

## **Conservation of Biodiversity in Naaha Community in Ghana**

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**ABSTRACT:** *This study reveals the extent to which indigenous knowledge contributes to biodiversity conservation in Naaha in Wa west district of the Upper West region of Ghana. This situation has received immense international concerns, and for that matter in Ghana. Data sources used in the study were both primary and secondary data sources. Using Taro's formula 1970, a sample size of 47 people was obtained from a projected total population of 623 people. Both probability and non-probability sampling techniques were employed to get the sample size. Face to face interview and focus group discussion were also used to solicit information from respondents. Data collection tools employed were semi-structured questionnaire and checklist. The questionnaire consists of close-ended as well as open-ended questions. Natural features were also observed through techniques such as guided walk. Tools such as SPSS and excel and analytical induction were techniques used in the data analysis. The study revealed that the people of Naaha, for more than a decade, have relied on their local knowledge systems in conserving biodiversity. These strategies which have proved to be effective include; tribal totems, fire belts, taboos and sanctions. This yielded positive cultural and environmental results.*

**KEYWORDS:** *biodiversity, conservation, ecosystem, indigenous knowledge, species*

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### **I. INTRODUCTION**

Many researchers have written on most of the major reasons for the failure of conservation efforts which links it to the fact that such efforts have often failed to integrate the local community knowledge with modern scientific knowledge when talk of conserving biodiversity. This situation is empirical in the Naaha community where efforts of organizations have been largely questionable in terms of their sustainability due to the neglect of the local peoples' everyday lives and concerns. Biodiversity is the biological diversity among which the various kinds of all species existing on earth. This includes variety of plants, animals, water ecosystems, micro-organisms, and marine species and land in which all exist (Rands et al., 2010). People conserve the environment by perceiving the benefits they may attain from it and this therefore determined their way of preserving biodiversity (Vodouhê, Coulibaly, Adégbidi, & Sinsin, 2010). Primitive knowledge and biodiversity are hand-in-hand phenomena very important to human development (Warren, 1996). Biodiversity is needed for existence of mankind and is also valuable in its own right (Bajracharya, Furley, & Newton, 2006), the reason being that it provides the fundamental establishment for the many products and goods and services which provides a healthy environment to shape our daily lives (Al-Farabi, 2013). Biodiversity conservation is a movement for which a number of remedies, blueprint approaches, have been promoted widely (F. Berkes, 2007). Over the past century, conservation has largely relied on national parks overseen by central governments, a strategy adopted by much of the world as the main, if not the only way to undertake conservation (Hawksworth & Bull, 2008). It is usually complicated to identify and generalize about local methods that really operate well in resource and ecosystem management (Coombe, 1998). A given practice may be merited in one social group but different in another at a point in time (Fikret Berkes, Colding, & Folke, 2000). Biodiversity is a universally important for humanity as a whole, a universal concession important for economy and indigenous people development, and other benefits, and a primitive commons that produces ecosystem services for well-being of people at the rural level (F. Berkes, 2007). Indigenous peoples having a wide historical knowledge about the resources of their communities are able to devise their own strategies and regulations to preserve their ecosystem. And enhancing on then perpetual existence of biodiversity for future generation (Gaston & Biodiversity, 1996). Concerns about the conservation of the natural environment has long been in prevalence but its expression as "biodiversity" conservation is comparative in recent paradigm (Agrawal & Gibson, 1999).

Traditionally, people relied heavily on the abundant wild natural resources that surrounded them (Fabricius, Koch, Turner, & Magome, 2013). This knowledge has come to exist through the accumulation of serial observations passed on from generations to generations (Gaston & Biodiversity, 1996). Where indigenous peoples have depended, for long periods of time, on local environments for the acquisition of several kinds of resources, they have developed interest in conserving, and in other cases, improving

upon biodiversity (Coombe, 1998). Local people are of the awareness that biological diversity is an imperative factor in generating the ecological services and natural resources on which they rely (Dudgeon et al., 2006). Some indigenous groups are able to influence and manipulate the local landscape to enhance its diversity, and some have also been found to be facilitated with methods to restore biodiversity in landscapes that are degraded (Gadgil, Berkes, & Folke, 1993). Biodiversity conservation – keeping natural ecosystems functional and healthy – is very diversified and often multi-scale processes that impacts several stakeholders and agencies and remains pivot to sustainable development (i.e. reaching a balance between environmental conservation socio-economic development) (Klooster & Masera, 2000). The knowledge presently and apparently available to the community on the distribution and changes of biodiversity is extremely inadequate (Gaston & Biodiversity, 1996). Natural resources form the basis of human existence thus food, housing, transportation, land use and economic development – and require effective planning to ensure sustainable management (Cobbinah, Black, & Thwaites, 2015).

The prospects for conserving biodiversity has been a general concern for interested people like social scientists, resource management professionals and conservationists (Hackel, 1999). From one point of view, there have been some increasing concerns and investment in local conservation of biodiversity (DeGeorges & Reilly, 2009). On the other hand, there has been rising concerns that community-based conservation of biodiversity is not working as expected and that the emphasis on community and participation is rather weakening the conservation agenda (Salafsky & Wollenberg, 2000). Conservation and management of biodiversity in developing countries has been a priority since adoption of the Convention at the United Nations Conference on Environment and Development (UNCED) (colloquially the Rio Summit) in 1992, there remains urgent need globally and requires a significantly new perspective, thus, developing countries contain most of the world's biodiversity (Adenle, Stevens, & Bridgewater, 2015). The German Advisory Council for Global Change (WBGU) recognizes biodiversity damage and loss as one of the key problems of global change, which, in turn, is rated by leading scientists as the greatest global ecological danger (Markussen, 2005). The German Advisory Council for Global Change (WBGU) recognizes biodiversity damage and loss as one of the key problems of global change, which, in turn, is rated by leading scientists as the greatest global ecological danger (Markussen, 2005). It is more evident now than ever that biodiversity conservation is successful only in societies where basic socio-economic needs have been met. Contemporary variances in management strategies resulted from people's historical and spatial patterns of settlement in the community (Aswani & Hamilton, 2004). This means that poor societies will conserve the flora and fauna around them if given the opportunity to be effective practitioners by including their indigenous knowledge, having effective access and benefit sharing regimes, making national parks more equitable, and tackling poverty and particularly land hunger which is devastating in its effects through deforestation (Markussen, 2005).

## II. METHODOLOGY

### 2.1 Sampling Techniques

During the survey information was sourced from key informants including the chief, the assembly man and the elders of the community were since they are the best people to give much information about the community and their biodiversity. There was a focused group discussion with the key informants on the community and the measures put in place to preserve their biodiversity. Simple random sampling was used to provide an equal chance of the members of the community to contribute to the study. With the population size of 623 people and sample error of 0.14%, a sample size of 47 respondents was arrived using the Taro's formula (1970).

Taro 1970 provides the formula;  $X = n \frac{N}{1 + n(e)^2}$

Where X = sample size, n= total population and e= sample error

$$\frac{623}{1 + 623(0.14)^2} = \frac{623}{13.210} = 47.1584$$

$X = 47$

#### 1.1. Data Collection Techniques and Tool

- *Interviews:* face to face interview to for acquiring information
- *Observation:* natural features and some rituals were observed in the community
- *Guided Walk:* this was used to assess some traditions and practices in the community.

Questionnaire is the only tool that was used for collecting data. Both close-ended and open-ended questionnaires were used to soliciting information from the participants.

## 2.2 Data Analysis Techniques

Both qualitative and quantitative techniques were used. The data collected on the field were analyzed with the use of SPSS quantitatively whereas qualitatively analyzed in a descriptive manner.

## III. RESULTS

### 3.1 Socio-Demographic Characteristics Of Respondents

**Population:** According to a population and housing census conducted by the Poyentanga clinic in 2012, the total population of Naaha is 673, of which 359 are females and 314 are males.

Table 1. Age and Sex Distribution of the Population

RANGE	MALE	FEMALE	TOTAL	PERCENTAGE (%)
0-4	27	38	65	9.7
5-14	31	49	80	11.9
15-28	114	103	217	32.2
29-40	109	121	230	34.2
41-60	17	28	45	6.7
61+	16	20	36	5.3
<b>TOTAL</b>	<b>314</b>	<b>359</b>	<b>673</b>	<b>100</b>

**Ethnicity and Religion:** The Naaha community located in the Upper West Region has only one ethnic group which is Waala and have Waale as the only language spoken. The Naaha community is mainly dominated by Islamic religion but there exist other religions such as the Traditional and the Christianity religion. However paganism also exists in the community.

**Chieftaincy:** The kinship of the Naaha community in terms of chieftaincy ran between two families. That is to say in the case of death of the chief, the next in line from the other family is enstooled as the chief. The younger brother next in line of succession is enstooled as the chief and is enthroned as the next chief. In special cases such as that of mental or severe sickness, a person is chosen to act on behalf of the chief until recovery.

**Traditional Political System:** traditionally the political system of the community is well structured. The Naaha community has the highest authority of the land to be known as the Yiriniƙpong (land owner). Next to the Yiriniƙpong is the Naa (Chief), following the Naa is the Tindamba (ritual leader), then the Community Elders (sectional leaders) and finally the community members. As custom demands the traditional leaders seek to the development of the community by playing several roles such as enforcement of law and order, settlement of disputes, ensuring the welfare of the community members, taking decisions on behalf of the community and among others.

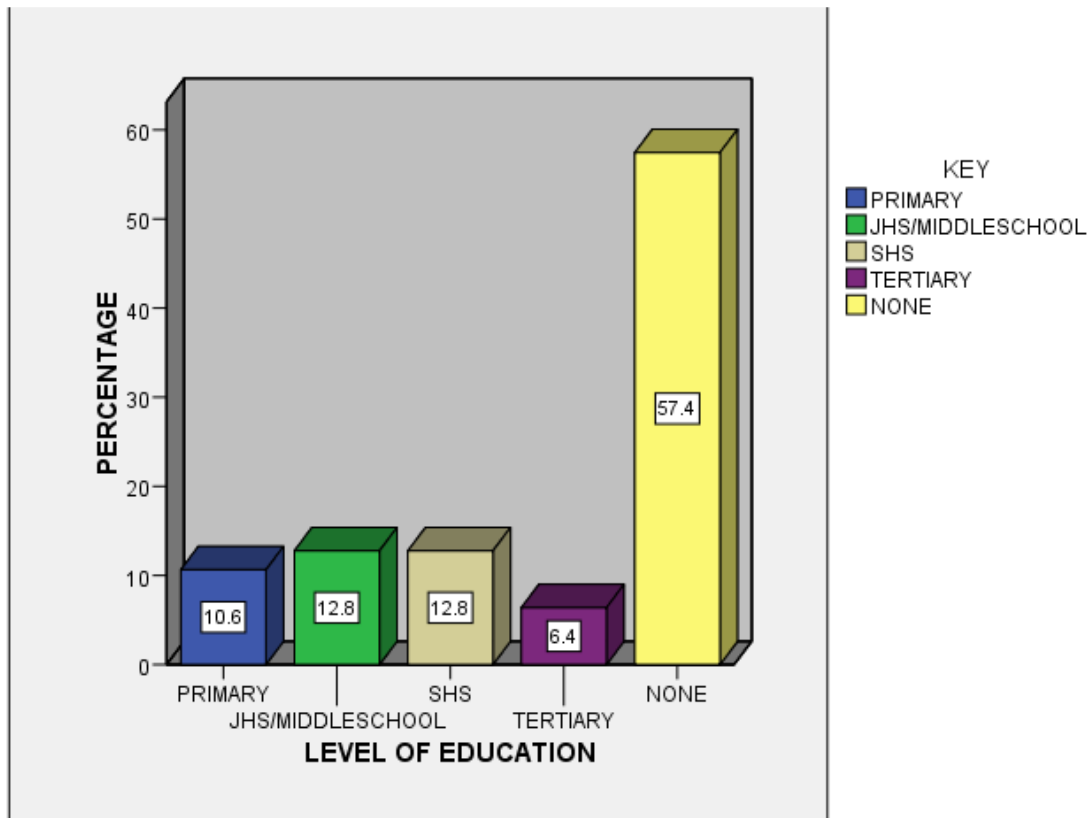
**Modern Political System:** The modern political system is made up of the District Assembly who represents the people at the district level, the Unit committee members and the community. The modern political structure plays a vital role in the community such as the monitoring of government institutions, ensuring the day to day administration of the area, playing supervisory role and above all assisting in the dissemination of information to and from the people. That is to say serves as a mediator between the community and government agencies.

The relationship between the political systems is very cordial through the interplay of functions at both the district and the community level. The assembly member being the representative of the district assembly and moreover the community collaborates with the chief in order to reach agreements and ways through which the development of the community can be promoted of which conserving the biodiversity of the Naaha community is not an exclusion.

### 3.2 Educational Status of Respondents

With respect to educational status, majority of the interviewees had no formal education representing 57.4%, 10.6% had primary education, 12.8% had JHS/middle school education, 12.8% had SHS education and those with tertiary education were the minority representing 6.4% as illustrated in the figure 4.2 below. Though the majority had no formal education, almost all the respondents had fair knowledge on the importance of conserving biodiversity.

Fig.1 Educational Status of Respondents



The survey revealed that though 68% of the population in the community has either had little or no formal education, 91.49% of the population is aware of the need for biodiversity conservation which has led to the establishment of the forest reserve using their indigenous knowledge. The survey came to realize that though there are agencies like the forestry commission and the EPA who are responsible for conservation of biodiversity yet are not playing their roles fully as expected, the people of the Naaha community had developed their own local strategies to conserving animal and plant species in the community. From the survey conducted, the study realized that the main reason for conserving biodiversity in the Naaha community was to give a future prospect to the children in the community and the generations to come to know the various animals and trees of the community by way of also ensuring sustainability of these species.

Moreover there were other reasons as given by the community were that conserving the biodiversity of the community gave back to them some benefits such as herbs from plants, food from trees and animals, and also for protection and attraction of rain, thus, enhancement of vegetation to attract rain. Although the indigenes of the community came to meet the forest and they have managed by using their own methods to preserving and keeping its existence for a very long time and have now gained support from the Environmental Protection Agency. The main reason behind the conservation project is to give a future prospect to the children in the community to know the various trees and animals (sustainability). Other reasons as suggested by the respondents are; for herbs, food, protection and attraction of rain. Though the natives came to meet the forest, they have managed to keep its existence for a very long time and have now gained assistance from the Environmental Protection Agency.

### 3.3 Primitive Knowledge Systems

The people of Naaha have developed an extensive body of informal knowledge methods such as taboos, totems, creation of fire belts, and spiritual beliefs that can help in promoting and sustaining biodiversity conservation in the Naaha community. Members of the community can have access to the forest reserve, however there are rules governing its protection such as the prohibition of felling trees. The community also has a very rich indigenous knowledge systems for the conservation of biodiversity of which 34.0% represent fire belts, 23.4% for sanctions, 17.6% for totems, 10.6% for taboos, and 14.9% represent education and awareness creation.

Table 2. Primitive Knowledge Systems for conserving biodiversity in Naaha

Systems	Frequency	Percentage	Cumulative Percent
Sanctions	11	23.4	23.4
Fire belts	16	34.0	57.4
Totem	8	17.0	74.5
Taboos	5	10.6	85.1
Awareness creation	7	14.9	100
Total	47	100	

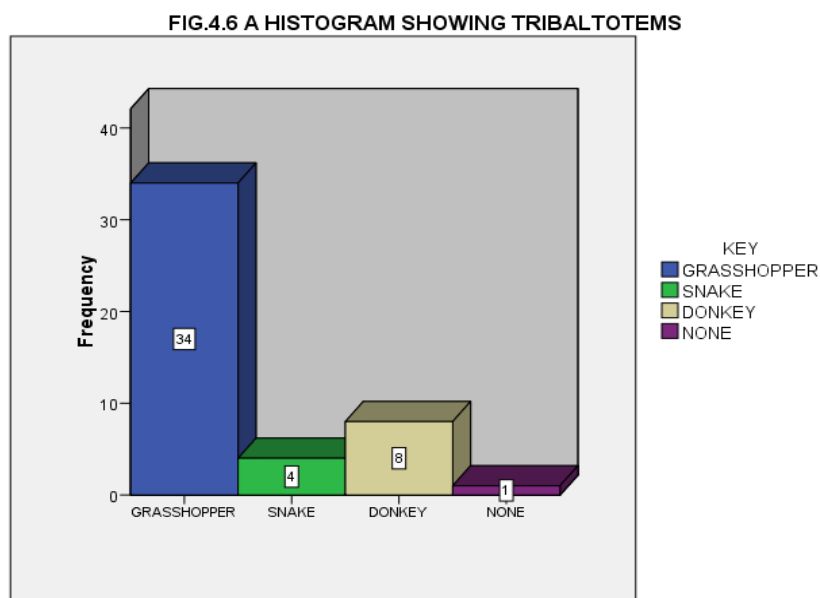
The following are the indigenous knowledge systems used in conserving the biodiversity in the community:

- ✚ Sanctions: exist to punish people who engage in indiscriminate felling of trees, bush burning, farming and hunting in the community reserve. This includes payment of GHC10, provision of a sheep, a bottle of “pito” and a white cock
- ✚ Fire belts: as a result of the dryness of the location of the community, fire belts are created around the forest during the dry season to protect the forest from fire outbreak from uncontrollable bush burnings and hunting of game using fires. This is in the quest of attaining sound environment for the future generation.
- ✚ Totems: some animals in the community are seen as totems which therefore hinders anyone in the community to harm them. It is believed that these animals are of historical significance to the community and should therefore not be harmed. These animals include the grasshopper, the cobra, the donkey and the python.
- ✚ Taboos: taboos are other indigenous system used in Naaha for conserving biodiversity. In the community, members are not supposed to wear sandals to the community’s river known as the Bubuli River. Women during their menstrual cycle are not allowed to go to the river side. Sex in the forest is also a taboo. It is believed in the community that defaulters will be stricken by the ancestral gods of the community. Thus system helps especially in reducing the amount of times people fetch water from the river since it is located in the savannah.
- ✚ Awareness Creation: the elders of the community create awareness on the indiscriminate felling of trees, bush burning, hunting, and farming in the community reserve. This is to ensure sustainability by putting an end to gradual deforestation and also killing of pregnant animals to prevent their extinction. This system is often done at home, school and social gatherings.

### 3.4 Tribal Totems As Primitive Knowledge System

The main totem of the community is grasshopper which is believed to have saved the life of their great grandfather-Danaa. Others include donkey, snake among others. The community has more than one totem which contributes to the conservation of such animals. “There is a belief that anintimate relationship exists between the totem animals and the tribe. Therefore, the members do not eat, kill or trap these animals (Conservation International Ghana, 2005 as cited by Luc Hens, 2006)”

Fig. 2 Histogram Showing Tribal Totems



**Grasshopper:** This insect is believed to have saved the life of their great grandfather and founder of the community- Danaa, by showing him to a water source when he nearly died of thirst. So the people do not harm it based on that belief- by leaving it to die naturally.

**Snake:** Two snakes- the Python and Cobra are forbidden to be killed or harmed owing to the belief that these snakes are the spirits of their forefathers.

**Donkey:** Though there is no special belief behind the donkey being a totem, the reason from the survey was that their forefathers saw these animals as very helpful yet very few hence there is the need for their protection.

#### **IV. DISCUSSION**

As Robert Jordan has it that “the tragedy of this life does not lie in not reaching his goal, the tragedy lies in not having a goal to reach”, the people of Naaha with the goal of sustaining their environment for the future generation have employed local conservation systems which have proven to be successful in several ways back since 1995 (Salafsky et al., 2008). The African context particularly concerning biodiversity conservation has been defamed and not treated very properly for some time now (Warren, 1996). Analysis show that, many primitive ecological knowledge systems have a component of observation of local knowledge on species and other environmental phenomena, a system of practice about how people carry out their resource use activities, and further, a component of belief pertaining to how people relate to or fit into ecosystems (Fikret Berkes et al., 2000). Meanwhile, EPA in 2008 came on board to play a supportive role in the community project which was being conserved using their indigenous systems. Thus, the management of community forest which contrasts strongly to the panorama of a general bleak of degrading of the forest and deforestation. Forest management business and small logging helps maintain forest cover, helps restore density and also the former mismanaged forests of commercial productivity (Klooster & Masera, 2000). In the endeavours to solving the loss of biodiversity loss and the restoration of the degraded lands, it is of significance to consider and apply TEKW of local peoples with their collaboration and involvement (Turner, Ignace, & Ignace, 2000). Conservation of biodiversity which is explicitly integrated into the concept of sustainability separates ecology as a question from its isolation and makes it a composed part of societal development globally (Fikret Berkes, 2009). This poses a considerable concern to scientific research; after all, the point is to identify determinants of vastly complex systems, thus, economic and social, and ecological systems alike and to come up with suggestions how to link them both locally and internationally in a justifiable way (Markussen, 2005).

About 89.2% also express concerns about deterioration of the environment due to development and modernization. Comparing their environment with that of their forefathers, it was found out that there has been depletion in forest and forest species resulting from the establishment of houses and other human activities. This knowledge could be so deeply ‘embedded’ in the culture that the people are conscious of its practical ecological benefits (Mokuku & Mokuku, 2004). Development agencies are beginning to review the role of indigenous knowledge in the development process at the policy level. Titilola has demonstrated the cost-effectiveness of adding indigenous knowledge components into development projects (Warren, 1996). On the part of biodiversity conservation, organizations responsible for biodiversity conservation and environmental sustainability are not playing their roles as adequate as possible (Cobbinah et al., 2015). The Forestry Commission and its subdivision- the Wildlife Commission according to the findings of the research, are not playing any role in the conservation of biodiversity in Naaha.

In the case of some biologists who support a “resurgent protectionist” strategy to conservation, this previous state was in accordance with conservation, while the use of firearms in hunting, and bush burning place the Naaha community at odds with goals of preserving the forest (Holt, 2005). The EPA however have been playing their part for protecting the Naaha environment but this has unexpectedly been unsuccessful as a whole relating to some several factors including their absence in environmental management activities in the community. One method which has been accepted for acquiring both ecological and economic success has been Ecotourism (Bookbinder, Dinerstein, Rijal, Cauley, & Rajouria, 1998). Although conservationists have been challenged to design effective strategies for conserving biodiversity in the biologically rich areas of the developing world (Bookbinder et al., 1998), agencies in Ghana however do not embark on frequent sensitization and creation of awareness. EPA has not been organizing information, education and communication campaigns to enlighten the people on the practices of biodiversity management (Field Survey). Species are essential not only human but also the environment that sustain living beings. This has therefore led to the importance for urgent action which is needed for the assurance of sustainability of biodiversity and ecosystems related services (Herrmann, 2006). Local people make a their daily living from what we synonymously may be referred to as Traditional Ecological Knowledge, Indigenous knowledge or commonly Local Ecological Knowledge, which is comes about from their rich knowledge interacts with the natural environment to make their living in their community a better one (Brook & McLachlan, 2008).

Nonetheless, there is not enough recommendations in most journals that are published which address problems faced by these local people in conserving their biodiversity in a more advanced way to sustaining their environment for the future(Heller & Zavaleta, 2009).Nonetheless, the prospects for conserving biodiversity has been a general concern for interested people like social scientists, resource management professionals and conservationists(Escobar, 1998). Conservation of biodiversity locally has arisen concerns in its investment from one point of perception(Fraser, Coon, Prince, Dion, & Bernatchez, 2006). On another point of view, there also has been a rise in concerns that indigenous ways of conserving biodiversity is not coming out as expected and therefore hammers on the view that the involvement and participation of the community tends to weaken the agenda of conservation(Fikret Berkes, 2004).

Most local people are used to the Monitoring as a measure for preserving the environment and this usually goes with studying the changes in the ecosystem(Fikret Berkes et al., 2000). Traditional ecological knowledge is complicated and the information gathered about species environment and how they relate and extended to other species over multiple generations(Hawksworth & Bull, 2008). It is a term that encompasses knowledge from a variety of activities, including (but not limited to) hunting, medicinal products collection, household economy and trade, and spiritual divination(Drew, 2005).

With growing recognition that a holistic framework is imperative for proper resource management and conservation of biodiversity, it has been debated that much and yet still lot of research is needed to find out strategies that can be used by both urban and indigenous knowledge(Fraser et al., 2006).Some agricultural crops, trees, livestock and fishes that are newly introduced into the ecosystem have rather invaded the already existing species and populating over their expected limit and putting the natural species in displacement(Scherr& McNeely, 2008).

Most observers also concede that current strategies to conserving biodiversity feature emphatic shortfalls and moreover do not provide enough species and protection of habitats. Disagreements however tends to arise when talk of these approaches(Brechin, Wilshusen, Fortwangler, & West, 2002).

The old system which primitive localities use-“fences-and-fines” method for protecting preserved areas has not attained its purpose fully and istherefore the need for governments to set up measures that are enforceable to guarantee the total protection of biodiversity(Barrett, Brandon, Gibson, & Gjertsen, 2001).

It has become a rising understanding that there is the significance for many protected areas(Ellis & Porter-Bolland, 2008).This therefore asks for more research into providing better and more ways of conserving biodiversity.

## **V. CONCLUSION**

Based on the major findings, the major problem of conservation in Naaha is lack of integration of modern scientific knowledge with indigenous knowledge in conserving biodiversity. A greater percentage of conservation is by the use of indigenous knowledge systems.It could therefore be concluded that, the community relies on indigenous knowledge systems in conserving biodiversity.

## **VI. RECOMMENDATIONS**

For conservation of biodiversity to be encouraged, the following recommendations are made;

- ✚ There should be the use of indigenous communication techniques such as drama, stories, videos by EPA on the success stories of indigenous knowledge in conserving biodiversity, since these indigenous communication techniques work better especially in the local literacy community like Naaha.
- ✚ Also the indigenous communication techniques must portray instances where people have to face penalties, sanctions and punishments by both chiefs and the gods for going against taboos and totems regarding the environment.
- ✚ The Forestry Commission has to embark on conservation spotting activities to assist indigenous communities that are conserving the environment using I.K systems rather than waiting to be invited by the local people themselves. This will even help the Commission to realize its long term vision of leaving a richer endowment for the future generation than we inherited.
- ✚ The traditional authorities should be strengthened and used effectively for community mobilization for biodiversity conservation activities. To achieve these powers to punish defaulters, it must be once again vested in the traditional authorities rather than conventional agencies like the court, police, forest guard etc.
- ✚ The government should formalize traditional norms into community rules and regulations for biodiversity conservation.
- ✚ The traditional authorities must reinforce the indigenous knowledge systems and make the primitive measures strict enough to deter people from going against the indigenous knowledge mechanisms.
- ✚ There should be the use of livelihood support as “bait” for biodiversity conservation by the government and all environmental friendly organizations.

✚ The Tourism Board should make efforts aimed at making the reserve a tourism resource; this will prompt the local people to put protective measures in place to maintain its beauty.

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