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Residents' perceptions of the environmental impacts of tourism in the Lake Bosomtwe Basin, Ghana

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This study investigates residents' perceptions of tourism's physical impacts in the Lake Bosomtwe Basin in Ghana. Data were based on a resident survey conducted in the basin in January 2006. Residents perceived both positive and negative impacts of tourism development, but were more inclined to the positive side. Based on the findings, it is recommended that the district assemblies in partnership with the Ministry of Tourism should start managing the impacts, and also educate the local population on the dangers of underestimating the negative impacts of tourism on the environment.

Keywords: Bosomtwe Basin; environmental impacts; residents' perceptions; Ghana tourism

Introduction

The environment is one of the main domains in which residents should assess the potential effects of tourism before they decide to embrace or reject it. According to Kuvan and Akan (2005, p. 703), residents tend to develop more sensitivity to, and concern for problems related to, the environment than the other negative impacts of tourism. Prior to this, Liu, Sheldon, and Var (1987) reported that residents' ratings of tourism impacts are generally high for environmental impacts. Mieczkowski (1995, p. 8) defines the natural environment as a combination of non-living things, that is, abiotic, physical components together with biological resources or the biosphere including flora and fauna. Kuvan and Akan (2005) describe the interest in investigations into community attitudes towards tourism and its impact on the natural environment as being important at a time when ecological problems, such as pollution, depletion of natural resources and deforestation, are increasing.

Like most destinations, the development of tourism in the Lake Bosomtwe Basin in Ghana presents challenges to the basin's ecosystem. While the geographical, ecological and cultural attributes of the basin attract visitors, the fragility and limitations of these same elements make the lake's environment vulnerable to the pressures of tourism. The term "fragile" is commonly used for lands that are potentially subject to significant deterioration under intense and frequent usage (Denevan, 1989, p. 11). The concept recognizes that certain environments including mountainous areas, savannahs, wetlands, deserts, islands and the arctic have biophysical characteristics that render them susceptible to damage by human activities. These areas, when disturbed, normally have relatively slow rates of recovery (Harrison & Price, 1996). With features similar to an island, the basin has the potential of

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encountering similar environmental problems faced by most island destinations if tourism development in the basin is not well planned (Mathieson & Wall, 1982; Mose, 1997). Any impacts could be concentrated around the perimeter of the lake.

Lake Bosomtwe is a totally enclosed meteorite impact crater; it has no outflow for its water. Given the enclosed nature of the basin (Figure 1), it stands the chance of being polluted by some of the tourism-related activities, especially with the introduction of power-driven vessels on the lake. With the introduction of such vessels, problems such as oil spillage and discharge of fuel, which were uncommon on the lake in the past, have emerged. The modern vessels currently operating on the lake are vastly different from the traditional ones used for fishing (Figure 1).

Since the water in the basin does not circulate and mix with other running water bodies, any pollutant entering it may not disperse or dilute, but will build up to a point of irreversibility. Given this situation, it would be improper to develop tourism without both a detailed scientific study and conception of problems and without consultations about the feelings of the local people. The purposes of this paper are threefold: to examine the perceptions of residents with regard to the environmental impacts in the Lake Bosomtwe Basin, to assess the effects of selected “independent” variables identified from literature on residents’ attitudes towards tourism’s impacts on the environment and, finally, to explore differences in perceptions across the socio-demographic groupings in the basin.

The focus on environmental impacts emerged from the general concern that insight into residents’ perceived environmental impacts of tourism has lagged behind that of the economic and social impacts of tourism (Kuvan & Akan, 2005). Apart from this, there is a dearth of information on residents’ perceived environmental impacts of tourism in developing countries (Kuvan & Akan, 2005; Madrigal, 1993). In spite of the fact that tourism is known to have a far more visible effect in rural areas and developing countries than in urban and developed ones, and, perhaps, a greater effect on rural residents (Madrigal, 1993, p. 337), studies into residents’ perceived impacts of tourism on the environment have focused more on destinations, communities and regions in the developed nations rather than on developing countries. Aside from this, Schluter and Var (1988) observed in their investigation into residents’ attitudes towards tourism in Argentina that there are some issues on the subject that are peculiar to developing countries. Further, a systematic analysis of

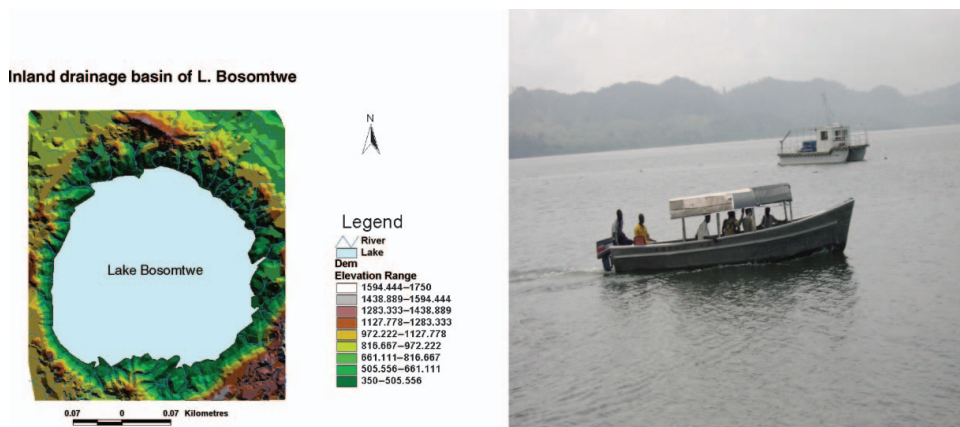


Figure 1. Form of the basin and types of vessels operating on it. Source: Author.

residents' perceived environmental impacts of tourism could help the district assemblies, planners and tourism practitioners in the Lake Bosomtwe Basin to identify real concerns in order to develop appropriate policies and actions.

Environmental impacts of tourism

Studies have identified both the positive and negative environmental impacts of tourism (Burns & Holden, 1995; Puczko & Rätz, 2000). On the negative side, Puczko and Rätz (2000) observed that inappropriate tourism development often leads to increased stress on destinations and in negative changes in the destinations' physical and sociocultural characteristics. According to Wood and House (1991), it is possible to identify broad categories of impacts that may affect all destinations to a greater or lesser extent. Tourism is known to have contributed to inappropriate development around Lake Tahoe in the United States (Iverson, Sheppard, & Strain, 1993) and at Pattaya in Thailand (Mieczkowski, 1995); oil pollution of water bodies at King George Island (Harris, 1991); habitat loss, fragmentation and erosion in Nepal (Croall, 1995); destruction of wildlife at Zakynthos in Greece (Prunier, Sweeney, & Green, 1993); disturbance of animals and loss of area for production in Kenya (Sindiga & Kanunah, 1999); and loss of the spirit of place/ambience at many destinations (Page, Brunt, Busby, & Connell, 2001).

On the positive side, most conservationists have argued that tourism is a relatively environmentally benign activity and an economically viable alternative to extractive industries, such as mining and logging (Ceballos-Lascurain, 1996; Doswell, 1997). Doswell (1997) argues that tourism focuses attention on significant environmental issues and stimulates initiatives to conserve and enhance the environment. Tourism draws attention to issues relating to biodiversity, endangered species and human impacts on the environment. Tourism is also often used to provide an economic rationale to preserve natural areas rather than to develop them for alternative uses, such as agriculture, forestry and mining (Master, 1998). With specific reference to Ghana, tourism offered an economic justification for maintaining the numerous nature reserves established by the colonial regime in the Gold Coast, as Ghana was then known.

Factors that affect residents' perceived environmental impacts

A number of studies have been conducted in the past two decades as part of the effort to identify the key factors that influence residents' perceptions and attitudes towards tourism. Among the factors studied and identified are community attachment (Gursoy & Rutherford, 2004; Lankford, 1994), state of the local economy (Gursoy & Rutherford, 2004; Pizam & Milman, 1986), proximity to the tourist zone (Faulkner & Tideswell, 1997; Weaver & Lawton, 2001) and socio-demographic characteristics (Teye, Sirakaya, & Sonmez, 2002; Weaver & Lawton, 2001). Favourable impacts have been described as "benefits", while unfavourable impacts are considered as "costs".

Individuals' attachment to community is one of the social variables that have been found to influence residents' evaluation of the positive and negative effects of tourism. Some researchers including Canan and Hennessy (1989) indicate that the longer the residents live in a community, the more negative they are towards tourism development. In contrast, Allen, Hafer, Long, and Perdue (1993) found that length of residence in 10 rural Colorado towns did not have a significant effect on attitudes towards tourism development.

Residents' attitude towards the environment is another element that has been noted to affect residents' support for tourism (Gursoy, Jurowski, & Uysal, 2002). These researchers

have noted that attitude towards the environment influence how individuals perceive both the costs and benefits associated with tourism. Residents who fear that tourism development will damage the environment often associate it with high costs and oppose it, while those who see tourism as an incentive to preserve and protect the natural environment support tourism development (Hillery, Nancarrow, Griffin, & Syme, 2001).

The proximity of residents to attractions has also been found to affect their perceptions of the impacts of tourism and support for the industry. Researchers, including Faulkner and Tideswell (1997) and Weaver and Lawton (2001), have observed that residents who live close to attractions have less positive perceptions of impacts and less favourable attitudes towards tourism. On the contrary, Mansfeld (1992) found that those living farther away from tourism areas were more negative about the impacts than those living closer. Further, studies show that residents who use the recreation resources that attract tourists may be more concerned about overcrowding and degradation of such resources. Consequently, the recreation base users will have a different perspective than the non-users (Lankford, Williams, & Lankford, 1997).

To aid our understanding of residents' perceived impacts of tourism on the basins' environment, the multivariate social exchange theory was adopted to guide this study. The model stresses macro-social or individual behaviour including exchange relationships (Blau, 1964). Since the model is underpinned by social exchange theory, most of the issues discussed in the exchange process model developed by Ap (1992) are implied in this model. Thus, individuals select exchanges after having assessed rewards and costs (Homans, 1961). This theory has some advantages in that it can provide a theoretical framework to explain why community members have positive and negative perceptions of tourism at both individual and collective levels. According to the theory, when the exchange of resources between community members and tourism has achieved a high level of balance in favour of community participants, the impact of tourism development is recognized positively. Alternatively, when the exchange is lower on one side or when there is an imbalance, the impacts are recognized negatively. That is, community members assess the positive and negative impacts of tourism based on what advantages they can derive from the industry versus the costs they will incur.

The study area

Ghana is one of the West African countries that now encourage tourism as a route to economic development. Given its central location in the sub-region (Figure 2), the country's tourism and overall economic vision is to serve as the "gateway" to West Africa. It is blessed with many tourism resources, which include pristine beaches, rain forests, festivals, local culture and historical resources, such as the castles and forts from the colonial era along the coast. Two of these castles, Cape-Coast and Elmina, have been designated world heritage monuments by UNESCO (Withers, 1995). The government established the Ministry of Tourism in 1993 to underscore its commitment to tourism development, and through assistance from the United Nations Development Program (UNDP) and the World Tourism Organization (WTO), it prepared a 15-year Tourism Development Plan for the period 1996–2010.

Tourism is Ghana's third largest earner of foreign exchange. Tourism currently ranks behind cocoa and mineral exports. International tourist arrivals in Ghana increased from about 145,780 in 1990 to 586,612 in 2007, while receipts increased very considerably from US\$19.52 million in 1985 to US\$1172 million in 2007. In the last decade tourism has become a major sector of the national economy and it is the only sector that recorded a

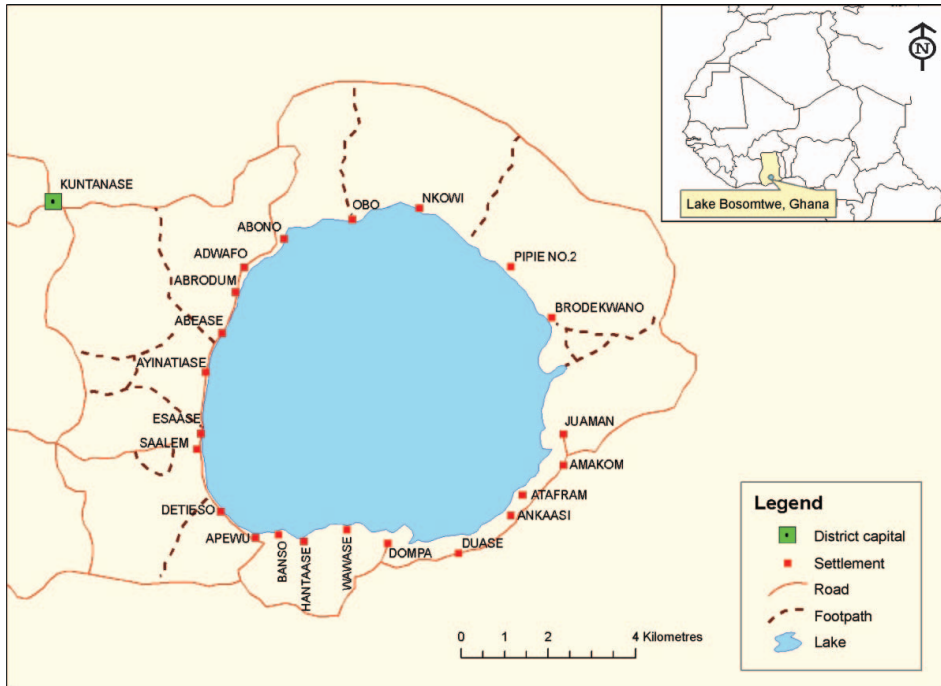


Figure 2. Map showing the Lake Bosomtwe Basin, Ashanti region, Ghana. Source: Author.

double-digit average annual growth rate of 12% during the 1993–2003 period. Tourism currently provides an estimated 206,091 direct jobs (Ghana Tourist Board, 2008).

Ghana's tourism industry is currently concentrated in two main regions, namely the Central and Ashanti. This, however, is not a deliberate policy. The Ashanti region, in which Lake Bosomtwe is situated, consists of 18 districts covering the former Ashanti kingdom. Kumasi, which is the most important city in the region, has good road networks, a rail terminal and an international airport that allows visitors to fly directly to the region. Hence, the proximity (about 32 km) of the Lake Bosomtwe Basin to Kumasi makes it fairly accessible to both local and international visitors. Currently, Lake Bosomtwe is one of the core attractions that draws tourists to the region. The meteorite depression is roughly circular in outline and nearly 8 km (5 miles) in diameter (Figure 2).

The basin has a wet semi-equatorial climate with an average temperature of 26°C and rainfall of between 1500 mm and 1700 mm. Four seasons are distinguishable in the basin: the dry season (December to April), the first rainy season (May to July with the peak in June) and the monsoon drought (July to August). The second rainy season is from September to November. Although the basin was once covered with dense forests, rich in odum, mahogany and silk cotton trees, much of that forest has been destroyed. It was observed during the fieldwork that most of the vegetation along the gentle slopes had been degraded, and in places like Nkawi and Pipie, part of the forest cover had given way to grassland.

There are 22 small villages in the basin, most with populations of less than a thousand people. Administratively, the basin falls under the jurisdiction of two districts in the Ashanti region, namely Bosomtwe-Atwima-Kwanwoma to the north (12 settlements) and Amansie

East to the south (10 settlements). Traditionally, each community has a chief through whom the people are mobilized for development. Generally, the Chief is the custodian of the community lands, and also custodian of the customary practices of the people. The basin is one of the most deprived parts of Ashanti region and unemployment is a major problem. The majority of jobs are found in the agricultural and fishing sectors, which are experiencing decrease in output due to increasing population pressures.

The Lake Bosomtwe Basin has both natural and cultural resources for tourism promotion. The potential includes water sports, adventure, village stay, rich culture, ecotourism, farm tourism and educational tours. These tremendous opportunities are yet to be fully explored. Interest in developing the Bosomtwe Basin into an attraction dates back to the colonial era: in 1918 a rest house was built near Abonu by Captain Blantyre (the then British Commissioner for the Ashanti Protectorate) for the exclusive use of British officials during their duty tour of that area. This interest has been rekindled in the last two decades culminating in the establishment of tourism-related facilities and services in the basin.

Although a growing industry, tourism is still in its infancy in the basin. At present, the basin is characterized by low levels of tourism development with most of the tourism-related facilities concentrated in Abonu (probably due to its easy access). Facilities in the basin include a car park, two telephone booths, a public toilet, two 2-star hotels and one eco-lodge and a pleasure boat on the lake. Generally, the basin is poorly serviced by public transport routes with the main access route being the first class road from Kuntunasi to Abonu. The majority of visitors arrive by car. The winding nature of the road and the high number of cars cause very serious traffic problems (congestion, traffic jams and parking difficulties) during the peak season for both tourists and local residents.

Though the number of arrivals is not particularly high (about 60 overnight visitors per week averaged across the year), the basin is overcrowded during public holidays, particularly during Easter and Christmas (Government of Ghana, 1996). Many visitors, particularly domestic visitors, are day-trippers, whilst their international counterparts, mostly researchers and expatriates, often stay overnight and patronize the existing hotel facilities. With controversy over the origin of the lake, the basin has attracted the attention of researchers for many years. Thus, as a field laboratory, the basin continues to attract researchers of different backgrounds and interests.

Efforts by the Amansie East District Assembly to improve the road to the southern half of the lake, and also the desire by the rest of the villages to release land for tourism projects (evidence from the fieldwork suggested that most of the villages were willing to release land in an effort to attract tourism projects to their villages) are expected to increase visitor numbers and consequently exert pressures on the basin's natural resources

Methodology, data collection and related issues

The data for the study were obtained through a questionnaire survey of 628 household heads or their representatives (any household member over 18 years) who resided around Lake Bosomtwe in January 2006. A multi-stage sampling procedure was used for the selection of the subjects. The first stage involved the use of simple random techniques to select 11 out of the 22 communities. However, Abonu, the most developed community in terms of tourism-related infrastructure, was purposively selected to serve as the pilot unit. The second stage consisted of the proportional allocation of the 660 respondents (sample size) among the 12 selected communities. In the third stage, the random sampling technique was used to select the required stratified sample size for each community. These methods

generated a total of 628 respondents in the following representation: 93 for Abonu, 30 for Adjaman, 81 for Amakom, 35 for Obo, 42 for Pipie, 83 for Ankasi, 34 for Apewu, 51 for Bansa, 37 for Detieso, 96 for Duase and 40 for Esaase.

The data were collected through a questionnaire, which consisted of three sections: factors that influence residents' perceptions, perceived impacts of tourism, and residents' socio-demographic characteristics. The first section measured some of the factors that are known to influence residents' perceptions including "community concern", "state of the local economy", "community attachment", "ecocentric attitude", "utilization of local resource base" and "power tension". The second section focused on residents' perceived impacts of tourism in the environment. A 5-point Likert scale was utilized to measure issues relating to perceived environmental impacts of tourism. Residents' perceptions were sought through two main constructs in this section, namely environmental benefits (five items) and environmental costs (six items). Most of the items that were used to measure the positive and negative impacts were based on questions used by Lankford (1994) and Gursoy and Rutherford (2004). However, the questions were adapted to the local situation and a lot of questions relevant to the local conditions were added. The section dealing with socio-demographic characteristics of residents requested information about their birthplace, length of residence, age, sex, educational attainment, marital status, religion, occupation and income.

The questionnaires were administered verbally by eight research assistants from the University of Cape Coast who speak English and several Ghanaian languages including *Twi*, the most common language in the Ashanti region. This approach was favoured over that of self-responding or writing due to the relatively high illiteracy rate in the Ashanti region. The Government of Ghana (2000) reports that the illiteracy rate for the region is 40% and the situation is often worse in rural areas. A total of 660 household heads constituted the sample, out of which 628 (95%) provided usable data for the study. The difference of 5% was due to either respondents refusing to participate or ending the interview process half way.

Research results

Respondents' profile

A detailed description of the profile of the respondents was crucial for the interpretation and understanding of resident-perceived impacts of tourism in the basin's environment. On the whole, about 87% of the respondents were native-born, whilst 13% were born outside the study area. Residents' length of stay ranged from 1 to 70 years, and an average length of stay was 29.5 years. About two-thirds of the respondents were over 35 years and married. Most of the respondents were male (67.4%) indicating gender bias. This was expected, as the unit of analysis was the head of household; in Ghana males rather than females are mostly heads of households. A female becomes a head of a household in the event of the death of her spouse or when she is not married (Government of Ghana, 2002). The skewness in the gender distribution of the respondents will be a limitation of the study. With regard to educational attainment, there was a high concentration of junior high school (JHS) leavers (62.9%), followed by those with primary or no formal or lower education (27.5%). Only 9.6% of the respondents had higher or tertiary education. Farming (87%), fishing (41%) and trading (20%) still remain the common occupations, but some tourism-related jobs including security (3.4%), tour-guiding (1.1%) and boat-operating (1.1%) had emerged in

the basin. About half of the households that participated in the study indicated that their household income was less than \$400 per annum.

Respondents' perceived impacts of tourism

Table 1 presents the frequency distribution of the responses to each of the impact statements, the means and the standard errors. Overall, about 98% of the residents admitted that the development of tourism in the basin would yield environmental benefits whilst about 67% identified possible environmental costs (Table 1). The mean responses also confirm that respondents were in higher agreement with the positive environmental impact statements than the negative elements. Among the positive environmental developments that are envisaged to take place are increases in environmental awareness (97.8%), the beautification of communities (98.1%) and the protection and maintenance of environmental

Table 1. Expected environmental impacts of tourism development in the Bosomtwe Basin.

Statement	Number	Percentage in agreement	Mean	Std error
<i>Environmental benefits</i>				
Tourism will raise the environmental awareness among residents	628	97.8	4.576	0.025
Tourism will lead to beautification of the communities	628	98.1	4.625	0.021
Tourism will lead to the protection and maintenance of environmental assets of the basin	628	97.1	4.599	0.022
Tourism will result in the preservation of sites of historical and cultural significance	628	96.3	4.594	0.022
Tourism will contribute to the preservation and restoration of the environment	628	98.2	4.605	0.022
<i>Overall perception of the environmental benefits</i>	628	97.8	4.600	0.062
<i>Environmental cost</i>				
Tourism will lead to increase in noise level within the basin	628	75.0	3.793	0.057
Tourism will increase the rate of pollution of the lake	628	60.6	3.247	0.063
Tourism will lead to generation of excessive litter in the communities	628	64.0	3.400	0.064
Tourism will result in over-crowding in the communities	628	71.9	3.691	0.060
Tourism will result in traffic problems in the communities	628	64.6	3.473	0.060
Tourism will accelerate the forest loss in the basin	628	65.9	3.408	0.062
Tourism will aid the collapse of the fishing industry	628	35.5	2.478	0.059
Tourism will result in loss of production lands	628	46.0	2.801	0.064
<i>Overall perception of the social environmental costs</i>	628	67.0	3.501	0.053

assets (97.1%). The residents of the Bosomtwe Basin seem to agree with all the positive environment-related items (Table 1).

On the negative side, residents of the Lake Bosomtwe Basin were certain that tourism would result in increased noise level (mean = 3.793). Similarly, about 72% acknowledged that tourism would result in overcrowding in their communities (mean = 3.691) and create more traffic problems (mean = 3.473) especially during the peak seasons. But residents were ambivalent that tourism would accelerate the degradation of the forest in the basin (mean = 3.408), increase littering (mean = 3.400) and pollute the lake (mean = 3.247). The overall mean score (3.501) indicates that residents were sure that some negative environmental impacts would definitely accompany the development of tourism in the basin.

Perceived environmental impacts by respondent profile

Both *t*-test and one-way analysis of variance (ANOVA) were performed in order to assess whether the residents' perceived impacts of tourism on the environment were influenced by their socio-demographic characteristics. *T*-test statistical analysis was employed on socio-demographic variables that were measured along a dichotomous scale. These included district of residence (1 = Bosomtwe-Kwawoman, 2 = Amansie East), gender (1 = male, 2 = female) and marital status (1 = single, 2 = married). Other characteristics of respondents, such as community of residence, age, educational level and annual household income, were measured along interval scale differences, which were sought through one-way analysis of variance. Table 2 presents the mean responses of environmental costs and benefits of tourism by socio-demographic characteristics.

The *t*-test results show that there were no significant statistical differences in the residents' perceived environmental benefits of tourism with regard to district of residence, gender and marital status. Respondents in each of these categories expressed higher levels of agreement (mean = 4.45 and above). On the contrary, the *t*-test result revealed that a significant association existed between district of residence and marital status on the one hand and respondents' perceived environmental costs of tourism on the other. The result shows that while the respondents in Bosomtwe-Kwawoma district were in agreement that tourism would result in environmental costs, their counterparts in the Amansie East were divided (mean = 3.29) as to whether tourism would lead to any significant environmental costs. The unmarried respondents were noted to express more negative disposition towards tourism (mean = 4.24) than their married counterparts (mean = 3.42). Unmarried people have more knowledge of what tourism entails because they frequent tourist sites, participate in most of the events organized in the basin and therefore have real experience with visitors and tourism. In contrast, the Akan culture does not encourage married individuals to patronize tourism-related facilities, such as the chop (a traditional catering establishment) and drinking bars.

The one-way analysis of variance revealed that there was an association between community, educational attainment and income on the one hand and residents' perceived environment benefits on the other. Although all the communities were in agreement that tourism would result in some environmental benefits, the Fisher's Least Significant Difference (LSD) suggested that the ratings of communities, such as Detieso (mean = 4.80), Pipei (mean = 4.77), Aygaman (mean = 4.68), Ankassi (mean = 4.67), Adwafo (mean = 4.46) and Abonu (mean = 4.46) were significantly different from the rest (Table 2). Also, a significant difference was observed among the different educational groups with regard to the positive impacts of tourism on the environment (Table 2). In addition, respondents

Table 2. Mean responses of environmental costs and benefits of tourism by socio-demographic characteristics.

Socio-demographic	Benefits of tourism					Cost of tourism				
	<i>N</i>	Mean	Std D.	Test statistic	<i>P</i> -value	<i>N</i>	Mean	Std D.	Test statistic	<i>P</i> -value
<i>District</i>										
Bosomtwe-K	298	4.59	0.49	<i>t</i> -test	0.610	298	3.73		<i>t</i> -test	0.000*
Amansie E	330	4.61	0.51	0.511		330	3.29		4.062	
<i>Community</i>										
Abonu	89	4.46	0.51	ANOVA	0.040*	89	4.37	0.63	ANOVA	0.000*
Ayghan	32	4.67	0.45	1.874		32	3.41	1.66	6.071	
Amakom	79	4.59	0.49			79	3.28	1.43		
Adwarfo	26	4.65	0.49			26	3.47	1.37		
Pipei	36	4.72	0.45			36	3.55	1.45		
Obo	32	4.66	0.46			32	3.81	1.14		
Ankaasi	78	4.67	0.52			78	3.15	1.55		
Apewu	32	4.49	0.54			32	3.74	1.00		
Banso	50	4.54	0.58			50	3.55	1.10		
Detieso	35	4.80	0.41			35	3.19	1.57		
Duase	96	4.58	0.49			96	3.05	1.19		
Esaase	39	4.59	0.49			39	3.60	1.32		
<i>Age (years)</i>										
<35	194	4.64	0.47	ANOVA	0.088	194	3.66	1.28	ANOVA	0.066
35–54	317	4.56	0.51	2.443		317	3.49	1.35	2.729	
>55	117	4.60	0.49			117	3.29	1.37		
<i>Sex</i>										
Male	423	4.63	0.48	<i>t</i> -test	0.057	423	3.47	1.37	<i>t</i> -test	0.460
Female	205	4.55	0.53	1.909		205	3.56	1.27	0.740	
<i>Marital status</i>										
Single	62	4.54	0.48	<i>t</i> -test	0.285	62	4.24	0.815	<i>t</i> -test	0.000*
Married	566	4.61	0.50	1.069		566	3.42	1.36	4.633	
<i>Education level</i>										
<Primary	173	4.50	0.53	ANOVA	0.005*	173	3.48	1.27	ANOVA	0.142
Middle/JHS	395	4.65	0.49	5.435		395	3.46	1.39	1.955	
Secondary+	60	4.56	0.48			60	3.83	1.13		
<i>Income</i>										
<Gh £100	130	4.44	0.54	ANOVA	0.000*	130	3.84	1.10	ANOVA	0.00*
Gh £100–399	195	4.57	0.51	12.064		195	3.64	1.31	9.506	
>Gh £400	300	4.69	0.46			300	3.28	1.41		

Note: *Significant difference exist at 0.05.

with higher incomes showed more agreement with tourism yielding environment benefits (mean = 4.69) than the rest.

On the negative side, the one-way analysis of variance detected a wider difference among the communities and the different income groups. Communities that were found to associate tourism development with high environmental benefits were also observed to express more doubts (Duase: mean = 3.05, Ankassi: mean = 3.15 and Detieso: mean = 3.19) whether tourism would result in environmental cost. Similar rating patterns were also registered for income.

Determinants of residents' perceived impacts

In conformity with the multivariate social exchange model that informed the study, the effects of the six explanatory variables, "community concern", "state of the local economy", "community attachment", "ecocentric attitude", "utilization of local resource base" and "power tension" on residents' perceived impacts of tourism in the basin's environment were examined. To achieve this, two hierarchical regression equations were computed (Table 3). In order to satisfy the interval scale requirement of the regression model, the scores for all items measuring a particular construct were added up (summed) to give a total score that reflected the respondents' judgement of the construct. Following this process, the Likert scale rating was transformed into an interval scale. The multiple regression models applied on the data yielded the results in Table 3. The F -values of the two regression models suggest that a statistically significant relationship exists between the set of independent variables and each of the impact domains. All the F -values generated were found to be less than the significant level set (0.05). The result reveals that the set of the independent variables combines to explain about 59% of the variation in residents' perceived environmental benefits and 35% of the perceived environmental costs.

Table 3 also presents the details about the nature of the relationships and the significance of the variables. First, the relationships between residents' perceptions about the state of the basin's economy and the perceived environmental benefits and costs were assessed. A significant positive relationship was established between residents' perception about the state of the basin's economy and the perceived environmental benefits ($b = 0.408$, P -value = 0.000). The same variable was found to correlate negatively with the environmental costs ($b = -0.330$, P -value = 0.029). Hence, the hypothesis that there is no relationship between residents' perceived costs and benefits on the one hand and their perception of the state of the local economy on the other was rejected.

Table 3. Regression analysis of factors that influence residents' perceived environmental impacts of tourism.

Variables	B	Std. error	Std. beta	t -ratio	Sig.
Environmental benefits					
Constant	1.156	0.194		5.965	0.000
Community concern	0.234	0.025	0.381	9.486	0.000*
Community attachment	-0.018	0.021	-0.024	-0.851	0.395
Ecocentric attitude	0.043	0.018	0.071	2.401	0.017
Perceived state of the economy	0.408	0.044	0.388	9.280	0.000*
Resource utilization	-0.007	0.010	-0.019	-0.686	0.493
Perceived power tension	0.057	0.020	0.080	2.834	0.005*
Model summary: $r^2 = 0.593$, F -value = 78.54, Sig. = 0.000					
Environmental costs					
Constant	6.102	0.667		9.147	0.000
Community concern	-0.365	0.085	-0.218	-4.293	0.000*
Community attachment	0.196	0.072	0.097	2.720	0.007*
Ecocentric attitude	0.320	0.061	0.197	5.236	0.000*
Perceived state of the economy	-0.330	0.151	-0.116	-2.183	0.029*
Resource utilization	0.267	0.035	0.272	7.699	0.000*
Perceived power tension	-0.381	0.070	-0.195	-5.426	0.000*
Model summary: $r^2 = 0.346$, F -value = 28.74, Sig. = 0.000					

Note: *Significant level set at 0.05.

In contrast, a significant positive relationship was established between attachment to community and the perceived environmental costs ($b = 0.196$, P -value = 0.007). The indication is that the more the residents are emotionally attached to the basin, the more they believe that tourism would degrade their environment, and, perhaps, destroy their culture and social values which are intertwined. Based on the results, the researcher failed to reject the hypothesis that there is no relationship between “attachment to community” and perceived environmental benefits whilst that of the costs component was rejected.

Moreover, a significant positive relationship was identified between community concern and the expected “environmental benefits” ($b = 0.234$, P -value = 0.000). The result suggests that as the level of community concern increases, residents become more positive about tourism yielding environmental benefits in their communities. At the same time, a significant negative relationship was identified with this variable and the environmental costs domain ($b = -0.365$, P -value = 0.000).

As expected, a significant positive relationship was established between ecocentric attitudes and environmental costs ($b = 0.320$, P -value = 0.000). This indicates that the more the individuals become ecocentric in their attitude, the more they harbour fears of tourism creating environmental problems in an area. At the same time, a significant positive relationship exists between “ecocentric attitudes” and environmental benefits ($b = 0.043$, P -value = 0.017).

With respect to the Bosomtwe Basin, a significant positive relationship was established between resource utilization and the residents’ perceived “environmental costs” ($b = 0.267$, P -value = 0.000). Thus, the more the residents perceive visitors’ activities to impinge on their resource base, the more they believe tourism will have negative impacts on their life. Although a positive relationship was identified with the benefit domains, no significant relationship was established.

In addition, the notion that power tension affects residents’ perception about tourism was tested. A significant direct relationship was established between this variable and residents’ perceived environmental benefits ($b = 0.057$, P -value = 0.005). Thus, the more the residents think power tension is negligible in their community, the stronger their belief that tourism would yield environmental benefits.

Discussion

The study confirms the popular notion that residents with higher education and income tend to be more positive about the environmental impacts of tourism than their counterparts (Kuvan & Akan, 2005; Lindberg, Andersson, & Dellaert, 2001). Lindberg et al. (2001) observed that respondents in the high-income groups were more supportive of the expansion of skiing projects in Sweden and attributed this position to the possibility of them benefiting more in the form of income and access to the facilities.

The notion among the residents that tourism development would lead to traffic problems in the basin was found to be consistent with the views of Page (1999). Page reports that generally much concern has been expressed about increased level of transport on roads and consequent effects on the environment and human health in tourism destinations. Police records available at Kuntunasi police station in the Bosomtwe-Kwawoman district suggests that, on the average, two fatal accidents occur on the Kuntunasi-Abonu road during the Easter and Christmas picnics at Abonu.

On average, respondents were found to express doubt whether tourism development in the basin would lead to the pollution of the lake. This particular outcome may be linked to the common notion that Lake Bosomtwe is one of the water bodies that are saddled

with natural pollution. The lake has been associated with intermittent dull detonations and sulphurous odours (Jones, Bacon, & Hastings, 1981).

The distribution of the coefficient of determination (r^2) suggests that the regression model employed for the analysis is able to explain the perceived benefits (59%) better than the cost component (35%). The observed pattern may be linked to three issues. The first is the tendency of residents to overestimate the perceived benefits and underestimate the perceived costs that tend to affect the quality of the data. Another aspect relates to sheer ignorance about the possible costs, especially when tourism is at the incipient stage or yet to be introduced. Finally, it is only when the carrying capacity is exceeded that some of the problems become visible and observable.

The established significant negative relationship between community concern and environmental costs of tourism development confirmed the findings of Long, Perdue, and Allen (1990). These researchers report that the extent residents associate tourism with negative environmental impacts decreases with the increased concern about the state of their social infrastructure.

Unlike Gursoy et al. (2002), who reported a negative relationship with both perceived benefits and costs, a significant positive relationship was established for the two impact domains in the basin. The positive relationship with the cost component indicates that some of the ecocentric individuals in the basin entertain fears that tourism will create environmental problems whilst the positive relationship with perceived benefit may be linked to the belief that tourism could be used to help support the case for the preservation of the lake. Generally, residents who fear that tourism development will damage the environment were found to oppose, while those who see tourism as an incentive to preserve and protect the natural environment were supportive (Hillery et al., 2001).

The study established a significant positive relationship between resource utilization and environmental cost, which implies that the more the residents perceive visitors' activities to impinge on their resource base, the more they believe tourism would have negative impacts on their life. It is essential to note that the lake forms the core attraction of the basin as well as a fishing ground for the majority of the local people.

The observed positive relationship between residents' perceptions about the state of the basin's economy and the perceived environmental benefits and an inverse with the cost component was as expected. Thus, the more the residents expect economic benefits, the less they associate tourism with environmental costs. This pattern of thinking can be linked to euphoria, which is common at the inception stage of tourism development.

Conclusions

The aim of this paper was to assess residents' perceptions of tourism's physical impacts in the Lake Bosomtwe Basin. This was in order to understand how these perceptions would affect the sustainability of tourism development in the basin, and how planning might best proceed. The methodology used was basically quantitative: questionnaire surveys were employed to collect data from residents in 12 of the communities around the lake. Based on the findings, five main conclusions were drawn. First, evidence from the study suggested that negative effects were less well known or accepted by the residents. The residents were found to have expressed doubts or uncertainty about the occurrence of most of the negative impacts including the pollution of the lake. This is in support of an earlier observation made by Matheson and Wall (1982). To these researchers environmental damage due to tourism is often difficult to gauge for a number of reasons, including the difficulty of disentangling

the effects of tourism from the effects of human existence and the complex and fragmented nature of tourism provision.

Given that tourism is relatively young at the basin, and also concentrated around Abonu, it can be concluded that most residents lack real experience of tourism and its possible environmental costs. Often, it is when the carrying capacity is exceeded that some of the problems become visible and observable. It is evident from the results that most residents were in doubt about tourism leading to serious negative impacts including the pollution of the lake. This result substantiated a series of findings that link residents' attitudes to the level of tourism development (Doxey, 1975; Martin & Uysal, 1990). These studies indicate that the level of tourism influences residents' perceptions of its impact. This indicates an inverse relationship between the level of tourism development and the perceived economic, social and environmental impacts on the community.

Based on the thinking and perceptions of the majority of the residents of Bosomtwe Basin, it might be concluded that they are at the euphoria stage of Doxey's Irridex model. Evidence suggests that they tend to overestimate the potential benefits to be derived from tourism and understate that of costs. These findings substantiate a number of findings that link residents' attitudes to the level of tourism development (Doxey, 1975).

It was concluded that the communities would be proactive towards tourism development in the basin as most of them consider tourism to have the potential to improve the quality of the basin's environment. People residing around Lake Bosomtwe consider tourism as an appropriate strategy for addressing most of their needs including the planting of *Triplochiton scleroxylon* (*wawa*), which is needed for the construction of canoes for fishing on the lake as well as saving the lake from drying up.

Another conclusion was that the regression model employed for the analysis is more able to explain the perceived benefits than the cost components. This was based on the fact that the coefficient of determination (r^2) generated for the benefits component was far greater than the cost aspects. On the whole, the set of independent variables was able to account for 59% of the variation of the perceived benefits associated with tourism, while the same variables account for only 35% of variation in the perceived costs.

Implications for policy and research

This study has implications for both policymakers and researchers. First, the habit of underestimating the potential costs of tourism in the basin has implications for sustainability of the industry as it could sow seeds of future tension and frustration. Underestimation of negative impacts could generate intense frustration as residents may not have been prepared enough for some of the negative environmental effects. The Ministry of Tourism and Diaspora Relations and the district assemblies need to collaborate with the relevant agencies including the tertiary institutions to intensify education on the benefits and potential costs of tourism in order to maximize the positive impact and minimize the costs.

As the residents of the Lake Bosomtwe Basin currently downplay the negative environmental impacts, the basin is likely to suffer. It would be appropriate to educate them to take the possible tourism-related environmental challenges seriously and undertake preventive action so as to avoid these environmental problems. This could ensure that tourism development does not cause irreversible changes to the basin's ecosystem. Edington and Edington (1986, p. 2) contend that a proper understanding of biological or, more specifically, ecological factors can significantly reduce the scale of environmental damage associated with recreational and tourist development.

Since there is an obvious need all over the world to protect natural resources from the negative impacts of tourism activities, there is the need for concerted efforts by the local people, district assemblies, the central government and friends of water bodies to ensure that tourism development does not cause irreversible changes to the basin's ecosystem, thus ensuring ecological sustainability.

Given that the basin is occupied by 22 communities, it is suggested that a further study be conducted into the host–environment interaction in the basin. Such a study will be useful in identifying existing environmental changes and damage in the basin, and, perhaps, prevent making tourism responsible for some of environment damages. It was evident from the fieldwork that some of the rich forests had already given way to grassland.

Notes on contributor

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