Contribution of Ecotourism on household income: A study from Buffer zone of Shivapuri Nagarjun National Park, Nepal

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Abstract: Rural Nepalese communities are largely characterized by high levels of unemployment and deprivation, low level of skills but very rich in natural resources, so ecotourism is one of the potential sustainable land use that can help local communities' economic well-being. This study examines the total income of the household in the trials routes three villages of Shivapuri Nagarjun National Parks which are directly and indirectly benefit to local communities by the national and international visitors. Data were collected 372 with the local residents. It indicates that ecotourism offers correctly available employment opportunities. Ecotourism is seen as the practice that most contributes to improving the quality of life of people in areas with increased financial and attitudinal support. By improving economic well-being, ecotourism has a high potential effect on remote communities, so it is considered better positioned for the further growth of tourism, especially ecotourism. Promoting ecotourism in these areas would encourage more participation of local communities than other activities of the household. OLS model used for the data analysis. Total income is in the dependent variable and off farm income, on farm income, livestock income, income from the selling goods and giving services are taking as independent variables.

Keywords: Natural resources, Ecotourism, Services, Well-being, Community, Participation

Introduction

Ecotourism is the part of the tourism which bring huge benefits through the national to host communities in the form individual and groups in environmental and natural resources conservation (Walter et al., 2018; K.C.et al., 2018). In the nature reserve are conducted ecotourism activities such as bird watching, forest walks, cycling, wildlife photography and butterfly observation, reptiles and amphibians.
The concept of Ecotourism is not new for Nepal. Nepal is rich in natural beauty, cultural heritage protected areas, landscape, forest, the himalayan range and ethnic diversity. (Nepal,1995; Bhusal,2007; K.C,2016). Nepal is aiming to practice more sustainable ecotourism to solve various rooted problems of the country like poverty, social inequality, and degradation of the ecosystem (K.C et al.,2018; Aryal and Maharjan,2018; Bhatta and Dhakal,2017; Aryal et al.,2019). According to Aryal et al. (2019),60% of visitors visit the protected areas of Nepal. While developing the ecotourism in Nepal, the priority was on the conservation of biodiversity, poverty reduction and sustainable development of local business (K.C et al.,2015; K.C and Neupane, 2018; Aryal and Maharjan,2018; Regmi and Dhakal,2017). Government of Nepal has established twelve national park, six conservation areas, one wildlife reserve, one hunting reserve, thirteen buffer zone and ten ramsar sites for the promotion of the ecotourism (Heinen et al.,2019; Poudel,2016; Regmi and Dhakal,2017). Community bases tourism in protected areas and outsides protected areas is a good way to earn income for the local communities which have been living there for a long time (Batta,2017, K.C et al.,2018).

Tourists may enjoy the beauty of the landscape, walk and climb the mountains and experience the local culture and tradition (Adhikari et al.,2011; Aryal et al.,2019). Annapurna conservation areas is the best tourism trekking destination in the western part of Nepal (Baral et al.,2012; K.C et al.,2015). Ecotourism plays a particularly important role because it can create jobs in remote regions that historically have benefited less from the economic development program than have more populous areas (K.C et al.,2018; Khatiwoda et al.,2015). Even the small number of jobs may be significant in communities where populations are low and alternatives are very few(Sangpikul,2017). Travel and tourism account for 10.4% of global GDP and 9.9% of total employment generated globally in 2017(Aryal et al.,2019). In the case of Nepal, the sector contributed to 4% of total GDP, thus accounting for 3.9% of all employment (Aryal et al.,2019).

Trekking and mountaineering generate opportunities to run tea houses and lodges along with the trails that have a direct impact on livelihoods (Baral et al.,2012; K.C et al.,2018; Aryal and Maharjan, 2018). Nepal's government has also established ecotourism as a strong sector that makes a major contribution to job creation and socio-economic development (Aryal and Maharjan,2018). Ecotourism has helped to improve the relationship between local people and park staffs in the protected areas, where their relationships are not harmonies (Khatiwoda et al.,2015; Bhattacharai et al.,2017; Aryal et al.,2019). Increasing tourism activities have decreased the
dependence of local people on the forest and grassland by diversifying sources of income (Shoo and Songorwa, 2013; Bhatarrai et al., 2011; K.C et al., 2018; Aryal and Maharjan, 2018; Aryal et al., 2019). Ecotourism helps to reduce the balance of payments deficits, increase economic growth rates and increase employment opportunities, produce tax revenues and profits in the regions (Kim et al., 2019; Wondirad, 2019). Which, directly helps to uplift the livelihood of the local people too. Hence, this study was carried out to find out the economic impacts of ecotourism on the local dwellers around the national park.

**Methods and Materials**

**Study area**

Shivapuri Nagarjun National Park (SNNP) is located in the northern part of the Kathmandu Valley, 12 km from the capital city. It covers an area of Kathmandu, Sindhupalchok, Nuwakot and Dhading district of Nepal. It is located at 27°47'42" altitude and 85°23'24"E longitude (Kuwar, 2008). The park is located in a transition zone of subtropical and temperate climates. SNNP is a lonely park to represent a mid-hills ecosystem of Nepal which is famous for globally threatening wildlife, birds, and butterflies (Bower et al., 2017; Kuwar 2008; Pandey and Bhajrachrya, 2015). The park was established as watershed conservation areas management of watershed of Holy rivers Bagmati and Bishnumati. It signifies high biological and cultural diversity. Visitors can enjoy Aryan and Mongolian culture. Nagigumba, Bagdwar, Bishnudwar, Jamacho, Manichur Mahadev, Kageshwori, Sundarijal, Baudashwor, Tarkeshwor, Pacahli Bhairav are the main pilgrimage destination (Kuwar, 2008; Heinen et al., 2019). The park is also famous for hiking, camping, picnic as well as adventure tourism activities like rock climbing, canoeing, mountain biking and other sports events (Bowers et al., 2017). Mostly "Tamang" indigenous people live near to the park so visitor also visits there to see their lifestyles and culture. Park is near to the meditation center, national and international come there for the meditation (Pandey and Bajracharya, 2015). Shivapuri National Park has a higher number of visitors among the other National Parks (DNPWC, 2019; Aryal and Maharjan 2018; Aryan et al., 2019). Ecotourism has been identified as the conservation strategy of the park. This paper is set in the context of growing ecotourism activities around Shivapuri Nagarjun National Park (SNNP), located in the mid-hills of the Center Region of Nepal.
Data collections
We stratified National Park dependent communities into two groups as a closer (household situated within the short distance from the boundary of the national park) and distance (households situated far from national park) dependent groups. We targeted closer groups for this study (Gautam et al., 2019) because this community comparatively more benefited from the economic activities of the tourist in the Park. From the total, 372 households were selected who have been involving in the giving services and selling goods to the national and international tourists. Respondents who guides, translators, trek cook, porters and hotel and lodge providers are taking as the service providers and selling tea and beverages on the trial and handicrafts, nature photography, selling fruits and vegetables are taking as the selling goods. Under the supervision of the author, three qualified youths have collected data. The sample household are selected randomly based on a list of names provided by Gorkerneshwor Municipality as the sample size (i.e,95% confidence interval with 5% marginal error) by using the Taro Yamen Formula. A study by Kim et al. (2019) also used this formula to select the number of villages.

Data Analysis
We followed Ekanayake et al., (2017) to define household income as the sum of cash and subsistence income. However, the cost of family labor was not monetized. (Exchange rate in 2019 was Rs111=1USD Rupees). The econometric analysis analyzed the relationship between income from ecotourism activities and household economic characteristics. Ordinary least square (OLS) regression was used. Total income was the dependent variable while income from the Ecotourism(selling goods and services), On Farm, Off-Farm, Livestock were independent variables. Comparing the total household income is compared with the total income of the...
country. Socio-economic Characteristics of Household of involving Ecotourism activities. The total income of citizens from the studies area (TINCOME) is defined as the dependent variable on income from Activities out Farm (TIOFFARM), Activities on Farm (TIONFARM), (TILS) total income from the livestock, Selling Products to Tourists (TIFECTSP) and Ecotourism Services (TIECSTER).

The relationship can be observed in the following equation:

\[
TINCOME_t = f(TIOFFARM_t, TIONFARM_t, TILS_t, TIFECTSP_t, TIECSTER_t) \quad \text{eq. 2}
\]

Making the addition to have the total income from ecotourism activity, we can combine the variables of TIFECTSP and TIECSTER into the variable TIESSPSER (Total Income from Selling and Ecotourism Services).

The relationship can be observed in equation 2:

\[
TINCOME_t = f(TIOFFARM_t, TIONFARM_t, TILS_t, TIESSPSER_t) \quad \text{eq. 3}
\]

To discard the differences in the measurement variables, we applied the natural logarithm on both sides of equations 1 and 2.

So, the new equation 1 and 2 will be transformed into equation 3 and 4, respectively:

\[
LTINCOME_t = f(LTIOFFARM_t, LTIONFARM_t, LTILS_t, LTIFECTSP_t, LTIECSTER_t) \quad \text{eq. 4}
\]

\[
LTINCOME_t = f(LTIOFFARM_t, LTIONFARM_t, LTILS_t, LTIESSPSER_t) \quad \text{eq. 5}
\]

Results and Discussion

First Model

According to Table 1, and to Log results, the model, represented in equation 3, should be:

\[
\begin{align*}
LTINCOME & = 1.78 + 0.14 \times LTIOFFARM + 0.25 \times LTIONFARM + 0.11 \times LTILS + 0.20 \times LTIFECTSP + 0.30 \times LTIECSTER \\
\end{align*}
\]

In the case of activities out of the farm, it’s demonstrated the positive impact of that independent variable in the increase of the total income, so when a person receives 1 extra dollar from activities of the farm, the total income will increase by 0.14. Before establishing the National Park, local people used to depend on natural resources. They could not get enough food from their land so local people used to go to city areas to earn money and feed to the family. Some households have an old member of the family so every month's government gives them a pension. For the case of activities on the farm, the total income is increased when the economic retribution becomes higher, having as a result of the increase in 1 dollar, the increase in the total income by 0.25. Agriculture is the main income source for the local people. Local people usually
grow crops, rice, wheat, millet in the farming land. Near the park, they can't get as much as they expect from the farming land. At the end of harvesting time, wild animals come out from the park and damaged the crops. According to Bhatta and Dhakal(2017), because of the wild animals, there is always a misunderstanding between local communities and park staff. They cannot get enough crops from agriculture. If the wild animals managed problems, local people can grow enough crops on their farms. In the case of the variable of livestock (LTILS) when there is an increase of 1 dollar, the total income will increase by 0.11. Local people have chicken, cows, buffalos, and goats in their house. Some families sell milk and goats to the hotels. Almost all of the respondents have chicken in their house. Respondents said that they used to sell it in the festival time. Many pilgrimages visit the areas so there will be a high demand for it. Tourists who visit the farming areas, they used to buy local chicken and have a good time with their families and friends so many respondents sell it to the visitors.

The increase of selling products to Tourist or visitors by 1 dollar, increase the total income of citizens by 0.20. Respondents who involve in the ecotourism usually sell tea, beverage, natural photography, vegetables, handicraft in the ecotourism site. Respondents have said that they can have a good income from it. Every day national and international visitors visit the sites and they usually prepare to buy the local produce items for their memory of the trip. According to the Kimengsi et al., (2019), found that selling the handicrafts in the ecotourism areas have helped to earn more money which makes local women more independent and freely communicator with the visitors. Another study did by Aryal and Maharjan(2018), found that selling tea and beverages to the visitors who were climbing to the mountain also earn good money compared to the other source of income.

Finally, about the services that citizens provide as an ecotourism activity, we can conclude that when it increases by 1 dollar, the total income will increase by 0.30. As a service provider, they involve different activities. Some people have open restaurants; some are working as porter, translator, and tourist guide. Some local residents take tourists to watch for the birds because it is the best destination for bird watching. According to Li et al., (2018), studied did at Yunnan and Sichuan provinces in China found that income from ecotourism generates much higher income per capital than domestic counterparts.
Table 1. Ordinary least square (OLS) regression: Model 1.

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<td>Ltioffarm</td>
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<td>0.01</td>
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<td>0.25</td>
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<td>0.11</td>
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<td>0.20</td>
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<td>0.30</td>
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<td>Cons</td>
<td>1.78</td>
<td>0.40</td>
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<td>$R^2$</td>
<td>0.963</td>
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<td>Adj. $R^2$</td>
<td>0.959</td>
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<td>Prob. &gt; F</td>
<td>0.000</td>
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Second Model

According to Table 2, and to Log results, the model, represented in equation 4, should be:

$$\text{LTINCOME} = 1.74 + 0.18 \times \text{LTIFFARM} + 0.26 \times \text{LTIONFARM} + 0.14 \times \text{LTLILS} + 0.40 \times \text{LTESSPSER}$$

According to the result, the Total Income from Selling and Ecotourism Services (TIESSPSER) has a higher and significant impact on the total citizens’ income. Local people have involved in different such as selling natural photography, homestay, local guide, birdwatching groups, handicrafts, teashop, transportation, local agriculture products, translators, porters. On respondents go to the trial routes of SNNP sell the beverages to the visitors, Some household sell the local fruits, vegetable to the tourists. Visitors like to taste the local produce goods which are natural and hygienic. It becomes a daily routine for the local communities to go there and sell their products which makes them aware and protect the natural resources and animals. When it increases in 1 dollar, the total income will increase by 0.40. According to Wondirad (2019), found that ecotourism has shown noteworthy economic impact in the lives of services providers and others involved in ecotourism of four study villages of Sikkim. The ecotourism benefits can be seen in the form of lifestyle changes wherein, people were able to afford various like automobiles, avail cable TV services. Another study did by Hunt et al., (2014), at Cota's
Rica's Osa Peninsula found ecotourism offers the best job opportunities currently available, twice as much as other livelihoods.

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<th><strong>Table 2. Ordinary least square (OLS) regression: Model-2</strong></th>
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**Conclusion**

From the above study, it can be said that ecotourism has contributed positively to the economic impact on the lives of local communities directly or indirectly involved in ecotourism activities for providing various services. Though traditional occupations like agriculture, livestock, off-farm etc. had been the source of income earlier and even now, however, ecotourism has become an additional but important environmental friendly source of income for local communities. Ecotourism is a high-value economic activity in the SNNP. It is seen as providing healthier, better-paid jobs and development opportunities than other economic initiatives. It also contributes to improvements in local perceptions towards positive views of Shivapuri Nagarjun national park and other protected areas. Due to the wild animals, local people always have complained about the National Park but ecotourism has made harmonious relationships between them. Other effects include its positive impacts on livelihoods in general, social welfare, skill development, empowerment of women and communities. Local residents who have involved in ecotourism activities have the ability to invest in assets and human capital provides opportunities to cope with future vulnerability and the adoption of more efficient livelihood strategies. With the help of ecotourism activities, family members have sent their children to a good school. The local people would depend less on forest resources and also helps to make a good relationship...
between the park and local communities. Moreover, the attitude of the local community towards ecotourism development at SNNP was positive in the sense that most locals supported its initiatives. The attitudes of the community towards any form of tourism have an impact on its eventual development.

**Acknowledgments**
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**Disclosure statement**
No potential interest conflict was reported by the authors.

**References**


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