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Fringe Community Attitudes and Protected Areas.

Insights from two Protected Areas in Ghana.

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Natural Resources Management

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Abstract

Understanding community attitudes toward protected areas is of great importance since this is inherently linked to the long term effectiveness of such areas. This study assessed the factors influencing community attitudes toward the Mole and Digya national parks in Ghana. Data was collected between June and August 2015 by random household interviews (N = 346) using a semi-structured questionnaire. Results showed that, attitudes were somewhat positive toward the protected areas, with Mole residents been comparatively more positive. Attitudes were largely influenced by benefits, costs, protected area, household size, occupation, awareness of or participation in livelihood projects and education. Findings suggest that extending benefits while minimizing costs of fringe communities goes a long way to making people more acquiescent to the concept of protected areas and conservation at large. Also, protected areas are likely to benefit more from locally-tailored management interventions as opposed to the adoption of wholesale interventions.

Introduction

The setting aside of priority areas for conservation and or preservation purposes is viewed as a crucial strategy in securing the planet's dwindling biological diversity (Bruner et al., 2001; Rodrigues et al., 2004; UNEP-WCMC, 2008; Geldmann et al., 2013). However, the establishment and maintenance of these protected areas is not entirely devoid of controversies. While many regard them as a perfect conservation strategy, others perceive them as a threat to peoples' livelihoods (Brockington and Wilkie, 2015).

Over the years, and especially on the African continent, management of such areas have followed a top-down approach giving little to no reference to the needs and aspirations of local communities within and around (West and Brockington, 2006; King, 2010). Ironically, the sustainable use concept propagated by these protected areas are usually incompatible with the resource use and needs of local communities (Lewis, 1996; Holmes, 2003; Cobbinah, 2015). People usually believe it is their right to exploit natural resources, much so if these resources are deemed to be in abundance (Kiss, 1990; Amoah and Wiafe, 2012). Such notion is detrimental to conservation going a long way to affect the overall success of implemented efforts.

The establishment and maintenance of protected areas often than not involve restriction of access to essential resources, evictions and the loss of traditional land use rights (McShane, 2003; Allendorf, 2010; Wilkie et al., 2010; Ayivor et al., 2013; Cobbinah et al., 2015). An unfortunate reality, especially in developing countries, is the fact that most areas subjected to protection are neighboured by scores of people who are generally impoverished and whose livelihoods depend on such areas (King, 2010). Such restrictions and alienation from resource areas make it difficult for these people to meet their basic livelihood needs (Amoah and Wiafe, 2012; Cobbinah et al., 2015). Restricting people in the attainment of their livelihoods does not inspire collaboration nor instill a feeling of ownership (Amoah and Wiafe, 2012). Securing livelihoods and assuring a feeling of ownership are key to garnering support for conservation. King (2010) asserts that the exclusion or restriction of people from conservation areas only goes to foster resentment and apathy toward conservation.

Sometimes, not only does the establishment of protected areas preclude people from resource acquisition, it may also bring untold hardships (Mfunda, 2010; Masud et al., 2014). Local communities are forced to bear significant losses associated with the management of these

areas (Kiss, 1990; Mehta and Heinen, 2001; Wang et al., 2006; Kideghesho and Mtoni, 2008; Karanth and Nepal, 2011; Vedeld et al., 2012; Cobbinah, 2015). These losses come in the form of raided crops, depredated livestock and damage to other property. In most instances however, there is usually no compensation to offset these losses. Restriction to access resources, coupled with crop damages and the lack of compensation thereof often yields negative attitudes (Wang et al., 2006).

Normally, local people are excluded from the management of conservation areas as well (Amoah and Wiafe, 2012). The exclusion of local communities from the management of protected areas is believed to be a main source of conflict (Lewis, 1996). Communities who do not feel a part, but at the same time bear the costs of conservation are expectedly unsupportive of conservation (Gillingham and Lee, 2003). However when they are involved in the conservation process, they tend to have positive attitudes since they feel a sense of ownership (Infield and Namara, 2001). Positive attitudes are a necessity for conservation success. Struhsaker et al. (2005) report that, positive attitudes toward protected areas by neighbouring communities correlate strongly with the success of that protected area.

It was apparent that wildlife protection excluding or without the help and acceptance of local communities was difficult (Kiss, 1990; Allendorf et al., 2006). Owing to this, there has been a shift from the traditional 'fortress' approach of conservation to a more integrative approach which seeks to balance conservation with the socio-economic development of local people (Wells and McShane, 2004; King, 2010). As a result, community participation in conservation is now considered an integral part of conservation practice (Holmes, 2003; Naughton-Treves et al., 2005). Also, the long term conservation of protected areas requires that the concerns of fringe communities be incorporated into management plans (Mehta and Heinen, 2001; Nepal, 2002; Allendorf, 2010; Brockington and Wilkie, 2015). Failure to incorporate community needs into conservation policy may cause people to put up detrimental behaviours just to show their antagonism (Kideghesho, 2010).

Nyahongo (2010) states that, a prerequisite for the effective management of protected areas is the inclusion of local communities since conservation of these areas go beyond the physical boundaries of parks. However, effective management of protected areas also calls for an understanding of people's attitudes and the factors behind these attitudes (Allendorf et al., 2006; Sarker and Røskaft, 2011). This is a way to mitigating park-people conflicts thereby ensuring a possible 'win-win' outcome for all stakeholders involved. Abbot et al. (2001) is of

the view that many community-based conservation initiatives assume a positive impact on people's conservation attitudes. If one is to go by this assumption, then it is meet to first understand prevailing attitudes and the factors which engender them. Understanding residents' perceptions and attitudes toward conservation and incorporating these into management interventions could further improve attitudes, park-people relations and conservation at large. This is evidenced in Allendorf et al. (2012). In the absence of such knowledge, established conservation programmes may not culminate in the desired results (Infield and Namara, 2001; Cobbinah et al., 2015). In this study, I assess the attitudes of fringe communities toward protected areas in Ghana using the Mole and Digya national parks as case studies. The factors affecting peoples' attitudes were assessed and compared across the two protected areas to discover any similarities and disparities.

Peoples attitude towards protected areas are largely swayed by perceived benefits and costs accrued from such areas (Gillingham and Lee, 1999; Allendorf et al., 2006; Tessema et al., 2010). Naturally, attitudes tend to be positive when people benefit in one way or another from the protected areas (Infield and Namara, 2001; Mehta and Heinen, 2001; Scanlon and Kull, 2009; Cobbinah, 2015). Likewise, Gillingham and Lee (1999) reported that people will generally support conservation efforts only when their livelihoods are not threatened. On the other hand, where livelihoods are threatened by conservation, people are usually negative (Baral and Heinen, 2007; Kideghesho et al., 2007). For example, in instances where crops are raided by pest animals from protected areas, attitudes tend to be negative (Manyama et al., 2014).

Against this backdrop, I hypothesize that households benefiting from the protected areas should portray more positive attitudes (H1). Also, considering the losses that may be incurred by locals and the absence of an effective compensation scheme, it is hypothesized that households overwhelmed by these losses will portray less favourable attitudes (H2). Abbot et al. (2001) provide evidence that livelihood programs are capable of affecting people's attitudes and behaviours positively making them more amenable toward conservation. As a basis, I also hypothesize that households that are aware of or have participated in livelihood support projects will portray favourable attitudes (H3). Having an alternate means of securing income or livelihood tends to engender positive attitudes. Nyahongo (2010) reports that, people with alternate means of income were less likely to engage in illegal activities like poaching. Also, in the absence of an alternate means of securing livelihoods, strict management of protected areas may engender or inspire negative attitudes. Nonetheless, the opposite may hold true, as

implied by Ansong and Røskaft (2011). If this assertion is valid, I predict that having an alternate source of livelihood will correlate with positive attitude (H4).

Studying the impacts of tourism on attitudes, Lankford et al. (1994), alluded to the fact that local residents' attitudes arise as a result of the interplay between perceptions and other underlying 'moderating' factors. Socioeconomic and demographic factors make up these 'moderating' factors. Socioeconomic and demographic variables have been found to influence conservation attitudes to certain degrees (Gillingham and Lee, 1999; Infield and Namara, 2001; Mehta and Heinen, 2001; Holmes, 2003; Wang et al., 2006; Karanth and Nepal, 2011; Sarker and Røskaft, 2011; Masud and Kari, 2015). As such, the effect of sociodemographic variables on attitudes was also assessed.

Admittedly, quite a large number of studies have assessed peoples' perceptions and attitudes in other areas. However, literature pertaining to local community attitudes toward protected areas in Ghana is rather scant, as such the need for more of such assessments. To the best of my knowledge, no recent study has assessed the attitudes of fringe communities toward the Mole and Digya national parks. Though some studies have examined stakeholder attitudes toward forest management in Ghana (Ansong and Røskaft, 2011; Owusu and Ekpe, 2011), this will however be amongst the few (if any) to assess community attitudes from a comparative standpoint.

An important contribution of this study is the country-specific knowledge it provides on park-people relationships. This knowledge could serve as a baseline for evaluating conservation attitudes vis-à-vis the implementation of new policies. This knowledge could also be juxtaposed with that of other areas to provide a comprehensive approach or framework for effectively mitigating park-people conflicts, especially those pertaining to peoples' attitudes. Findings will broaden our understanding of the factors that influence local residents' attitudes, a step closer to the effective mitigation of park-people conflicts. Findings should also assist policy makers in the formulation of more effective conservation interventions.

Methods

Study Areas

I focus on investigating locals' attitudes toward conservation in Ghana. Ghana has a fairly extensive network of protected areas which offers protection to varied ecosystems and their associated biota. Wildlife conservation in Ghana dates back to the colonial era. However, the first Wildlife policy for the country was adopted in 1974, recognizing the importance of protected areas in conservation. In 1994, this policy was revised placing emphasis on the role of community in wildlife conservation (Ntiama-Baidu et al., 2001). The study was conducted in communities around two protected areas in Ghana, the Mole national park and the Digya national park.

The Mole national park is situated in the northern part of Ghana (Figure 1). The park covers an approximate area of 4800 km², and is the largest in the country. Although established in 1958, the Mole national park was re-designated in 1971 as a national park (Ntiama-Baidu et al., 2001). The habitat type is Guinea Savannah woodland and the mean annual rainfall is about 1000 mm (Jachmann, 2008; Burton et al., 2011). Over 90, 300 and 740 species of mammals, birds and plants respectively are protected within the park (Ghana Forestry Commission). Four of the occurring plant species are believed to be endemic to this area (Ntiama-Baidu et al., 2001). The park is surrounded by about 33 villages (IUCN-PAPACO, 2011b). These communities are largely engaged in subsistence farming. Farming activities are seasonal relying heavily on the rains.

The Digya national park, the second largest in the country is located in central Ghana (Figure 1). It covers an area of roughly 3480 km² and is bordered to the east and north by the Volta Lake. Vegetation is largely Guinea Savannah woodland and transitional semi-deciduous forest. Mean reported annual rainfall ranges between 1200-1300mm. The area was first established as a game reserve in 1909 and later expanded and gazetted as a national park in 1971 (Twumasi et al., 2005). The park is inhabited by sizable populations of elephants (*Loxodonta africana*), ungulates, manatee (*Trichechus seneganiensis*), and primate species among others (Twumasi et al., 2005; Jachmann, 2008). The park stretches across three regions of Ghana, namely the Brong Ahafo, Eastern and Ashanti regions and is fringed by indigenous and migrant communities engaged in farming and fishing as a means of livelihood.

I selected these protected areas because of their sizes. They are the largest in the country, well established and very important in the conservation of biodiversity within the country. These sites also show diversity in ecological and socioeconomic settings. Tourism is very established in the Mole national park. However the same cannot be said for the Digya national park. Poverty is reported to be the root cause of conflicts between fringe communities and the park in the Digya area (Ayivor et al., 2013). I am of the opinion that the same is true for communities around the Mole national park. Poaching, bushfires, illegal grazing and logging are the main pressures faced by these protected areas (IUCN-PAPACO, 2011b; IUCN-PAPACO, 2011a).

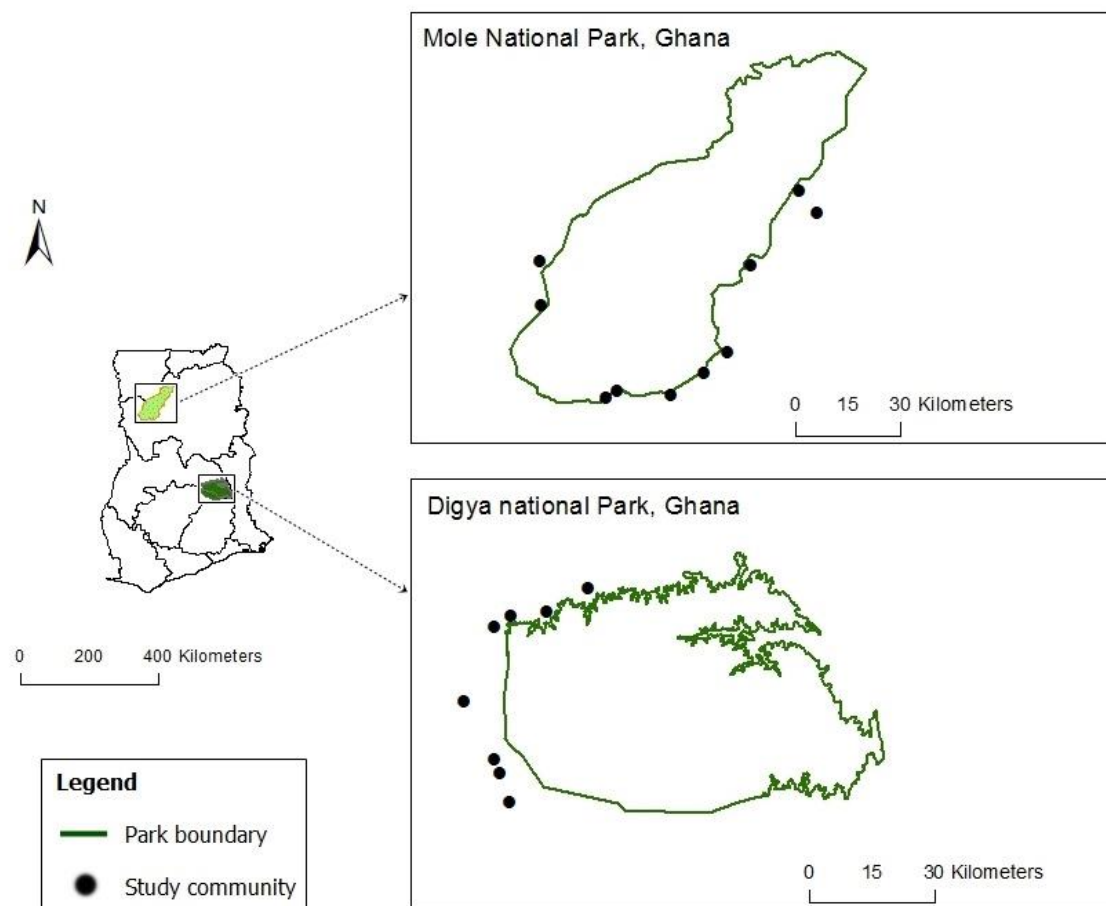


Figure 1: Map of Mole and Digya national parks in Ghana showing study communities.

Data Collection

Questionnaire Design

Household interviews were carried out using a semi-structured questionnaire. The layout of the questionnaire comprised a part to record demographic details of respondents, a part to record benefits and costs accrued from protected area and also a part to assess their perceptions or attitudes toward the protected area. I assessed respondents attitudes with 12 statements (Table 1) which used a 5-point Likert scale ranging from strongly disagree (coded as 1) to strongly agree (coded as 5). The undecided or neither position of each statement was coded 3 (Likert, 1932). Here, attitude is defined as the tendency to act in a particular manner when confronted with a particular situation or object (Oppenheim, 1992; p.174) based on evaluations or opinions of the presented situation or object (Petty et al., 1997).

The whole questionnaire was preceded by an introductory part which highlighted the study as academic and clearly spelt out its aims. All questions included in the questionnaire were evaluated taking into consideration whether participants could understand and whether they would be able to answer (Lee, 2006). I pre-tested the questionnaire using the first 10 respondents in the study area. This was necessary to assess its clarity and also possible difficulties that were likely to arise as a result of translation into local languages. Based on the pre-test, some questions were modified to address ambiguity. Also, some filter questions were included and somewhat redundant questions were discarded.

Sample Design Selection and Determination of Sample Size

Since little information was available on the populations of interest prior to the field work, I adopted simple random sampling as the sampling approach (Israel, 1992b). Communities around the protected areas visited were listed and a number of them randomly selected based on advice from officials as regarding accessibility.

In the determination of the sample size, I used Cochran's formula (Cochran, 1963) as quoted in (Israel, 1992a). The equation is given below;

$$n = \frac{Z^2 pq}{e^2} ;$$

Where 'n' is the sample size, 'Z' is the abscissa of the normal curve (z-score), 'p' is the degree of variability in the population, 'q' is 1- p and 'e' is the desired level of precision (sampling error).

Table 1. Mean scores of attitude statements for the two protected areas.

Attitude statements	Mole ^a (n = 190)		Digya ^b (n = 148)		Statistics	
	Mean	SD	Mean	SD	χ^2	P
I am happy about the presence of the protected area in my community.	4.3	1.4	4.2	1.2	20.09	0.001*
The presence of the protected area has improved my living conditions.	2.4	1.7	2.6	1.7	7.61	0.107
The presence of the protected area has worsened my situation.	3.1	1.9	4.1	1.5	41.83	0.001
The presence of the protected area has brought development to village.	2.7	1.8	1.4	1.0	56.19	0.001
Management of the protected area is effective.	4.3	1.1	3.8	1.3	13.08	0.011
The protected area is necessary for the protection of the remaining resources.	4.8	0.8	4.7	0.8	19.60	0.001*
People should be allowed to hunt in the protected area.	4.7	0.8	4.4	1.3	13.76	0.008
Relationship between community and park officials is cordial.	4.3	1.2	4.4	1.1	2.00	0.736
Park officials understand and are concerned about our needs.	2.0	1.5	2.4	1.4	34.72	0.001
The community is involved in decision-making and management of the area.	3.8	1.5	1.2	0.7	211.53	0.001
We are encouraged to participate in conservation programs.	3.9	1.5	2.6	1.7	62.06	0.001
My personal relationship with the protected area is good.	4.3	1.2	4.4	0.9	23.88	0.001*

Notes: Negative statements are in bold face. Scores of these statements were reversed so that high scores indicate more positive attitudes. *df* is 4 for χ^2 test.

* Statistically significant, but actual difference between mean scores rather small.

^aCronbach's $\alpha = 0.77$

^bCronbach's $\alpha = 0.70$

To determine the actual sample size, maximum variability was assumed within the population ($p = 0.5$) (Israel, 1992a). The confidence level was set at 95% (corresponding $z = 1.96$) and the desired precision was set at 5%. The resulting sample size derived was approximately 385. This number was divided between the two protected areas.

Questionnaire Administration

The survey was conducted between June 2015 and August 2015. In each community, I sought permission from the community head before the interviews were conducted. Household heads (main targets) were interviewed face-to-face using the questionnaires. In their absence, any member of the household over 18 years of age (mostly housewives) was interviewed. Prior to the commencement of the interviews, the aim of the research was explained (Pershing, 2006). Household heads or their representatives who were willing to participate were then interviewed. Over 90% of visited households had males as heads. This resulted in a disproportionately large number of male interviewees. However, mention should be made of the fact that most of the interviews were carried out in the presence of the housewives whom were allowed to contribute.

For ethical reasons and also to improve willingness to participate, respondents' names were not obtained. This was to ensure anonymity of responses thereby encouraging respondents to provide actual information without the need for alteration (Podsakoff et al., 2003). Respondents were also assured the utmost confidentiality with regards to their responses. This was in hope of reducing the likely apprehensions that were to arise (Oppenheim, 1992; p.104). Interviews were conducted mainly in local languages with the aid of translators. Interviews with respondents on average lasted between 20 to 25 minutes.

Due to time constraints and the difficulties experienced in accessing communities around the Digya National Park, the calculated sample size of 385 was not realized. Nonetheless, I was able to conduct 346 household interviews, 196 households around the Mole national park and 150 from the Digya national park. Table 2 presents descriptive statistics of respondents' socio-economic and demographic characteristics in the two protected areas. Differences between the two areas were also explored using chi-square test.

Data Analyses

Analyses were performed using IBM's Statistical Package for Social Sciences (SPSS) version 23 (IBM Corp., 2015). Significance value was set to 0.05.

Table 2. Respondents' characteristics in the two protected areas and results of χ^2 tests.

Variable	Protected Area		Statistics		
	Mole (%)	Digya (%)	χ^2	<i>df</i>	<i>P</i>
Age (years)			6.17	2	0.046
≤ 39	27.1	33.6			
40-59	40.1	45.6			
≥ 60	32.8	20.8			
Household size			47.69	1	0.001
≤ 7	40	77.9			
> 7	60	22.1			
Annual Income (GHC)			6.90	1	0.009
≤ 2000	68	52.8			
> 2000	32	47.2			
Formal Education			47.83	2	0.001
None	74.7	38			
Primary	14.9	41.3			
Secondary or higher	10.3	20.7			
Occupation			127.53	2	0.001
Farmer	90.7	63.3			
Fisher folk		38.7			
Other	9.8	10.6			
Benefit from PA			6.05	1	0.014
Yes	50.5	36.7			
No	49.5	63.3			
Problems from PA			56.45	1	0.001
Yes	75.5	34.7			
No	24.5	65.3			
Residency			185.97	1	0.001
Native	85.7	11.3			
Migrant	14.3	88.7			

Calculation of a composite attitude score

The scores of statements used in assessing respondents' attitudes toward the protected areas were summed up to produce a composite attitude score. Prior to the summation, scores of negative statements were reversed to ensure that scoring on all statements were uniform. As such, high scores on negative statements connote positive attitudes. Also, the internal reliability of the statements was verified (Table 1). All 12 statements were included in the calculation since none had a very low correlation with the composite score. According to Likert (1932), a weak correlation is an indication of the fact that, an item or statement does not measure what the remaining items or statements are measuring. Statements' scores computed ranged from 12 to 60. Scores above the midway point on this continuum were considered as an indicator of positive attitude (Oppenheim, 1992; p.198). The percentages of respondents with positive and negative attitudes were then determined.

With the composite attitude scale, an independent-samples t-test was also conducted to compare the mean attitude scores of households from the two protected areas.

Multiple regression analysis

I performed multiple regression analyses on the attitude scale for both protected areas to assess how socioeconomic and demographic variables, as well as benefits and costs affect attitudes toward the respective protected areas. Choice of socio-demographic variables included in the regression model was based on their significance in influencing attitudes, as reported in similar studies. These variables were age (Karanth et al., 2008; Masud and Kari, 2015), years of formal education (Tessema et al., 2010; Manyama et al., 2014), occupation (Khatun et al., 2012; Masud and Kari, 2015), household size (Tessema et al., 2010), annual household income (Sarker and Røskoft, 2011; Lepetu and Garekae, 2015), residency status (Holmes, 2003), alternate form of employment (Nyahongo, 2010; Lepetu and Garekae, 2015), and awareness of or participation in livelihood support projects (Mehta and Heinen, 2001; Kideghesho et al., 2007). This analysis also sought to determine the best predictor of attitude within the survey areas. It should however be stated that, the word predictor is used loosely in this context and does not imply any causal relationship (Tabachnick and Fidell, 2013; p.122).

Preliminary analyses were carried out to make sure there were no violations in the assumptions of multiple regression (Pallant, 2005; p.142). This led to the logarithmic transformation of two

variables, namely household size and annual income. This was necessary for the reduction of skewness and hence the improvement of normality (Tabachnick and Fidell, 2013). One variable (years of formal education) deviated slightly from normal. However, I found no transformation that produced a nearly-normal distribution without the loss of values. As a result, I used the untransformed version of this variable for the analyses.

Also, the ratio of cases to independent variables (sample size) was above the minimum requirement recommended by Tabachnick and Fidell (2013; p.123). Their method of estimating the sample size takes into account the number of independent variables one intends to use in the analysis. Using this formula, $N \geq 50 + 8m$ (where m = independent variables), I needed a minimum of 130 cases (10 independent variables) for analysis involving the individual protected areas and a minimum of 138 cases (11 independent variables) for analysis across both protected areas.

Results

Household characteristics

All respondents interviewed were aware of the existence of the protected areas within their locality. Out of the 346 household respondents interviewed, 334 (96.5%) were males. The ages of respondents ranged from 20 to 101 years with a mean of 48.8 (SD = 15.6) years. About 59% of respondents had no formal education; 26% however had attained some primary education while 15% had obtained secondary education or higher. Majority of respondents (about 79%) were into farming, while 17% were fishermen (all around the Digya national park). The remainder of the respondents (10%) were engaged in other forms of employment. This included employment in the formal sector, petty trading and charcoal burning. The average household size for respondents across the study areas was 8.3 (SD = 5.6) persons.

Benefits from the protected areas accrued to about 45% of respondents. Benefits were in the form of non-timber forest products (NTFPs, 88.6%) water (26.6%) and financial incentives (14.9%). Also, about 58% of respondents faced or had faced problems from the protected areas. Among the problems faced by respondents, crop raiding was the most cited (87% of respondents). The other problems (restriction to access, conflicts with officials and livestock depredation) summed to 18.5% of cases. Animals implicated in the crop raids included patas monkeys (*Erythrocebus patas*), elephants (*Loxodonta africana*), warthogs (*Phacochoerus africanus*), red river hogs (*Potamochoerus porcus*) and baboons (*Papio anubis*) among others. Percentages pertaining to occupation, benefits and losses were in excesses of 100% as a result of multiple responses from respondents. The respondents' characteristics, including differences between the two protected areas are listed in Table 2.

Attitudes toward protected areas

The calculated reliability index for the attitude scale was 0.73 for both protected areas. The alpha value for the Mole national park scale was 0.77 while that for Digya national park was 0.70 (Table 1). A total of 338 (97.7%) households had a mean attitude score of 42.6 (SD = 8.7), an indication of mild positive attitudes toward the protected areas. Households around the Mole national park had a mean score of 44.6 (SD = 9.1) with individual scores ranging from 22 to

60. Households around the Digya national park had a mean score of 40.1 (SD = 7.4) with scores ranging from 20 to 56.

Although on the whole analysis inferred mildly positive attitudes toward the protected areas, not all households shared the same view (Figure 2). About 24% (82) of the respondents expressed negative attitudes. Also, residents around the Mole national park were more positive. A statistically significant difference was found between the mean attitude scores for households around the Mole and Digya national parks [$t_{(335)} = 5.02, p < 0.001$].

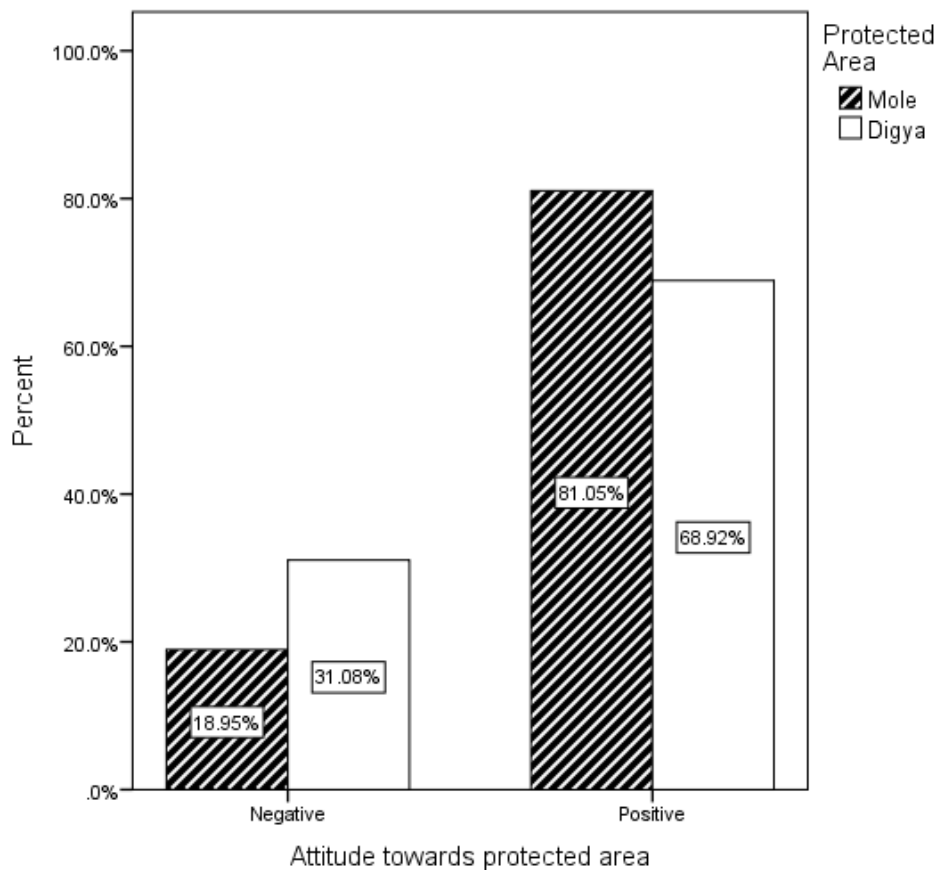


Figure 2: Households' attitudes toward the two protected areas.

Factors influencing attitudes toward protected areas

Mole National Park

A multiple linear regression analysis with the attitude as dependent variable was highly significant [$F_{(10,153)} = 4.48, p < 0.001$]. 22.7% of the variation in respondents' attitudes was explained by the regression model ($p < 0.001$). Of all the variables included in the model, benefits ($p = 0.002$), problems ($p = 0.017$) and household size ($p = 0.029$) significantly affected attitudes. Households which held more positive attitudes were likely to be of small sizes, benefited and encountered little to no problems from the protected area. However, of these significant variables, benefit ($\beta = 0.242$) was the largest influencer of attitudes (Table 3).

Digya National Park

A combination of the independent variables helped explain about 23% of the variance in attitude scores [ANOVA: $F_{(10,130)} = 3.85, p < 0.001$]. In this study area, households expressing positive attitudes were more likely to have benefited from the protected area ($p < 0.001$) and faced no problems from the area ($p = 0.002$). They were also likely to be farmers ($p = 0.037$). Again among variables significantly affecting attitudes, benefit was the greatest influencer ($\beta = 0.293$), as indicated by the unique contribution to the total variance (Sr^2 ; Table 3). This was followed by problems resulting from protected area ($\beta = 0.262$). Residency status of respondents was almost significant ($p = 0.051$).

Both protected areas

Based on a multiple regression model, the independent variables were statistically significant in explaining the respondents' attitudes [$F_{(11,293)} = 8.95, p < 0.001$]. Of the eleven variables included in this model, seven were significant in influencing attitudes toward protected areas ($p < 0.05$). These included benefits, problems, protected area, household size, occupation, awareness of livelihood support projects and education. Together, these independent variables explained 25.2% of the variation in attitudes. Among these variables, protected area makes the largest contribution ($\beta = -0.29$). The unique contributions of significant variables are displayed in Table 3. Alternate means of employment, annual income, residency status and age did not influence attitudes.

Table 3. Standard multiple regression analyses with attitude as dependent variable and different socio-demographic factors as independent variables. For analysis across the two areas, the protected areas themselves were included as independent variables.

Variable	Mole (n = 163)			Digya (n = 140)			Both PAs (N = 304)		
	β	<i>P</i>	Sr ²	β	<i>P</i>	Sr ²	β	<i>P</i>	Sr ²
Benefit (No)	0.242	0.002	0.049	0.293	< 0.001	0.080	0.262	< 0.001	0.063
Problem (No)	- 0.200	0.017	0.029	- 0.262	0.002	0.061	- 0.215	< 0.001	0.034
Protected area (Mole)							- 0.294	0.003	0.023
Household size (log)	- 0.174	0.029	0.024	- 0.083	0.322		- 0.156	0.009	0.018
Occupation (Non farmer)	0.101	0.232		0.175	0.037	0.026	0.142	0.013	0.016
Livelihood project (No)	0.134	0.072		0.076	0.360		0.182	0.019	0.014
Education	0.070	0.378		0.141	0.095		0.118	0.035	0.011
Alternative employment (No)	0.098	0.199		0.045	0.590		0.100	0.062	
Annual income (log)	0.068	0.394		0.139	0.099		0.067	0.234	
Residency (Migrant)	- 0.142	0.062		0.164	0.051		- 0.056	0.463	
Age	0.023	0.774		- 0.014	0.861		0.012	0.819	
Model Summary									
<i>R</i>		0.476			0.478			0.502	
<i>R</i> ²		0.227			0.228			0.252	
Adjusted <i>R</i> ²		0.176			0.169			0.223	
Unique variability		0.102			0.167			0.179	

Notes: β = Standardized regression coefficients, *P*= significance, and Sr² = unique contribution of variable to total variance. Direction of predictor variables are indicated in parenthesis except for Household size and Annual income which indicate type of transformation

Discussion

An assessment of community attitudes toward the Mole and Digya national parks revealed findings that are noteworthy. Here, only results that are significant are discussed. Non-significant results are however mentioned but not discussed at length.

Attitudes toward protected areas

Generally, local communities were mildly positive toward the protected areas and conservation at large. This could be attributed to local communities' understanding of the fact that protected areas are necessary for the protection of resources. General attitudes were not considerably positive, likely due to reasons which could be inferred from scores of statements comprising the attitude scale (Table 1). In as much as communities regarded the protected areas as essential, their presence had neither improved their living conditions considerably nor brought any major development to the communities. The perceived lack of understanding and concern for community needs by park officials could also explain the low positive attitudes expressed by people. If not adequately addressed, such perception could in the long run inspire negative attitudes.

Although households expressing positive attitudes in both areas were in the majority, the level of positivity is not at par when the two protected areas are contrasted (Figure 2). Residents around the Mole national park were comparatively more positive than those around the Digya national park. This observed disparity could be in part explained by the level of engagement of community members in decision making and management of the protected areas. The data show that communities around the Mole national park are more engaged in the management process. Also, there is very little encouragement of Digya residents to participate in conservation programs. Personal observations and interviews indicated conservation programs to be almost non-existent around the Digya national park. Another likely cause of the observed difference could be ascribed to unresolved conflicts between protected area management and fringe communities around the Digya national park. Most of these conflicts pertain to evictions and have been rather confrontational over the years (see Ayivor et al., 2013). Unresolved conflicts make it difficult to foster harmonious relations between affected communities and parks (Infield and Namara, 2001).

Factors influencing attitudes toward protected areas

The study was based on the assumption that perceived benefits and costs largely influenced attitudes. Regression analyses for both Mole and Digya national parks emphasize the importance of benefits and losses on conservation attitudes (Table 3). This finding is in congruence with similar studies elsewhere (Gillingham and Lee, 1999; Holmes, 2003; Allendorf et al., 2006; Kideghesho et al., 2007; Tessema et al., 2010). The results affirm the assertion that, the receipt of benefits elicits favourable attitudes (H1) thus making people more amenable to the concept of protected areas. From the data more households around the Mole national park benefited in one way or another than those around Digya national park (Table 2). This could also be a plausible reason why Mole households are comparatively more positive.

Assessing the social and conservation outcomes of protected areas at the global scale, Oldekop et al. (2015) discovered that, achieving positive conservation outcome was more likely when socioeconomic benefits accrued to local communities. Considering this, conservation policies need to ensure that some tangible benefits stemming from protected areas accrue to locals if they are to wholly or partly support conservation. These benefits must be relevant, in the sense that they must outweigh the perceived costs (Scanlon and Kull, 2009) and also address the actual needs of people (Kideghesho and Mtoni, 2008). However, to ensure that these benefits elicit the desired conservation attitudes, they should be intrinsically linked to the existence of the protected areas (Kiss, 1990; Mehta and Heinen, 2001).

Although most households were happy about the existence of the protected areas in their locality, personal interviews revealed they were not happy about the fact that they had to bear the costs associated with its existence. Regression results also give credence to the hypothesis (H2) that, households overwhelmed by losses portray less favourable attitudes (Table 3). Conversely, Kideghesho et al. (2007) report that, villagers experiencing minimal conflicts or losses are more positive than their counterparts. Interestingly, majority of households around the Mole national park experienced more losses than households situated around the Digya national park. This disparity between losses and attitude could be explained by the fact that benefits received by Mole residents have been somewhat adequate at offsetting their costs. However, in as much as steps were taken to minimise the possibility of social desirability bias, this cannot be totally ruled out considering the nature of the responses. In social desirability bias, respondents tend to report what they think enumerators want to hear rather than what actually is (Podsakoff et al., 2003).

When asked about the current intensity of problems (especially crop raiding) compared to five years ago, majority of respondents (79%) who experienced losses claimed the situation to be increasing. If this indeed is the case then pertinent measures must be established to avert this trend. This is necessary considering the fact that losses correlate negatively with favourable attitudes. Most households also stated that they had stopped reporting raids and damages to officials since nothing was done to alleviate their plight. Although direct compensation is reported to correlate with park effectiveness (Bruner et al., 2001), no such scheme was available to households of the study areas visited. In the absence of compensation schemes, employment opportunities or alternate means of securing livelihoods should be in place so as to help households offset costs that are incurred as a result of the protected areas.

Benefits together with problems or losses were the common significant variables influencing attitudes in the two study areas. Results also indicated that household size significantly influenced Mole households but not Digya households. On the other hand, occupation significantly influenced Digya households but not Mole households. Generally, household size also correlated negatively with attitudes when the two areas are considered as a unit. Mutanga et al. (2015) report similar finding from Zimbabwe. Larger households may tend to require much more resources from protected areas. Amidst strict exclusion from resource areas, these households may feel more curtailed when it comes to the attainment of their household needs. In agricultural communities larger households may require rather large tracts of land for their subsistence farming. When farm lands become scarce, these households may not see conservation as an optimal land use option hence their likely apathy.

From the study, non-farmers appear to be less favourable toward the protected areas. This seems rather contradictory considering the fact that farmers are purported to bear greater costs of conservation as a result of crop raids. However, this finding may not be contradictory assuming the non-farmers were previously farmers who had been forced to change occupation because of inability to cope with the costs they incurred. Also, a large proportion of non-farmers were fishers and these were exclusive to communities around the Digya national park. These fishers were in constant conflict with park officials with some claiming to have been extorted from. Digya national park is fringed largely by water, with boundaries extending into these waters. Most fishers claiming not to know the boundary breach or drift into the national park. When arrested, punitive sanctions often apply. This creates antagonism and resentment toward park officials and toward the park in general. Locals feel they have a right to at least fish in the river in order to acquire their livelihoods since they are not allowed access to the

land. Similar findings were reported by Ayivor et al. (2013). These constant altercations and the subsequent negative attitudes they are likely to engender could also explain the variation in household attitudes between the Mole and Digya national parks.

On the whole, households which were aware of or had participated in livelihood projects significantly portrayed positive attitudes (Table 3). This finding is in accordance with my hypothesis (H3). Contrary to my other hypothesis (H4), having an alternate means of securing livelihood had no effect on attitudes at the 5% significance threshold. Nevertheless, this variable supports the hypothesis at a significance threshold of 10%. People often lose their livelihoods when conservation areas are established. In such situations and amidst strict restrictions, it is rather natural that such people will exhibit negative sentiments. On the other hand, when projects aimed at peoples' ability to secure livelihoods are in place, attitudes will often steer toward the positive spectrum. Also, amidst strict law enforcement, people will still exploit resources within protected areas illegally if no strategies or alternatives are set in place to cater for their livelihood needs (Kideghesho, 2010; Amoah and Wiafe, 2012). This underscores the need to make more livelihood-relevant projects and schemes available to local communities. The establishment of such programs must however include inputs from local people. Projects have been reported abandoned because local inputs were not adequately sought and factored into them (Cobbinah et al., 2015). Livelihood projects could also be used a proxy for the distribution of conservation benefits.

The other factor affecting community attitudes across the study areas was education. A host of studies (Xu et al., 2006; Kideghesho et al., 2007; Manyama et al., 2014; Masud and Kari, 2015; Mutanga et al., 2015) also report a correlation between level of education and conservation attitudes. Better educated people are suggested to be in better position to perceive the role of protected areas in conservation (Tessema et al., 2010). Cobbinah (2015) notes that, in the absence of socio-economic benefits, local communities may still express positive attitudes or may actually support conservation because of the environmental services. Allendorf et al. (2012) also alludes to this assertion. However, these people should be able to perceive these services and the only way to do that is if they are educated in that regard. From their study, Allendorf et al. (2012) noted that communities which received requisite conservation education were better equipped to perceive ecosystem services and benefits stemming from conservation. The aforementioned stresses the need for more conservation relevant education in communities bordering conservation areas.

Karant and Nepal (2011) and Allendorf et al. (2012) report that protected areas themselves are vital predictors of attitudes. Regression results from this study are in good agreement with the above report, implying that local conditions (for example management interventions) are capable of swaying local attitudes for better or worse. This further implies that, an exclusive and militaristic approach to protected area management may not augur well for conservation at large in the long run. Local communities are ready and willing to be a part of conservation. When asked about who should be responsible for the management of the protected areas, majority of households called for partnership between communities and government (protected area management). Amoah and Wiafe (2012) report similar sentiments. Collaborative management should be given the necessary consideration bearing in mind the fact that most protected area managers are ill-equipped (resource-wise) to effectively carry out their mandates (Allendorf et al., 2006). Notwithstanding, in as much as communities call for their inclusion in the management process as regarding the protected areas, pertinent questions need to be asked: What will be the role of the communities in the management process and to what extent are they allowed to act? Also, are they to participate in management of the areas, benefit sharing or both?

Despite findings elsewhere, this study provided no evidence to the effect that income, age and residency status significantly affected attitudes.

The study has some limitations. First, regardless of their status as important conservation areas, the Mole and Digya national parks are not representative of all conservation areas in the country and as such extrapolation of these findings to other areas should be done with some caution. Second, the components and variables from which attitude was inferred cannot be said to be all-inclusive. Third, the differences in attitudes scores of the two areas could also be as a result of sampling anomaly. The presence of fisher folks may have lowered the overall attitude score of residents around the Digya national park.

To conclude, this study examined attitudes of fringe communities toward selected protected areas in Ghana. The result depicts general attitudes across the two protected areas to be mildly positive. However, Mole residents were comparatively positive than their Digya counterparts. The importance of benefits and losses in mediating park attitudes was reaffirmed. Based on this, I subscribe to the notion by Lewis (1996) that, most of the prevailing conflicts pertaining to protected areas and local communities will be resolved if benefits are extended to local people and or if the negative impacts associated with living close to protected areas are

mitigated. I also found that awareness of or participation in livelihood support projects had positive effects on attitudes. Furthermore, prevailing local conditions in each of the protected areas significantly influence attitudes. This calls for locally tailored management techniques rather than the adoption of blanket approaches.

Achieving conservation goals while meeting the resource and livelihood needs of local communities is an arduous but not impossible task. Based on findings from this study, a number of recommendations are suggested which when considered may further improve peoples' attitudes toward the protected areas.

1. Management should capitalize on their cordial relationship with communities (Table 1) and actively engage local communities in conservation especially those around the Digya national park.
2. The tourism potential of the Digya national park should be harnessed creating more local economies from which people can derive some tangible benefits to offset losses and opportunity costs. Building local economic capacity applies to both protected areas. However, tourism should be carefully planned so as not to jeopardize the protection of biodiversity (Danelutti et al., 2015).
3. Policies, projects and recommendations that have a direct impact on livelihoods of local communities and also park-people relations should be given prime considerations. These projects should however be hinged on the adaptive management framework, where they can be monitored, evaluated and if need be improved (Wells and McShane, 2004).

If recommendations are adequately integrated or incorporated into management programs, then a re-assessment of community attitudes could be undertaken in the future to ascertain whether integrated changes have had the desired effects on attitudes. Also, a longitudinal study taking into consideration other factors that are likely to influence local peoples' attitudes toward conservation is not out of place.

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Appendix

The semi-structured questionnaire used in this study.

INTRODUCTION

Dear respondent,

As part of the requirement for the completion of a master programme in Natural resources management is the execution of this project. My thesis or project aims to assess the factors influencing the attitudes of local communities toward protected areas. This study is important in forestalling conflicts that may arise between local communities and protected area management, and as such the need for your response. I hope you would take a few moments of your time to answers the questions below. There are no right or wrong answers and I assure you that your response will be treated with the utmost confidentiality.

Thank you.

Questionnaire no.: _____ Date: _____

Village name: _____ GPS coordinates: _____

Please tick or fill in where applicable.

A. Demographic details

1. Are you the household head? Yes [] No []
2. Gender: Male [] Female []
3. Year of birth:
4. Years of schooling:
5. Are you employed: Yes [] No []
6. Main form of employment:
Formal employment [] Crop farmer [] Livestock farmer [] Hunter []
Fisher folk [] Trader [] Other (Specify):
7. For crop farmers: Distance of farm from protected area.
Less than 1km [] 1-3km [] 4-6 [] More than 6km []

8. Do you have any alternative source(s) of livelihood? Yes [] No []
9. Household size:
10. What is your annual household income (GH¢)?
11. Residency: Indigene [] Migrant []

B. Perceived benefits and costs accrued from protected areas.

1. Are you aware of the existence of a protected area around your locality?
Yes [] No []
2. Do you benefit in any way from the protected area? Yes [] No []
3. Type of benefit: Meat [] Medicine [] Fuelwood/Timber []
Financial incentives [] Water [] Other (Specify):
4. Do you face problems from the protected area? Yes [] No []
5. Type of problem: Crop raiding [] Livestock depredation []
Destruction of property [] Conflicts with park officials [] Threat to life and personal
safety [] Restriction on access [] Other (Specify):
6. Which animals are responsible for these problems?
.....
.....
7. The population(s) of these problem animals is/are:
High [] Stable [] Low []
8. Compared to 5 years ago, what is the intensity of the problem(s) currently?
Increasing [] Stable [] Decreasing []
9. Usually, in which month is the damage highest?
10. Do you have an idea of how much damage is caused? Yes [] No []
11. If yes, can you estimate the annual cost? GH¢
12. Are you compensated in any way for losses caused by “park animals”?
Yes [] No []
13. What form of compensation do you receive?
14. Are you satisfied with the level of compensation? Yes [] No []

C. Perceptions of protected area.

1. I am happy about the presence of a protected area in your locality?
Strongly agree [] Agree [] neither [] Disagree [] Strongly disagree []
2. Reason(s) for opinion:

3. The presence of the protected area has improved my living conditions.
Strongly agree [] Agree [] neither [] Disagree [] Strongly disagree []
4. The presence of the protected area has worsened my situation.
Strongly agree [] Agree [] Neither [] Disagree [] Strongly disagree []
5. The presence of the protected area has brought development to the village.
Strongly agree [] Agree [] Neither [] Disagree [] Strongly disagree []
6. Management of the protected area has been effective.
Strongly agree [] Agree [] Neither [] Disagree [] Strongly disagree []
7. Reason(s) for opinion:

8. The protected area is necessary for the protection of remaining natural resources.
Strongly agree [] Agree [] Neither [] Disagree [] Strongly disagree []
9. People should be allowed to hunt in the protected area.
Strongly agree [] Agree [] Neither [] Disagree [] Strongly disagree []
10. Relationship between community and park officials is cordial.
Strongly agree [] Agree [] Neither [] Disagree [] Strongly disagree []
11. Park officials understand and are concerned about our needs.
Strongly agree [] Agree [] Neither [] Disagree [] Strongly disagree []
12. The community is involved in decision-making and the management of the protected area.
Strongly agree [] Agree [] Neither [] Disagree [] Strongly disagree []
13. We are encouraged to participate in conservation programs.
Strongly agree [] Agree [] Neither [] Disagree [] Strongly disagree []
14. My relationship with the protected area is
Very Good [] Good [] Neutral [] Bad [] Very bad []

15. Are you a member of a conservation planning committee? Yes[] No[]
16. What is your role in the committee? Executive [] Member []
17. Have you had or do you know anyone who has had confrontation with park officials.
Yes [] No []
18. Are you aware of any livelihood support program in the village?
Yes [] No []
19. If yes, do you or have you participated in any livelihood support program?
Yes [] No []
20. In your opinion, who should be responsible for the management of the park?
Local community [] Government [] Partnership []
21. What will make you fully support conservation and management of the protected
area?
Compensation [] Livelihood projects [] Access []
Financial incentives [] Employment as park staff []
22. Any additional comments?

Thank you.