Research on Humanities and Social Sciences
ISSN (Paper)2224-5766 ISSN (Online)2225-0484 (Online)
Vol.4, No.19, 2014

The Effects of Natural Resource Conservation on the Development of Fringe Communities around the Barekese Catchment Area

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Abstract
The study sought to assess the effects of nature resource conservation on fringe communities in the Barekese conserved area in Ghana. A sample of 82 household heads was randomly selected from four fringe communities and interviewed to gather the needed primary data. Also focused group discussions were held with farmers, fishers, hunters and chain-saw operator groups in the sampled communities. The findings were that the Barekese catchment area conservation project had resulted in the reduction in farmlands of the people living in the fringe communities. It has also brought about some natural resource use conflicts, poverty and the undermining of livelihood opportunities of the fringe communities. It is therefore recommended that alternative livelihood opportunities, especially nonfarm businesses need to be encouraged and supported by the government and other local authorities among the resource fringe communities to minimize the negative effects of conservation. Active involvement of the fringe communities in the decision making process, before, during and after the conservation, could have engendered local ownership and reduced the antagonistic tendencies from the fringe communities.
Keywords: natural resource, conservation, fringe communities, Barekese

Introduction

All over the world, natural resources such as forests and water remain key to many development efforts. Natural resources are critical for the achievement of most of the Millennium Development Goals (MDGs) especially those related to the reduction of poverty and hunger. Natural resource utilisation is said to provide livelihoods to a greater proportion of the world's population. According to Pimental et al (1997), this includes not only people engaged in agriculture in rural areas but some 1.6 billion people who rely on natural resources such as forests for all or part of their livelihoods. In the same vein, Mayers and Vermeulen (2002) posit that about 1.6 billion people in the world see natural resources as valuable livelihood assets. Similarly Prescott-Allen and Prescott-Allen (1982), indicated that majority of rural Africans rely on natural resources for their daily bread as these resources provide a platform for sustaining livelihoods and safeguarding against poverty. In Ghana, the reliance on natural resources such as forests, land and water for livelihoods is enormous. Statistics on the proportion of people who depend solely on natural resources for their livelihoods is not known. However studies on resource fringe communities in Ghana by authors such as Abane et al (1999), Agyare (1996), Ntiamoah-Baidu (1999), Amisah et al (2009) and the International Union for the Conservation of Nature (IUCN, 2010) point to the fact that such resources form the basis of their livelihoods and for that matter the development of the fringe communities. These studies have established that fringe communities derive products such as canes, pestles, mushrooms, game and fish, as well as snails from the forests and water bodies and also support activities such as farming, fishing, hunting, gathering and tourism.

The overarching issue of contention is that while fringe communities derive their livelihood from the natural resources, it is increasingly becoming obvious that if conservation plans are not put in place, the resources would be depleted within the next few years. This picture points to the fact that natural resource conservation is critical for the sustainability of natural resources. The concept of sustainability has come to change attitudes about how natural resources should be utilised in the quest to satisfy present needs without compromising the ability of future generations to realise their dreams. Natural resource conservation has therefore evolved from the concept of sustainability that was espoused by the Brundtland Commission in 1987. It now emphasizes on development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This is as a result of the fast pace of natural resource depletion worldwide. Dixon and Sherma (1990) backed this argument by indicating that natural resource conservation aims at prevention of extinction, mitigation of erosion, maintenance of microclimate, protection of watersheds and ecological processes, promotion of research and education as well as the promotion of tourism and recreation. Due to the above mentioned aims, there is the tendency to overlook the effects of conservation on the people who depend on these resources. Natural resource conservation affects the resource fringe communities and this calls for deliberate and conscious efforts to build a balance between conserving a resource without worsening the living conditions of fringe communities. According to Nelson and Hossack (2003) cited by Colchester (2004), an estimated 1 million square kilometres of forests, pasture, and farmlands have been taken up in Africa to make

way for natural resource conservation projects, but accompanying statistics are lacking on the number of people displaced as a result of such projects. In Ghana where this study is carried out, several areas have been reserved and access and utilisation restricted.

Natural Resource Conservation in Ghana

The conservation movement in Ghana is said to have started prior to colonisation but backing conservation with policy started during the colonial rule. The 1927 Forest Regulation is one of such efforts to underpin natural resource conservation. This Regulation is said to have regulated forest use, logging, water resources use, and set penalties for forest and wildlife related offences. There was an amendment in the 1927 Forest Regulation in 1948 that also concentrated on forest and wildlife conservation. According to the IUCN (2010), conservation started in earnest in the 1970s and saw the Bui National Park gazetted in 1971, the Bia Conservation Area gazetted in 1974, the Bomfobiri Wildlife Sanctuary gazetted in 1975 and the Ankasa Strict Nature Reserve gazetted in 1976. The conservation efforts continued and several other natural resources were declared conservation areas and gazetted. These conservation projects are said to have displaced a significant proportion of fringe communities that formerly depended on these resources. The study focuses on the effects of the Barekese Conserved Area in the Ashanti Region of Ghana.

The Barekese Conservation Area and the Research Problem

The Barekese Reservoir and protected catchment area were conserved to provide water to the city of Kumasi and its environs. The reservoir was constructed between 1967 and 1971 and rehabilitated in 1998 with the objective of providing potable water to the Kumasi Metropolis and its environs. The authorities in charge of the project created a protected area within which no human activity is allowed. These protected resources apart from the reservoir include lands and forests along the banks of the reservoir. The Barekese protected area is located in the Atwima Nwabiagya District in the Ashanti region of Ghana. The Barekese Reservoir according to Tyhra et al (2010) serves as a water treatment and storage facility that produces over 80 percent of the total public water supply for Kumasi and its environs.

The laws that were passed in support of the conservation right from the onset catered less for the development of the fringe communities. There was over emphasis on the need to conserve the natural resources from over exploitation especially forest and wildlife resources and little or no provisions for the fringe communities was made. Boakye and Baffoe (2006) indicated that the Forest and Wildlife Policy of 1948 stipulated that the government was the sole manager of forest resources, without the collaboration of the forest fringe communities. This has had some effects on incorporating fringe communities in the planning and management of natural resources for a long time. Fringe communities have long been considered as passive stakeholders of natural resource conservation and this has led to fringe communities most often being negatively affected by natural resource conservation projects. Studies by authors such as Tyhra et al,(2010), media reports and activities of conservation advocates such as Friends of Water Bodies in Ghana have failed to identify the likely effects of conserving the Barekese reservoir and its protected catchment areas on the people, their coping and adaptive strategies and how the effects could be managed. It is from this background that this study is carried out to assess the effects of conserving the Barekese reservoir and the protected catchment area on the fringe communities in order to make recommendations for the amelioration of the negative effects on the fringe communities. Coming from this background, the study sought for answers to the following research questions:

i. How have the fringe communities been affected as a result of the conservation of the resource?
ii. What measures have been put in place to address the effects of the conservation on the livelihoods of the people?
iii. What are the various adaptive and coping strategies adopted by the fringe communities?

Research methodology

The study employed the case study approach to conduct an in-depth analysis of the actual effects of the conservation on the lives of the people in the fringe communities. This enabled the researchers to employ multiple sources of evidence and benefits from previous theoretical propositions. Both primary and secondary data from various sources were used for the study. Some of the sources included the management of the reserve, traditional leaders (chiefs and elders), local politicians (Assembly members), local associations and groups and households within the fringe communities. The study was conducted in four purposively selected fringe communities including Barekese, Nkwantakese, Pampatia and Penten. Again, the research used a variety of methods in collecting data and these included interviews, focus group discussions, observation and documentary analysis. Interview guides were employed in gathering data from the management of the reserve, traditional leaders and local politicians in the selected communities. Open ended questionnaires were used in soliciting data from the household heads in the communities. In all, two members of the management team of the reserve, three traditional leaders, four Assembly members and 82 household heads were sampled from the selected

communities and interviewed.

The management of the reserved area was involved in the study because it is officially mandated to manage the reserve. The chiefs and Assembly members were selected purposively because they are the traditional and opinion leaders in these communities. The 82 household heads interviewed were selected from a total of 470 households in the selected communities using the formula $n = N/[1+(N \alpha^2)]$ Where n = sample size, N = sampling frame (i.e. the total number of affected households) and α = the confidence level. A confidence level of 90 percent was used. The 82 household heads were selected for the interviews using the simple random sampling technique. Focus group discussions using a discussion guide were held with three identifiable groups comprising of farmers, hunters and chain-saw operators in the area. The researchers also visited the communities and walked through them to acquaint themselves with the level of development in the communities, their development problems and challenges. Finally, several documents including project reports and research papers on conservation were accessed, reviewed and analysed to get enough evidence to arrive at the findings of the study. All these methods and tools were used in gathering data on the socio economic characteristics of the households; the benefits that households enjoyed from the resources before and after the conservation; the effects of the conservation project on households in the communities; measures put in place to address the effects; and adaptive and coping strategies adopted by households after the conservation project. The analysis of the data collected is presented in the succeeding sections of the paper.

Characteristic of respondents

In all, 91 people were interviewed during the data collection exercise. All the nine purposely selected respondents comprising of three traditional leaders, four assembly members and the two management staff of the Barekese conservation area were men. From the 82 household heads interviewed from the various communities 52.4 percent (i.e. 43) were females and 47.6 percent (39) were males. Their opinions were sought concerning the effects of the conserved area on the development of the various communities covered in the study. The higher proportion of female headed household in these communities corroborates some other findings of the study which revealed that men in the communities normally leave to seek for jobs elsewhere because their means of livelihood has been curtailed by the conservation project.

About 36.2 percent of the respondents had no formal education while 28.6 percent and 20.9 percent had attained middle or junior high school and primary education respectively. Also 14.3 percent of the respondents had attained post secondary education. It could be deduced from the above figures that about 57.4 percent or more of the respondents were not qualified for white collar formal employment and their livelihoods tended to be based on the available natural resources. The conservation therefore was likely to have higher effects on their lives. Again, the respondents were adults and had families to cater for. This makes their dependence on the conserved resources very high so as to be able to meet the needs of their families. Majority of the respondents representing 89 percent were natives of the area and had stayed there for most of their lives. The remaining 11 percent were migrants. A respondent indicated that a lot of the migrants used to live in the affected communities before the conservation as the area had adequate land for farming but the number reduced as land for farming became scarce after the conservation. This is because the remaining available land was given to family members first before others were considered.

Benefits of the Barekese Dam Catchment Area before its Conservation

The Barekese Dam catchment area served various purposes for the fringe communities before the conservation project. On the benefit of the area before the conservation project, 14.6 percent of the respondents indicated that the reserved area served as a source of bush meat and mushrooms while 28 percent indicated that they got water from the area for both domestic and commercial purposes. About 18.3 percent of the respondents also indicated that the area used to serve as a source of fuel wood before the conservation project. Some of the benefits of the area before the conservation as indicated by the respondents are presented in table 1.

Table 1: Some benefits derived from Area before Conservation

Resources	Household Heads that Benefited from the Resources	
	No	Percent
Bush meat/Mushrooms	12	14.6
Timber	3	3.7
Pestles	3	3.7
Canes	6	7.3
Raffia Palm	9	11
Water	23	28
Fuel Wood	15	18.3
Environmental/Ecological Benefits	11	13.4
Total	82	100.0

Source: Field Survey, 2012

Livelihood Activities of the Respondents before and after the Conservation Project

An interview with the respondents indicated that the conservation project had altered their livelihood activities. The farming activities of the respondents had reduced to 43.6 percent after the conservation project. This confirms the views of Colchester (2004) and Agrawal and Redford (2007) that, natural resource conservation projects in most cases alter the livelihood activities among resource fringe communities. The reduction in this case was due to the prevention of farming activities on lands which originally served farming purposes. Under such circumstances if the right alternative coping strategies are not put in place before natural resource conservation projects are undertaken, the affected people's livelihood sources may be undermined and this could lead to poverty as posited by Colchester (2004) and the IUCN (2010). As indicated in table 2, the respondents said that they had to diversify their livelihood activities from farming after the project to include activities like trading (31%), carpentry and driving which were virtually absent before the project. This implies that natural resource conservation projects may also bring some diversity in the livelihood activities in resource fringe communities. This may in turn diversify the income sources of resource fringe communities to their own advantage.

Table 2: Forms of livelihoods before and after conservation

Livelihood **Period**	Farming	Trading	Formal Sector Employment	Carpentry	Driving
Before the Conservation	100	0	0	0	0
After the Conservation	43.6	30.8	8.9	10.3	6.4

Source: Field Survey, 2012

Average Annual incomes of the Respondents before and after the Conservation project

The alterations in the livelihoods activities as indicated in table 2 also affected the total annual incomes of the respondents. Although majority of the respondents could not estimate their farm income before the conservation project, they maintained that those who had their farmlands reduced due to the conservation project earned less income. They attributed this to the fact that farming for some of them had reduced to subsistent levels after the conservation project. According to the respondents, their dwindling annual income was as a result of the undermining of their livelihood opportunities due to the conservation project.

Access to the Conservation Area

As many as 37 percent of the respondents had no access at all to the conservation area. This was because the project management considered the activities of such groups of people detrimental to the sustainability of the conservation area and so they were denied access. The activities were mainly farming related. The management of the project believed that farming could negatively affect the quality of water in the conservation area. About 10 percent of the respondents gained access without permits to the conservation area for the purposes of hunting.

Activities such as hunting on large scale and gathering of canes and raffia palm for weaving and cutting of tree branches for pestles for sale were allowed with permits from the management of the conservation project. About 27 percent of the respondents who were undertaking these activities had access to the conservation area with permits. These permits were given to users of the conservation area in order to regulate the use of the area. The interviews with the respondents showed that 8 percent entered the conservation area to undertake commercial activities without permits from the management of the project. These respondents indicated that they secretly fell timber for sale because the management of the project would not give them permission to do so. This is however, dangerous to the project as it could undermine the sustainability of the resources in the conservation area. The types of access the respondents had to the conservation area are presented in table 3.

Table 3: Entry access of Respondents to the Conservation Area

Type of Access	Percent
No Access at all	37
Access with Permits for domestic purposes	27
Entry without permits for domestic purposes	10
Entry with permits for commercial purposes	18
Entry without permits for commercial purposes	8
Total	100

Source: Field Survey, 2012

Effects of the Conservation Project on the Livelihoods of the Fringe Communities

The interviews with the household heads in the study communities revealed some effects of the conservation

project on the lives of the people within the fringe communities. When the respondents were asked whether the conservation project led to any physical displacement, 60 percent answered in the affirmative while 40 percent indicated that the project did not displace them. The 60 percent who said they were displaced indicated that they were relocated to new areas as a result of the project. These people lost their farmlands to the conservation project and therefore had to look elsewhere for livelihood opportunities. This was also supported by the focus group discussions with the community interest groups. The 40 percent who said they were not displaced by the project indicated that their farms and lands were not taken from them and so they could undertake their livelihood activities but were quick to indicate that in economic terms they have been displaced by the conservation project. This confirms the views of Agrawal and Redford (2007) that natural resource conservation projects may lead to either physical or economic displacement or even both depending on the livelihood strategies of the affected people.

According to 86.8 percent of the respondents, the conservation project has denied them access to natural resources. These respondents were of the views that they could no longer enter the conservation area for their livelihood activities. This was corroborated by the interest groups during focus group discussions. Thirteen respondents however indicated that they had access to the natural resources in the conserved area since the activities they undertook were regarded as friendly to the project. Such activities included gathering of fuel wood (but not charcoal production), harvesting of pestles, canes, raffia and hunting for game. These respondents however indicated that the level of access was now regulated as compared to the pre-conservation era.

Majority of the respondents (i.e. 51.6 percent) indicated that the project had not affected their kinship and family relations in any way. One respondent indicated that "the family (Abusua) is too big to be disrupted by just this conservation project". This revelation is at variance with the views of Colchester (2004) and Agrawal and Redford (2007). The reason for the disagreement is that, the negative effects of natural resource conservation projects on resource fringe communities vary from place to place. However 46 percent of the respondents agreed that the project had resulted in the disruption of kinship and family ties among them. This they claimed was as a result of the relocation exercise that took place. Some people were relocated to communities such as Asuofia and so the ties with their relations in other places have become weak due to the distance and the new environments. With regards to whether the conservation project had resulted in disorganised settlement patterns in the fringe communities, 55 percent responded in the affirmative whilst 45 percent said there was no effect. According to the respondents, the conservation project altered the original plans of the communities and as a result buildings are now scattered everywhere.

An overwhelming majority of the respondents i.e. 95.6 percent believe that the conservation project had led to the undermining of livelihood opportunities because it had disorganised their livelihood activities. Only 4.4 percent indicated that their livelihoods were not undermined and further investigations revealed that they were illegally felling trees (timber) in the conservation area. As many as 56 percent of the respondents indicated that the conservation project had led to sporadic conflicts especially among families over access and control over lands. These conflicts arise because population increases in the fringe communities has exerted pressure on the now limited land for farming and other uses, resulting in conflicts in some instances as advanced by Agrawal and Redford (2007).

All the respondents overwhelmingly indicated that the conservation project has resulted in poverty and pressure on the remaining natural resources outside the conservation area. The majority of the negative effects of natural resource conservation projects identified by Colchester (2004) and Agrawal and Redford (2007) were faced by the majority of the respondents in this study. The views of the respondents on the negative effects of the conservation project on their livelihoods are presented in table 4.

Table 4: Negative Effects of the Conservation Project on Respondents' Lives

Type of Impact	Negative Impact		No Negative Impact	
	Frequency	Percentage	Frequency	Percentage
Displacement	47	60	31	40
Denial of access to natural resources	68	87	10	13
Disruption of kinship systems	36	46	42	54
Disorganised settlement patterns	35	45	43	55
Undermining of livelihood opportunities	75	96	3	4
Undermining of property rights and opportunities	72	92	6	8
Poverty	78	100	-	-
Pressure on Natural Resources outside the conservation area	78	100	-	-
Conflicts	44	56	34	44

Source: Field Survey, 2012

Some Positive Effects of the Conservation Project on the Fringe Communities

With regards to some of the positive effects of the conservation project on the fringe communities, 38 percent of the respondents indicated that the project had increased tourism activities in the area. This was confirmed by the chiefs and the community interest groups during some focus group discussions with them. Tourists now visited the place to see the conservation area and the dam as well. Nine percent of the respondents said that the project had increased the number of researchers who visit the fringe communities to undertake research on issues pertaining to the conservation project and its effects on the people. One respondent said that

> "*just as you have come here, others have been here already and we believe that when you go, you will inform the people 'up there' about our situation. I have never been to school but today I am interacting with students because of the conservation project and I hope that my children will look up to you and study hard to become like you*".

These testimonies indicate that the people appreciate the non-financial and psychological gains. Some of them were satisfied because of the interactions they constantly had with researchers and tourists/visitors. Other respondents, representing about 35 percent of the households interviewed, indicated that the conservation project had helped to protect some plant species used for medicines that would have been lost if the area had been given up for farming activities. To them, the conservation project has helped in the preservation of some natural resources for future use.

Adaptive and coping strategies adopted by the fringe communities

As to the coping strategies adopted by the respondents after the conservation project, 44 percent of the respondents indicated they were still engaged in agriculture (farming) but on reduced sizes of farmlands. Thirty-one percent of the respondents also indicated that they were now engaged in trading (nonfarm businesses). They had to take up trading because farming was no more profitable to them since they had lost their farm land to the conservation project. Nine and ten percent of the respondents had gotten employment in the formal sector and carpentry respectively after the conservation project. Six percent of the respondents also indicated that they were now into commercial driving because of the conservation project. It is of interest to note that more than half of the respondents were now coping with different livelihood activities instead of farming which was their major livelihood activity before the conservation project.

Conclusions and Recommendations

From the above findings of the study, it can be concluded that the conservation of natural resource areas has enormous consequences on the inhabitants of fringe communities. This includes the altering of existing livelihoods which were dependent on the resources now under conservation and the shifting of the affected people in the various communities into new livelihoods including less known ones. Also it has the ability of plunging the affected people into deep poverty and conflicts between the managers of the conserved area and the communities affected as well as among affected community members. Moreover, conservation leads to restriction in the use of the available natural resources in an area. The findings of the study above support some of the findings of other researchers including Agrawal and Redford (2007) and Colchester (2004).

The following recommendations are therefore made to help address the effects of the conservation project on fringe communities. Generally, alternative livelihoods should be promoted in the fringe communities to help community members whose livelihoods have been adversely affected. This should be managed and sustained over a long period of time. The new alternative livelihoods should have the ability of adapting to changing technology as well as the needs and demands of the changing communities. Some of these alternative livelihood activities could include livestock rearing, poultry farming, aquaculture and bee keeping.

Assisting the affected households in fringe communities with loans to undertake non-farm businesses could also serve as alternative livelihood activities. More so, local authorities such as the district assembly of the affected areas could promote agriculture in a way that fringe communities could harvest more yield from small parcels of land through the introduction of improved seeds and subsidized farm inputs. This will go a long way to improve upon agriculture for such households that still undertake farming after the conservation project.

Also, the active involvement of the fringe communities in the management of the conserved area will also engender local ownership of the conservation project and reduce antagonistic tendencies from the fringe communities in line with the Community Resource Management Area (CREMA) concept (Braimah et al, 2009).

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