activities.

The study is designed in an explorative andanalytical framework by used the descriptive and infernal statics to evaluate the livelihood impact of Kulekhani Hydro Station-II project. Both primary and secondary data were used in this research. Semi-structural questioners were used for the primary data collection. Both qualitative and quantities methods were used for data analysis.

3.2. Sample design

This study is livelihoodimpacts analysis of Kulekhani Hydro Station-II project in the rural people of the Bhimphadi Rural Municipality-4, Nibuwatar of the Makawanpurdistrict. The study is designed in an explorative, descriptive and analytical framework to evaluate the livelihood impact ofKulekhani Hydro Station-II project.

3.3.Sample Size

The total number of households of Nibuwatar of the Bhimaphadi rural Municipality is universe of this research and about 15 percent of them are selected as sample from these households by using simple random sampling technique. The size of the universe is 500 households and the sample size is 75 households. The information was taken from the sample households were inputs the using Statistical Package for Social Scientists (SPSS) Software and analysed by the used of the descriptive as well as infernal statics also applied the logistic regression model .

3.4 Model Specification

This research uses logistic regression method to analysis the livelihood impact of the Kulekhani Hydro Station-II projects surrounding communities. For this purpose followingmodel is specified: (Achia et al. 2010).

Model:

Logit (y) = $\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5$

Where,

Y is benefits from KHP, X_1 is saving expenditure, X_2 is employment, X_3 is trade/business, X_4 is harmful, and X_5 is business before KHP.

Model Fit:

Overall goodness-of-fit statistics of the model, will consider:

Pearson chi-square statistic, X^2, Likelihood ratio test

4. Data Analysis and Interpretation

4.1 Purpose of Electricity Used

Sample area people used the electricity power for the household and business purpose. At the time of data collection respondent provided information about the purpose of hydroelectricity used for their deli life express from the table 4.1 as follows:

Table 4.1: Purpose of Electricity Used

Purpose	Frequency	Percent
House-Hold	39	50.9
Business	37	49.1
Total	76	100.0

*Source:*Field Survey, 2021

Table 4.1 express the purpose of the hydroelectricity power used for the deli life at the surrounding community from the sample people provide information through the questioner survey at the time of data collection. From the table 50.9 percent household people used hydroelectricity only for their household purpose and 49.1 percent household people used hydroelectricity for their business purpose also in the surrounding community.

4.2 Different Business in the Sample Area

Those people who have used the electricity for their household purpose as well as business purpose, they have different business. The sample area of this research had not any industrial development but, local people have their small scale business and they used hydroelectricity power for their business. The table 4.2 shows the different kinds of business of the surrounding community.

Table 4.2: Different Business in the Sample Area

Items	Frequency	Percent
Hotel/Restaurants	39	50.6
Agro-Processing	16	21.8
Others	21	27.6
Total	76	100

Source: Field Survey, 2021

Table 4.2 provided the information about the surrounding community people business KHS-Respondent provide information through the questioner survey at the time of the field survey

total respondent those who had business, 50.6 percent of them had hotel/restaurant, 21.8 percent had agro-processing business and 27.6 percent had other business in the surrounding community.

4.3 Average Expenditure For Electricity Power

Surrounding community people expend the cost for the electricity power for their household consumption as well as business purpose also. With the help of the table 4.3 provided information minimum expenditure, maximum expenditure and average expenditure of the people had expressed.

Table 4.3: Average Expenditure For Electricity Power

information	Number	Minimum	Maximum	Mean	std
expenditure	76	80	6300	1153.29	1502.706

*Source:*Field Survey, 2021 & Researcher Calculation

Table 4.3 has expressed the expenditure of the surrounding community people of the KHS-III project. From the respondent provide information minimum expenditure for the electricity cost is Rs 80 and maximum expenditure for the electricity cost is Rs 6300 per household. Average expenditure of that area people for the electricity cost is 1153.29, which shows the mean value from the table 4.3. The value of the standard deviation maximum which shows the maximum different of the cost for electricity in the surrounding community. In the reality those who have business they paid maximum cost for electricity and those who used electricity for their household purpose, paid only nominal cost for electricity.

4.12. Logistic Regression Analysis

The econometric model that was fit to the data was given by

$Logit(y)=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5$

Where,

Y is benefits from KHP, X_1 is market expansion, X_2 is saving expenditure, X_3 is time for agro-processing, X_4 is negative effect from KHS-II, X_5 is trade/business. This was arrived at using a forward stepwise selection method. Result from the data had shown by the help of the following table:

Table 4.4: Variables in the Equation

	B	S.E.	Wald	D.F	sig	Exp(B)
constant	0.539	0.238	5.138	1	0.23	1.714

*Source:*Field Survey, 2021 &Researcher Calculation

Table 4.4 shows the overall result of regression model by the used the different variables. The strand error of this regression model 0.238 and overall regression model is significant in 5% degree of freedom. The constant term is 0.539 and odd ratio is 1.714.

Table 4.5: Variables Used in Equation

Variables	Score	Degree of freedom	Significant
Market Expansion	76	1	0
Saving Expenditure	12.776	1	0
Time for Agro-processing	2.617	1	0.106
Negative effect	4.17	1	0.041
Trade/business	6.51	1	0.011
Overall	76	5	0

Source:Field Survey, 2021&Researcher Calculation

(*Significant at level p<=0.05)

Table.4.5 shows the relationship between dependent and different independent variable. The table shows the significant result with benefit between market expansion, saving expenditure, negative effect and trade/businessat the 5% degree of freedom. Time for agro-processing had insignificant with benefit. Overall statistics of the regression is significant in the 5% degree of freedom. The overall significant result of statistics has shows that the KHS-II project has positive economic impact for the like hood of the surrounding community people.

5. Conclusion

Different types of hydroelectricity project are constructing and operating in this time. To construct and operate these, hydroelectricity project is beneficial for the country in the séance of state economic activities. In the context of the surrounding community people of the project area have beneficiated or not is very important. This research article tries to analysis the likelihood impacts of the cascades hydro-electricity project of the reservoir hydroelectricity project. In this researchused the sample people of KHS-II project surrounding community for the likelihood impact analysis. Both descriptive as well as infernal statistics were used for the data analysis based on the various economic indicators

of the people. Sample area people used the electricity power for the household and business purpose. Project help to start and established the local trade and business in the surrounding community, it helps to increase their income and positive likelihood impact for the surrounding community. The logistic regression shows the significant result between benefit from the project with different variables. From the different variable has positive result shows that project have positive impact with their likelihood.

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