Impact of Nature-based Tourism on Local Livelihoods: Evidence from Keenjhar Lake in Pakistan

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Abstract

Keenjhar lake is one of the most important freshwater lake of Pakistan. The lake has a vital wetland area of great ecological significance and has been recognized as a wetland of international importance under Ramsar Convention. The lake provides numerous goods and services including recreational services for tourists. The main objective of this study is to investigate the contribution of tourism at Keenjhar lake towards the livelihood of local people living in the adjoining areas of the lake. For this study, primary data were collected from 264 households selected by stratified random sampling method. This study applies endogenous dummy variable model to evaluate the impact of households' participation in tourism related work on their earnings. Results show that the households who participate in the tourism related work enjoy 7.6 percent higher level of earnings relative to the conditions they would have been in had there been no tourism activities. Furthermore, households' productive assets provide 20 percent annual rate of return and are an important source of their earnings and livelihood. Education level of earning members also increases the earnings of the household. This study finds that tourism at Keenjhar lake improves the standard of living of local people by raising their earnings, and that the nature-based tourism can be an effective poverty alleviation strategy. The promotion of tourism will not only provide the earning opportunities for poor local people but it will also raise the revenue from the entrance fee, which can be used for conservation and management of the lake.

1. Introduction

Nature-based tourism is the fastest growing part of tourism (Kuenzi and McNeely, 2008). Wetlands areas including lakes are an important source of nature-based tourism as tourists like their scenic views and enjoy doing different activities including swimming, canoeing, swimming, diving and learning about nature (van der Duim and Henkens, 2007). Wetlands are amongst the most important ecosystems on Earth and provide numerous goods and services including recreational services (Mitsch and Gosselink, 2007). Increasing demand for nature-based tourism has raised the importance of wetlands due to their recreational services.

In the developing countries, millions of people depend on wetlands for their livelihoods. However, due to population growth and lack of alternative livelihood resources, wetlands have been threatened due to over-exploitation of their resources, which, in turn, would affect the livelihood of poor people and lead to increased poverty. In order to break this vicious circle,

tourism has increasingly been considered as a possible solution (van der Duim and Henkens, 2007). Pro-poor tourism can be best strategy for both poverty alleviation and wetland conservation (Ashley et al., 2001). According to United Nations World Tourism Organization (UNWTO, 2011) there are many ways by which the poor can get economic benefits from tourism such as by getting employment, supplying of goods and services to tourism enterprises, direct sales of goods and services to tourists, revenue generation, voluntary support and investment in infrastructure. Poor households have surplus labor that is well suited to tourism activities. Measures can be taken to increase the level of employment of poor people within all kinds of tourism related activities and enterprises including hotels, resorts, transport companies and tourism services.

Keenjhar lake is one of the largest natural freshwater lake of Pakistan. Keenjhar Lake, also known as Kalri Lake, is located in Thatta district. It is 24 km long and 6 km wide and has an area of 14,000 haectares (WWF-Pakistan, 2007). The lake has a vital wetland area of great ecological significance and provides habitat for internationally important water birds. Due to its ecological functions and economic, cultural, scientific and recreational value, the lake has been declared as one of the Ramsar sites recognized as the wetlands of international importance under Ramsar Convention in 1971. The lake has also been declared as wildlife sanctuary under Sindh Wildlife Protection Ordinance, 1972. The lake is located 122 km from Karachi city and 19 km from Thatta city in Sindh province. The lake has great scenic beauty and attracts national and international tourists. In the year 2010, the official annual visitor count at Keenjhar lake was 385,000. Tourists pay an entrance fee varying between 2 Pakistan Rupees (Rs.) for students and children under five years and Rs. 5 for every adult (and additionally Rs. 5 for a scooter and Rs. 20 for a bus). The revenues from entrance fees are US$ 38,000 (Pakistan, 2009). With proper sustainable management of the recreational facilities at Keenjhar Lake, the number of tourists could be increased and the tourism could become an even more important source of revenues for lake conservation and improvement of the livelihoods of the poor living around the lake.

According to WWF-Pakistan (2007), about 50,000 people from surrounding villages depend on the lake for their livelihood, especially on fishing and tourism. Most of the local people who depend on this lake for their livelihoods are landless and earn marginal incomes for their families. Keenjhar lake and its aquatic ecosystem are seriously threatened by over-exploitation, pollution, and poor management of the lake. Due to illegal fishing, improper fishing methods, and poor management, the fish stock in Keenjhar Lake is depleting and fishing cannot sustain livelihood of poor people due to reduced catch rates (WWF-Pakistan, 2007). Thus, these poor people need alternative earning opportunities.

Keenjhar lake has a great potential for nature-based tourism, largely because of its location near Karachi, the most populated city of Pakistan with population over 13 million and among top ten mega-cities of the world (Government of Pakistan, 2010). Tourism can potentially be an effective strategy that can provide income generating opportunities for local poor people and generate revenue for wetland management and conservation. Thus, for effective sustainable planning and policy making, there is need to evaluate the contribution of tourism on livelihood of local people. Knowing the economic value of this contribution provides an important indicator of the social desirability of maintaining and further improving the site (Carrier and Macleod, 2005). Previous studies on contribution of Keenjhar lake have focused on the valuation of various goods

and services, especially recreational services (e.g., Mangan *et al*., 2013; Dehlavi and Adil, 2011, Amjad and Kidwai, 2003). Although these studies have highlighted the importance of tourism by providing recreational value of Keenjhar lake, there is a lack of information on the contribution of tourism towards the livelihood of local people who live in the adjoining areas of the lake and participate in the tourism related work.

The main objective of this study is to investigate the contribution of tourism at Keenjhar lake to local livelihoods. This study attempts to answer the question, do the households who participate in the tourism realted work enjoy higher levels of welfare relative to the conditions they would have been in had there been no tourism activities? This study uses econometric model with endogenous dummy variable to investigate the impact of tourism participation on the household earnings of local people. In the econometric modeling, we account for self selectivity of household's decision whether to participate or not in tourism activities. To our knowledge, this is the first application of endogenous dummy variable model to estimate the impact of nature-based tourism on local livelihoods in Pakistan.

The remainder of this paper is organized as follows. The next section presents a brief literature review. Section 3 specifies the model of this study and estimation methods. Section 4 describes the data used in the study. Section 5 presents the empirical results of the study. Finally, Section 6 draws conclusions and offers their policy implication.

2. Literature Review

Poverty has been one of the most complex social problems challenges facing the world today. A review of literature indicates that poverty and wetland degradation are interlinked (van der Duim and Henkens, 2007; Goodwin, 2006; Jamieson *et al.,* 2004; Holland *et al*., 2003; Ashley *et al.,* 2001; Bennett *et al*., 1999). There are many strategies that can be followed for poverty reduction and to improve wetland management and conservation. Tourism can potentially be one of the most important strategies that can provide income generating opportunities for local poor people and can generate revenue for wetland management and conservation. This section provides a brief review of previous studies on the contribution of nature-based tourism towards local livelihoods.

Bennett *et al*. (1999) highlighted the importance of tourism as a tool for ensuring minimum environmental damage (green tourism), conservation of resources through community-based tourism, and enhancing welfare and wellbeing of poor people, as tourism generates employment opportunities, especially for the poor.

Guha and Ghosh (2007) examined the contribution of tourism in providing livelihood of the local people in Indian Sundarbans. In this study, household expenditure was compared between tourism participants and non-participants using regression analysis in order to control for other factors. The results of their study showed that the households who participate in tourism activities were found to spend 19 percent more on food items per capita and 38 percent more on non food items per capita as compared to non-participants households.

Leon (2007) evaluated the impact of tourism on rural livelihoods of the Dominican Republic's costal areas. This study conducted survey in 23 coastal communities covering a range of tourism levels and types and followed the Dominican Republic's Central Bank's methodology to estimate household income. This study used household income as a measure of the standard of living. Results of this study also highlighted that tourism play a very important role in improving the standard of living of people involved in tourism related income generating activities.

Bandyopadhyay and Tembo (2010) in their study on "Household consumption and natural resource management around National Parks in Zambia" investigated the impact of community-based wildlife management and participation in related community institutions on household welfare. They used household and community level survey data from Game Management Areas (GMAs) and other areas near national parks (non-GMAs) and employed Maddala's treatment regression techniques. Their study found significant welfare gains, measured as consumption per capita, in some GMAs but these gains were unevenly distributed. The welfare gains accrued mainly to the relatively well off, while the poor did not gain. Bandyopadhyay *et al*. (2004) evaluated the benefits of community conservancies in Namibia based on a survey covering seven conservancies and 1192 households. They divide their study in two parts i.e. evaluation of conservancy impact and evaluation of economic impact of participation in conservancies. They used multivariate analysis method to evaluate the impact of household participation in conservancies. They found a positive impact of conservancies on standard of living of local poor people.

3. Model and Estimation Methods

Keenjhar lake is an important source of livelihood for the poor people living in the adjoining areas of the lake. There are 12 large and 20 small villages around the lake. About 50,000 people from these surrounding villages depend on the lake for their livelihood (WWF-Pakistan, 2007). Majority of people depend on fishing for their livelihood. Other professions of these local people include tourism services, agriculture labor, farming, livestock rearing, stone mining, shop-keeping, business, mat making, transport, teaching, government service, tailoring and nursing.

Local people working in tourism at Keenjhar lake are involved in different income generating activities and provide services such as boating, huts for resting, vending services, swimming dresses, and tour guides. Local people also work on part-time basis on the restaurants and furnished huts established by the Sindh Tourism Department. Households working in tourism at Keenjhar lake do not entirely depend on tourism-based earnings due to seasonal variation in tourism activities. Annual visitor count at Keenjhar lake is 385,000. During the peak season of summer from May to August, more than 15,000 tourists visit the lake weekly. During the off-peak season of winter from October to January, the number of tourists decline significantly and reach up to 50 tourists per week during very cold days.

Households living in the adjoining areas of Keenjhar lake make a choice whether or not to participate in the tourism related work. This study examines the impact of tourism on the income of households who participate in tourism related work.

This section specifies the model and estimation methods to measure the impact of tourism on the income of households who participate in tourism related work. We first specify a model where participation in tourism related work is assumed to be an exogenous variable. Next we relax this assumption because it is the household's choice whether to participate in the tourism related work or involve in other income generating activities. We then specify an endogenous dummy variable model, where participation in tourism related work is assumed to be endogenous variable.

An early work on self-selection of professions is discussed in Roy (1951) who studied the problem of individual's choice between two professions, hunting and fishing, based on their productivity (earnings) in each. The issue of self-selectivity has also been addressed in the studies on the behavior of females' labor supply in Gronau (1974) and Heckman (1974).

Endogenous dummy variable model used in the present study has been used in a variety of application. This model has been used for evaluating the impact of participating in natural resource management in Game Management Areas in Zambia on the household welfare (Bandyopadhyay and Tembo, 2010). This model has also been applied for measurement of treatment effects and program effectiveness when there are cross-sectional data. The model presented in this section is based on the conceptual framework for evaluating treatment effects as given in Greene (2012, p. 890) and Stata (2011).

3.1 Model with Exogenous Dummy Variable

To evaluate the impact of tourism, the econometric model is specified as:

$$y_i = x_i\beta + \delta z_i + \varepsilon_i \tag{1}$$

where y_i denotes annual income of household; x_i is the vector of explanatory variables including number of earning members of household, value of household's productive asset, average years of schooling of earning members, and average age of earning members of the household; β is the vector of unknown parameters; δ is unknown parameter; ε_i is s the error term representing the unobserved other factors; and z_i is a dummy variable indicating whether or not the household participates in tourism related work:

$$z_i = \begin{cases} 1 & \text{if household participate in tourism related work} \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

If z_i is an exogenous dummy variable, then the expected earnings of household who participates in tourism related work are given by:

$$E[y_i|z_i = 1, x_i] = x_i\beta + \delta \tag{3}$$

In this case, the impact of participating in tourism related work on household earnings is:

$$E[y_i|z_i = 1, x_i] - E[y_i|z_i = 0, x_i] = \delta \tag{4}$$

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3.2 Endogenous Dummy Variable Model

In the above model, the dummy variable indicating whether or not the household participates in tourism related work, z_i, is assumed to be exogenous variable. However, z_i is an endogenous dummy variable and is selected by the household as the household makes a decision whether to participate in tourism related work or involve in any other income generating activities. In this model, household's earnings (y_i) and decision to participate in tourism related work (z_i) are jointly determined by two equations:

$$y_i = x_i\beta + \delta z_i + \varepsilon_i \tag{1}$$

$$Prob(z_i = 1|w_i) = \Phi(w_i\gamma) \tag{5}$$

where Equation (5) represents a probit model, $\Phi(.)$ is the standard normal cumulative distribution function, and w_i denotes the vector of exogenous covariates that may affect household's decision to participate in tourism related work. In this study, w_i includes a variable defined as distance from household's village to the recreational site of Keenjhar lake. The probit model is represented based on an underlying latent variable model. Let z_i^* be a latent variable that determines whether or not the household participate in tourism related work:

$$z_i = \begin{cases} 1 & \text{if } z_i^* > 0 \\ 0 & \text{otherwise} \end{cases} \tag{6}$$

We do not directly observe z_i^* but instead we observe a binary outcome z_i that depends on z_i^*, as given in Equation (6). It is assumed that z_i^* is a linear function of w_i and a random error term u_i.

$$z_i^* = w_i\gamma + u_i \tag{7}$$

In this model, the two error terms ε_i and u_i have bivariate normal distribution with mean zero and the following covariance matrix:

$$Cov = \begin{bmatrix} \sigma^2 & \rho\sigma \\ \rho\sigma & 1 \end{bmatrix} \tag{8}$$

where ρ is the correlation between the two error terms ε_i and u_i, and σ is the standard deviation of ε_i. The expected earnings of household participating in tourism related work are given by:

$$E[y_i|z_i = 1, x_i, w_i] = x_i\beta + \delta + \rho\sigma \left[\frac{\phi(w_i\gamma)}{\Phi(w_i\gamma)} \right] \tag{9}$$

where $\phi(.)$ is the standard normal density function, and $\Phi(.)$ is the standard normal cumulative distribution function. The expected earnings of household not participating in tourism related work are given by:

$$E[y_i|z_i = 0, x_i, w_i] = x_i\beta + \rho\sigma \left[\frac{-\phi(w_i\gamma)}{1 - \Phi(w_i\gamma)} \right] \tag{10}$$

In this case, the impact of participating in tourism related work on household earnings is given by:

$$E[y_i|z_i = 1, x_i, w_i] - E[y_i|z_i = 0, x_i, w_i] = \delta + \rho\sigma \left[\frac{\phi(w_i\gamma)}{\Phi(w_i\gamma)[1-\Phi(w_i\gamma)]} \right] \qquad (11)$$

In this study, the above model is estimated by the maximum likelihood estimation method using 'treatreg' command in Stata 11.2.

The last term in Equation (9), $\left[\frac{\phi(w_i\gamma)}{\Phi(w_i\gamma)} \right]$, is referred to as selectivity correction variable. Comparing Equations (3) and (9) shows that the selectivity correction term is an omitted variable in Equation (3) where the self selectivity of z_i is not accounted for. If the correlation between the error terms is zero, $\rho = 0$, then the Equations (4) and (11) will yield the same results for estimating the impact of working in tourism sector on household earnings. However, if $\rho \neq 0$ and the selectivity correction term is omitted, then the least squares estimates through Equation (3) would be biased and the impact of working in tourism sector on household earnings given by Equation (4) may be overestimated or underestimated.

4. Data

To examine the impact of participating in tourism related work on earnings of households, we collected data from households from villages which were within the area of 10 kilometers from recreational site of Keenjhar lake. Data were collected from two types of households: participants and non-participants in tourism related work. Tourism participant household has been defined as the household with at least one of its family members earns from the activities directly related to the tourism sector while households having none of its family members engaged with tourism related income generating activities are defined as the non-participants.

For this study, six villages were selected within the area of 10 kilometers from recreational site of Keenjhar lake. These six village are Abdullah Gandhro, Wadero Adam Manchi, Haji Khameso Khaskheli, Yousuf Hilayo, Sonehri, Jafar Hilayo. From the population of 1345 households of these six villages, 264 households were selected by stratified random sampling method. From each of these six villages, 44 households were selected with 22 tourism participants and 22 non-participants. Figure 1 show the map indicating the location of Keenjhar lake while Figure 3 presents map of the study area where household data were collected.

Face to face interviews of head of the households were conducted using a structured questionnaire pre-tested through a pilot survey of 25 households. The data were collected for twelve months of year. The survey was conducted two times for ensuring the accuracy of data. The first survey was conducted to collect data for six months (March to August 2010) which included peak season of tourism. The second survey was conducted to collect data for six months (September 2010 to February 2011) which included off-peak season of tourism.
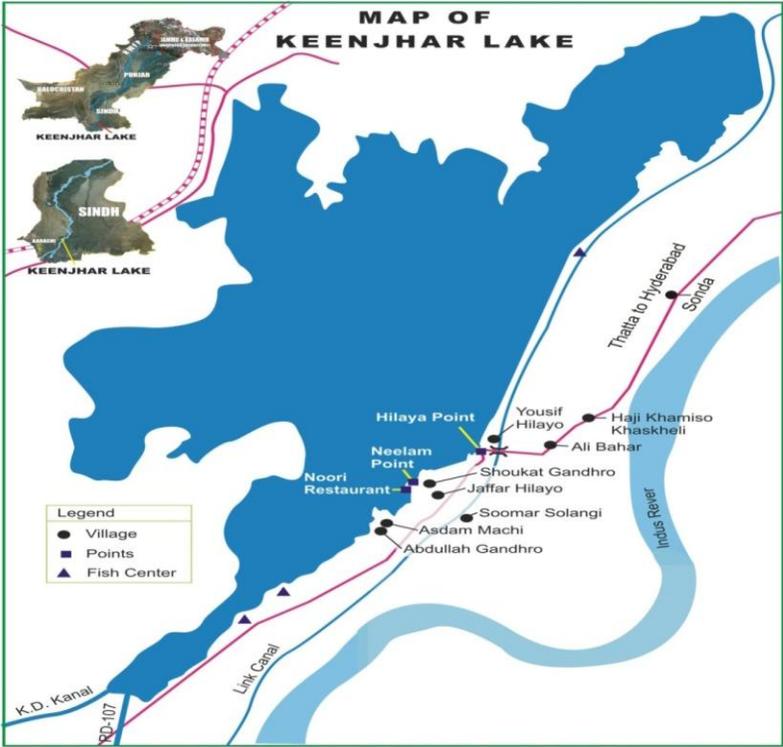
Figure 1: Location of Keenjhar Lake

Figure 2: Map of Study Site

5. Empirical Results

5.1 Descriptive Statistics

Table 1 presents the summary statistics to compare the average values of variables between the households who participate in tourism related work and households who do not participate in tourism related work. The results indicate that the average annual earnings of tourism participants are higher than the non-participants by Rs. 16,021. However, this difference in earnings cannot be attributed as the impact of the participation in tourism because of the difference in other household characteristics. Partial effect of participation in tourism related work on household earnings can be statistically identified using regression analysis, presented in the next subsection.

Results in Table 1 show that the number of earning members and their average education level of tourism participants is higher than the non-participants. However, the value of assets owned by participant households is lower as compared to non-participants. Earning members of participant households are younger (average age of 28 years) than non-participants households (average age of 33 years). Due to the difference in other factors, regression analysis is conducted in the next subsection to investigate the partial impact of tourism participation on household earnings. Summary statistics in Table 1 also indicate that both groups of households have overall very low earnings, low education level, low value of assets, and large family size.

Table 1: Summary statistics

Variables	Definition	Tourism household	Non tourism household
Earnings	Annual earnings of household in Rupees	138,412	122,391
Household size	Number of family members in household	7.77	7.60
Earning members	Number of earning members in household	2.61	2.30
Education	Average years of schooling of earning members	4.51	4.15
Age	Average age of earning members in years	28.15	33.80
Assets	Value of productive assets owned by the household in Rupees	23,440	28,748
Distance	Distance in kilometers from household's village to the recreational site of Keenjhar lake	2.22	3.45

Tourism related income generating activities are personated in Figure 3. Providing boating and hotel facilities to the tourists are the highest income earning activities with 18 and 17 percent contribution in the earnings of households, respectively. Providing tent and tubes to the visitors

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are the subsequent highest incomes earning tourism activities with 15 and 13 percent contribution, respectively. Renting productive assets in tourism business is also a profitable business and makes 10 percent contribution in the earnings. Providing transport and labor services at the recreational site of the lake make 5 percent contribution each. Vendor services, shop keeping and government services account for 4 percent of their earning, while car washing is the lowest earning activity at the lake (3 percent).
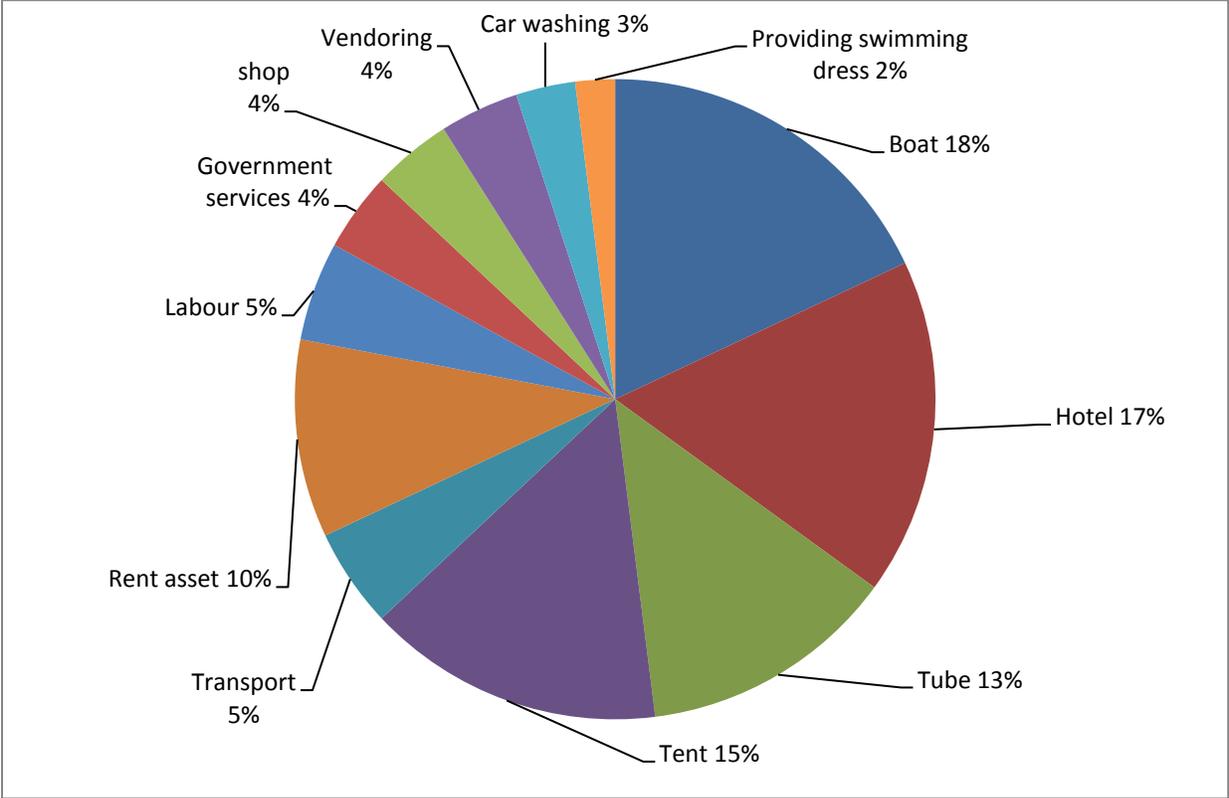

Figure 3: Income earned from tourism related economic activities

5.2 Regression Results

Table 2 presents the regression results. In our model, household earnings depend on the number of earning members, value of productive assets, average age and average education level of earning members. Participation dummy is equal to one if the household participates in tourism related work, otherwise zero. As discussed in Section 3, the household makes a decision whether to participate in tourism related work or involve in any other income generating activities. This makes the decision to participate as an endogenous dummy variable.

Table 2 presents the results of three models. Third column of the table presents results of a model where participation dummy variable is assumed to be exogenous. In this case, the model is represented by only Equation (1) with earnings as a dependent variable. Fourth and fifth columns

present results of the endogenous dummy variable model. In this model, participation dummy variable is assumed to be endogenous. In this case, the model is represented by two equations: Equation (1) with earnings as a dependent variable and Equation (5) with participation dummy as a dependent variable. For this model, two specifications are presented. In the fourth column, the exogenous variables affecting the participation include distance as well as other variables which also affect household earnings. Following the exclusion restriction, in the last column of the table, the exogenous variable affecting the participation is distance only.

Table 2 presents the estimate of the correlation between the error terms (ρ). The Chi-squared test results show that this correlation estimate is statistically significant at 1 percent significance level. The test indicates that we have $\rho \neq 0$ and supports the endogenous dummy variable model. Endogenous dummy variable model is also supported by the Jarque-Bera statistic for normality test for normality of the error term. In this test, the null hypothesis is that the error term is normally distributed. As p-value is much greater than 0.05, the test does not reject the null hypothesis. Thus, the diagnostic tests support the endogenous dummy variable model. As Specification 2 of this model (in the last column of Table 2) satisfies the exclusion restriction, we will discuss and interpret the result of this model.

The results of participation equation in the last column show a negative coefficient estimate for distance variable which is statistically significant at 1 percent significance level. These results show that the likelihood of household's participation in tourism related work decreases when distance from household's village to the recreational site of Keenjhar lake is higher. Results of earning equation in the same column show that the explanatory variables earning members, assets, and education are statistically significant at 1 percent significance level. The estimates indicate that the marginal effect of an additional earning member on household's average annual earning is Rs. 13,987. The marginal effect of productive assets is 0.2, which indicates that any additional Rs. 100 investment in productive assets would result in higher earnings by Rs. 20. The marginal effect of an additional year of education level is Rs. 5,258 on household's average earnings.

As explained in Section 3, the impact of participating in tourism related work on household earnings is given by Equation (11). Results in Table 2 show that the impact of the participation on household annual earning Rs. 9,251, which is 7.6 percent of the earnings. These results show that the households who participate in the tourism related work enjoy 7.6 percent higher level of earnings relative to the conditions they would have been in had there been no tourism activities. When the participation dummy variable is assumed to be exogenous, the impact of the tourism participation on household annual earnings is Rs. 12,003 (9.8 percent of the earnings), which is overestimated as the correlation between the error terms (ρ) is statistically significant. In endogenous dummy variable model, the results of two specifications are similar. The impact of the tourism participation on household annual earnings is 7.4 and 7.6 percent, respectively. Results of this study show that tourism at Keenjhar lake makes a positive contribution in the earnings of the poor local people and in sustaining their livelihoods.

Table 2: Regression results

Dependent variable	Explanatory variables	Model with Exogenous Dummy	Model with Endogenous Dummy	
			Specification 1	Specification 2
Earnings				
	Constant	47,365***	1,091	24,276*
		(3.680)	(0.0622)	(1.800)
	Earning members	15,619***	15,133***	13,987***
		(7.219)	(6.184)	(6.546)
	Assets	0.236***	0.268***	0.204***
		(4.248)	(4.243)	(3.718)
	Education	5,523***	5,487***	5,258***
		(11.61)	(10.21)	(11.42)
	Age	279.5	1,046***	400.4
		(0.937)	(2.794)	(1.371)
	Participation dummy	12,003**	58,073***	62,677***
		(2.317)	(5.095)	(5.802)
Participation Dummy				
	Constant	-	1.839***	0.360***
			(4.455)	(3.586)
	Distance	-	-0.127***	-0.114***
			(-4.516)	(-5.126)
	Earning members	-	-0.0546	-
			(-0.757)	
	Assets	-	-3.87e-06*	-
			(-1.953)	
	Education	-	-0.0114	-
			(-0.742)	
	Age	-	-0.0381***	-
			(-3.759)	
	Observations	264	264	264
	R-squared	0.586		
	Goodness of fit F-statistics	73.16***	-	-
	Goodness of fit Chi-Square	-	308.2***	367.3***
	Correlation between error terms (ρ)	-	-0.655***	-0.704***
	Jarque-Bera statistic for normality test	11.88	0.298	0.434
	p-value of above	0.003	0.861	0.805
Impact of participation in tourism on earnings				
	Impact in Rupees	12,003	9,051	9,251
	Impact in percentage	9.8	7.4	7.6

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6. Conclusions and Policy Implications

This study examines the impact of nature-based tourism on the livelihood of local people at Keenjhar lake in Pakistan. For this study, primary data were collected from 264 households selected by stratified random sampling method. This study applies endogenous dummy variable model to evaluate the impact of households' participation in tourism related work on their earnings.

Results of this study show that the households who participate in the tourism related work enjoy 7.6 percent higher level of earnings relative to the conditions they would have been in had there been no tourism activities. Study finds that tourism at Keenjhar lake makes a positive contribution in the earnings of the poor local people and in sustaining their livelihoods.
Furthermore, households' productive assets yield 20 percent annual rate of return and are an important source of their earnings and livelihood. Education level of earning members also increases the earnings of the household.

This study finds that tourism at Keenjhar lake improves the standard of living of local people by raising their earnings, and that the nature-based tourism can be an effective poverty alleviation strategy. The promotion of tourism will not only provide the earning opportunities for poor local people but it will also raise the revenue from the entrance fee, which can be used for conservation and management of the lake.

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