

## Sustainability of natural resource management: where do informal and formal strategies converge?

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### Abstract

Sustainability of natural resources has been an important part of people's culture since creation. Managing these natural resources, particularly land, has been a major concern for a majority of peoples and governments in Sub-Saharan Africa. Land control and use as well as other natural resources has been the way to sustaining a population in Sub-Saharan Africa in particular. There is direct and indirect links between natural resources, livelihoods and the environment. In areas of abundant natural resources such as fertile lands, good water sources, and forests in northern Ghana, livelihood is enhanced as the environment is sustained. In areas of chronic food shortages, natural resources are used to directly bridge the food gap. People derive different livelihoods from varied natural resources for their living. These resources need to be sustained through proper management strategies with the informal (traditional) knowledge systems complementing that of the formal knowledge systems because the people are over exploiting them. Communities therefore argue that, in order to have sustainable resources, there is the need to resort to informal and formal knowledge systems as they prevent resource depletion through traditional and modern laws. This is because, peoples' livelihoods revolves around these resources. Promoting both strategies would enhance the sustainability of these resources in their communities. A combine ethnographic and survey techniques to gather both quantitative and qualitative data was employed during the research as a methodology. In addition, an extensive literature review was also used in the methodology. Issues emanating from the findings are that informal (traditional) knowledge systems complement that of formal knowledge systems in natural resource management. Natural resources in the study area are depleting as a result of population pressure. Conclusions drawn from the study show that, traditional knowledge systems constitute the major form of management strategies with the formal system the least in the study area. It is recommended that local knowledge system and that of modern knowledge systems need to collaborate effectively and continuously in their strategies in solving this problem of resource depletion in the area.

**KEY WORDS:** sustainability, natural resource management, strategies, informal (traditional), formal, Lawra District

### Introduction

Rural people have historically depended on resources from within protected landscape for subsistence and income. Close inter-relationships among people, wilderness areas and their resources are central elements of traditional cosmologies and cultures. Human interaction with protected area ecosystems began long before officially designated conservation status was known, and in some cases pre-date even modern statehood (Mittelman, 1995a; Eder, 1997), in Mittelman, 2001. Different people derive livelihoods from varied natural-resource use and management activities, ranging from game hunting, livestock and crop production, to the collection of thatch grasses, medicinal plants and marine resources (Leach, Mearns and Scoones, 1999).

Analysis using the environmental entitlements framework shows how access to and control over natural resources is mediated by a set of interacting and overlapping institutions, both formal and informal, which are embedded in the political and social life of the area (Leach, Mearns and Scoones, 1999). Certain resource use practices result in ecological outcomes which are detrimental to others' livelihoods; for instance burning land for grazing destroys the thatch grass collected by women (ibid). Yet other resource use is more mutually compatible; thatch grass collection appears to be in tune with many nature conservation objectives. An understanding of this complex set of institutional relationships, by making conflicts and complementarities explicit, is shown to be a vital precursor to exploration of any co-management options for the nature reserve (Leach, Mearns and Scoones, 1999)

Traditional communities derive both their socio-cultural and spiritual identity, in part, from the land. The respect for the land was built into the use of the land. Indigenous practice was based on a sense of harmony with the natural environment, which resulted in sustainable practice and sustainable use. The traditional use of natural resources was based on traditional values base on the arguments advanced above. The image of the family therefore finds

expression in how people relate to their shrines and groves as well as the entire environment. Families and communities have extended family relations with their shrines and groves that they regard as their ancestral origins and will not disobey or wrong as a management strategy to ensure livelihood sustainability. The living thus sees themselves as the children of shrines and groves because of these close bonds. By their regulatory prescriptions for natural resources exploitation and prohibition from exploitation of others totem, they ensured there was peaceful co-existence between humans, vegetation, trees, animals and other forms of life on earth. Stones, rocks, mountains, rivers and the aquatic life they contain were similarly protected or regulated in their use as the ancestors passed on. The resilience of shrines and groves, despite the religious battles against them and their survival, in spite of the varying levels of degradation, call for policy attention to traditional religion as a way of conservation, management and sustainable utilization of natural resources. Millar (2002:7) observed that people still respect and revere shrines and groves for what they stand for. This is why they have survived the test of time and are still relevant in the community-based organization. In many developing countries, the use of natural resources such as land is necessary for the well-being of their people. For centuries, their way of life has comprised mechanisms of conserving or ensuring sustainable utilization of such resources through a system of values and taboos (Steiner et al, 2004). In relating the above assertion to societies such as the Dagara of the Lawra District of Ghana, fairer distribution of income is possible, both at the inter-generational and intra-generational levels. The resources belong to the communities, and thus they exploit them keeping in mind the interests of future generations. Under traditional resource management regimes, redistribution is an accepted practice. Communities usually pass on their indigenous knowledge of resource management to the next generation through oral transmission. The continuous existence of such systems of managing natural resources depend heavily on the passing down of this knowledge. Hence, the continuity and transmission of that knowledge and its associated culture from one generation to another, and its more effective distillation into practical applications that are socially and economically beneficial, are critical factors in the survival and dynamics of the culture. Sustainability of these natural (cultural) resources is therefore necessary for mankind in Africa, Ghana and more especially the study area as a whole.

#### **Methodology**

An extensive literature review using secondary data sources was adopted for the study. A combine ethnographic and survey techniques to gather both quantitative and qualitative data was employed during the research. According to Osuala (2007: 254), the survey researcher is interested in the accurate assessment of the characteristics of whole populations of people. This enabled the researcher (me) to infer the corresponding characteristics in the population. Community and household (individual) level survey was conducted for the purposes of this research in each of the selected communities. Combining both qualitative and quantitative is informed by the fact that, though the two differ in many ways, but they complement each other as well (Neuman 2006: 151). Both methods are necessary in the sense that, there is more than one gate to the kingdom of knowledge. Therefore, I considered the two approaches – qualitative and quantitative methods which data are contained within the perspectives of people that are seen as those with vested knowledge in resource diversity and resource management of local institutions as well as individual/group participants. The focus group discussions which formed part of the community level survey, local people who are considered experts in natural resource management practices were drawn from within the selected communities to discuss the issues on resource diversity and existence. With gender sensitive three generational approach as part of the households survey, individuals - males and females - including family heads in the generations were interviewed using questionnaire that answered issues on local resource management systems. This was done using in-depth interviews. As stated earlier, the combination of both approaches - ethnographic and survey research helped me synthesized the perceptions of the people in the communities. The peoples' socio-cultural background was also taken note of in the data collection process once I used ethnographic survey which delved into the lives of the people. The main characteristic of ethnographic research is familiarity with the subject, closeness to the respondents, quality and type of relationship between researcher and the researched, which must be at least equalitarian and referenced to the large sociocultural system as the explaining source (Sarantakos: 1998). The choice of Lawra District for the study was informed by the fact that, environmental degradation is eroding the available natural resources in the district as a result of population increase leading to resource depletion while the peoples' livelihoods is dependence on the available natural resources.

#### **CONCEPTUAL FRAMEWORK**

Some concepts have been central in the analysis and investigations presented in this paper. These are formal institutions, informal (traditional) and natural resource management. These are concepts that need to be elaborated in order to gain a better understanding of the problem at stake.

## 1. Formal Institutional Ways of Managing Natural Resources.

African societies evolved various institutions to guide natural resources management. Kendie (2006) agreed with Silverman (2000) that, 'institutions comprise a wide variety of formal and informal relationships that enhance societal productivity by making people's interactions and cooperation more predictable and effective'. Social groups of various kinds are increasingly involved in natural resource management (NRM) in many rural areas of Africa (Adams and Anderson, 1988; Little et al., 1987; Shepherd, 1992 in Ole 1993). Kinship, locality, or "traditional" political institutions, not wider ethnic or class based associations, tend to form the organizational basis for such groups. They are often limited in membership and geographical scope. Some institutions have organizational form, while others have more diffuse patterns of norms and behavior about which there are social consensus. Involvement of social groups is often a necessary condition for sustainable NRM. Although much celebrated (Chambers, 1991) it is not sufficient. Often NRM problems involve actors above the locality (Atkinson, 1991; Toulmin, 1986 in Ole 1993). Frequently groups and individuals using a resource often neither control nor have effective corporate power over it: village use of forests are interfered with by central government; migratory pastoralists and sedentary agriculturalists compete for the uses of land (Arntzen, 1990; Moris, 1988); upstream water users affect downstream users (Boesen and Hansen, 1991); parastatals or absentee landlords colonize common land (Atwood, 1990). Local groups therefore often have pressing needs at the aggregate level of the district or above. This requires inclusive institutional arrangements above the locality that can serve as platforms for interest group aggregation, actions, and struggles. Institutions are thus understood as complexes of norms and behaviours that persist over time by serving some socially valued purposes. They thus provide shared understanding of the cultural meaning of activities. Governmental and non-governmental organizations within the district (which for the formal institutions) therefore have the legitimate power to be part of this resource management process as an important condition for their involvement in natural resource management based on consent.

With the advent of European rule in Africa, traditional forms of natural resource management was considered may be outmoded and was downplayed by these Europeans. Today, there is an outcry for collaboration between the two as they have come to realize that one approach is insufficient for effective management of these resources. Rural people survive in their environment sometimes, where they never had any contact with Europeans. It goes to tell us that, environmental management of the local people is sustainable as they have survived with time. Conflicting ideas emerged between traditional forms of management and modern forms as the rights of local people in terms of their control over environmental resources and cultures are tempered with.

This modern system of managing natural resources permeate in the fabric of Ghanaian societies till date with government institutions such as local government, forestry commission among others playing lead roles. In Ghana's forestry sector for instance, Leach, Mearns and Scoones, (1999) assert that, following a history of reserve-based exclusionary approaches, there is currently much interest among government and non-governmental organizations (NGOs) in community-based and co-management approaches which involve local communities in forest management and conservation. These concerns echo recent international debates concerning joint forest management. The approach in Ghana earlier on focused on protection and conservation practices but later shifted to community-based natural resource management Kendie and Guri (2006). Recently, most natural resource interventions by donor agencies encourage co-management in order to yield efficient resource conservation in Africa and Ghana as a whole. This is as a result of the realization by McCallum and Humphrey (1990) that community-based resource management in the 1990s was the combined result of two factors: the failure of local government agencies to adequately address environmental problems with their own limited resources, and a public sector management philosophy increasingly centred upon efficiency and cost recovery. It is justified that, rural people are better placed to know their own problems and consequently seek their own solutions representing a shift in government policy. Kendie and Guri (2006) argued that the failure of many programmes in Ghana in particular has been seen in the top-down approach that particularly pays no attention to local needs. By and large, modern trends are eroding the intricate relationships evolved over the millenia between African people and nature even though such relationships also had conservation dimensions (Kendie and Guri, 2006). Recent approaches to natural resource management are now been seen including cultural norms which connect both traditional and modern systems showing how they mutually affect each other in the context of environmental protection and nature conservation. The failure of natural resource management systems according to Coop and Brunchorst (2001) in Lawrence et al. (2001) has in recent years often been greater in magnitude than those observed historically. Current resource management has clearly failed to safeguard the dynamic capacity of ecosystems or to manage ecological and social systems for resilience and sustainability. There is considerable evidence of poor management of ecosystems with many conventional prescriptions of resource management now known to be unsustainable. In the process of natural resource management decision making, it is important to combine the influence of institutional

structures; the distribution of social, environmental and political values; and the functional-ecological connectivity between landscape components as three essential building blocks of resource governance.

## **2. Informal (Traditional) Institutional Ways of Managing Natural Resources**

Traditional institution has been understood as local, collectively agreed upon social arrangements that govern the interactions among members of a given group (Bacho, 2004). Traditional institutions evolve over time, and thus reflect the time, place and experiences of the group. Under traditional tribal law, land and the fruits of the land belong in the first instance to the spirit world. The first settlers through spiritual intermediation of their leaders covenanted with these spirits to gain user rights in exchange for certain ceremonial rites. This covenant was passed down over time through the 'Tindamba' whose spiritual role binds the community with the spirits, the ancestors the present, the future generations and regards man and physical objects such as mountains, trees and rivers as a continuum of the same ancestry. The use of natural resources, both plant and animal was done with respect and guided by conservation requirements of never using more than what would provide sufficient seed for the future (Abu 1998, Millar 2001 cited in Millar 2003). Millar further argued that the image of the family found expression in how people related to their shrines and groves. Families and communities had extended family relations with their shrines and groves that they regarded as their ancestral origin and could neither wrong nor disobey.

The living thus saw themselves as the children of shrines and groves because of these close bonds. By their prescriptions for natural resources exploitation and prohibition from exploitation of other totems, they ensured there was peaceful co-existence between mankind, vegetation, trees, animals and other forms of life on earth. Stones, rocks, mountains, rivers and the aquatic life they contain were similarly protected or regulated in their use as the ancestors passed on. Traditional form of managing natural resources for me is nothing other than the arguments advanced so far above.

Not only that, Haverkort et. al. (2003) also emphasized that; religious consideration dominates the ordering of daily life in African societies. The beliefs in mystical powers exist. This is reflected in the existence of institutions in the rural setting such as the Tindamba as well as the modern chieftaincy institutions in the study area. These traditional institutions are structured and exist in every community. Building relationship with them leads to the establishment of a form of cooperation and respect (Haverkort and Millar, 1994). These institutions which form part of the indigenous knowledge systems of a people are imperative for development since they influence the selection and integration of externalities into the local practices (Dessein, 2005 cited by Yelfaanibe, 2009). Until recently, this view has been incapacitated by colonialists thus limiting the capacities of rural people to solve their own problems and developing technologies and skills that serve their own needs (Haverkort et. al., 2003). Millar 2003, further argued that the resilience of shrines and groves despite the religious battles against them and their survival, in spite of the varying levels of the degradation calls for policy attention to native religion as a way of conservation, management and sustainable utilization of natural resources. He made the observation that people still respect and revere shrines and groves for what they stand for. This is why they have survived the test of time and are still relevant in the community-based organization. In his conclusion, modern governance systems tried to take away traditional role of local leaders including spiritual leaders as the owners and custodians of natural resources on behalf of the people that brought conflict into natural resource exploitation which I agree with. Probably the reason been for effective management of these resources but rather tend to overexploitation by themselves. However, in the case of the study area, though those modern institutions exist, their influence on traditional management of these resources is not much felt as compared to the forest areas of the southern belt of Ghana. In traditional set up the main rule governing access to these natural resources is that insiders has the right of access to resources for free, while outsiders has to pay a tribute to the insiders in the form of proceeds from farms and more often than not tree fruits such as dawadawa and shea are not to be harvested by the outsiders.

### **Community-Based Natural Resource Management (CBNRM) Strategy**

CBNRM presumes that local residents can understand and will support larger interests and principles of conservation, factoring these into their economic, social and cultural considerations about how natural resources should best be treated. It should not, however, idealize or romanticize local resource users, who for a variety of reasons – economic, social or cultural – may be more disposed toward resource-degrading behaviour (RDB) than resource-conserving behaviour (RCB) (Uphoff and Langholz 1998). Sometimes communities may preserve the resources within their own jurisdiction by diminishing those of neighbouring communities, as in the case of the Madan Pokhara panchayat in Nepal (Acharya 1984). Threats to natural resource sustainability can come from any level, from micro to macro, so decisions are not entrusted entirely or exclusively to higher levels or to lower ones. CBNRM is a system of natural resource management, especially because there may be need for higher level support for enforcement of local management efforts and restrictions. The essential feature of CBNRM is starting with communities, taking them into confidence and having confidence in them. It engages their ideas, experience,

values and capabilities on behalf of resource conservation objectives, at the same time it seeks ways for communities to become better remunerated and better serve

### **The Political Administrative District**

The research was carried out in the Lawra District of Upper West Region of Ghana. Lawra District is one of the few districts that were created during the colonial regimes in the then Northern Territory of Ghana. The district was made up of four traditional areas namely; Lawra, Nandom, Lambussie and Jirapa forming the Lawra Confederacy. As part of bringing development to the grassroots, the Provisional National Defense Council (PNDC) through its decentralization derive created the then Jirapa/Lambussie District in the 1980s out of the Lawra District and subsequently, the New Patriotic Party government in 2008 further separated it to Lambussie/Kaane District with the capital at Lambussie. The Lawra District now comprises the two traditional areas of Lawra and Nandom with one constituency with diverse demographic characteristic which give each ethnic group some specific features in their perceptions of natural resource management within their respective resource domain.

### **Location and Natural Environment**

The Lawra District now is bordered by both the Jirapa district to the southeastern and southern parts, and on the northeastern is the Lambussie/Kaane District. The west and the north are bordered by the Republic of Burkina Faso. It is one of the nine (9) districts in the Upper West Region and derives legal existence from Legislative Instrument (L.I) 1434 of 1988. It lies in the north western corner of the Upper West Region between latitudes 2° 25' W and 2° 45'W, and longitudes 10° 20'N and 11° 00'N (District Medium Term Development Plan 1996-2000, 2009). The total area of the district is 1051.2 square kilometers. This consists of 5.7% of the region's total area of 18,478 square kilometers representing 12.7% of the total area of Ghana (GSS, 2005).

The ecological zone to which my research area belongs is generally referred to as 'Guinea savannah woodland'. Kees, (2004: 80) described the ecological area as 'Orchard bushland', 'tree savannah', 'Sudanese parkland', 'savannah woodland' and 'interior savannah zone'. Kees therefore argued that, the area is covered with savannah grasses, shrubs and scattered trees. The vegetation is characterized by the guinea savanna type with scattered drought resistant trees such as the Shea, the baobab, locust bean (dawadawa) ebony and torn. Kees agreed with Nsiah-Gyabaah (1994: 135-136) that generally the density of trees decreases where population density increases. GSS (2005) assert that, the heterogeneous collection of trees provides all domestic requirements for fuel wood, charcoal, construction of houses, cattle kraals and fencing of gardens which serve as sources of livelihood to the people. The shorter shrubs and grass provide fodder for livestock. I tend to agree with this assertion in the sense that man depends on nature for his survival.

The climate of the district is that of tropical continental with the mean annual temperature ranging between 27 and 36 the period between February and April is the hottest. Between April and October, the tropical air mass which blows over the area gives it the only wet season in the year which is common to the rest of northern Ghana (Dickson and Benneh, 1988). Bacho, (2001) therefore agreed with Dickson and Benneh (1988) that, there are two seasons in the year - the dry and the wet seasons. The dry season commences from early November to late March, with cold and hazy Harmattan winds particularly during the nights and early morning and high temperatures by mid-day.

### **Findings and Discussions**

#### **Informal and formal strategies**

This section looks at the traditional institutions that are available and managing natural resources within the study area and the adequacy of these resources in enhancing rural livelihoods.

#### **Sustainable Management Strategies by Traditional and Modern Knowledge Systems**

Apart from institutions in charge of managing natural resources and the adequacy of these resources, the study also looks at the sustainable management strategies by both traditional and modern systems in enhancing livelihoods in the various communities of the area. Traditional methods from the analysis are the appropriate strategy for managing natural resources within the area. 68.3% from the data assert that traditional method is still the best option and serves as a control measure because of the spirituality attached to it that deters people away from the destruction of these resources. Secondly, they argue that cost of agricultural inputs and implements are dearer that they cannot afford in the case of land for agriculture which is the main source of their survival. However, they also argue that sustainability can be enhanced if both methods are combined on the grounds that these resources are very important to their individual households and the community as a whole. 87.8% responded that the combination of modern methods and that of the traditional methods will enhance sustainability of these resources for the future generations to come. And only 12.2% disagree with the combination but neither said only traditional nor modern methods is appropriate.

From the field questionnaire the data reveal that almost everyone has access to these resources in one way or the other. Access takes the form of ownership through inheritance, open access in terms of other resources for instance

economic trees such as dawadawa and shea depending on their location except land, begging/leasing among others. It can be concluded that access to these resources largely depends on a plethora of family and community networks systems that are operating in the area by people seeking for a particular resource. The rights and level of access to a particular resource one gets depends on the decision of the owner. He is notified earlier to enable him consult with his family members in the case of land since it is usually communally owned. For the case of land, people who are considered illegitimate children, that is born to their maternal homes often grow up to be landless with their mothers and sometimes widows with no male child or if their fathers died without owning a piece of land through inheritance. There are some families that are landless as a result of historical factors among others. The right to use lies with the owner. Access to land is not so much an issue despite its limitation. Landless people have the right to use a piece of land but the use right is limited because as part of management strategy, land owners retrieve the land lease to tenants when they realize the land is been degraded. From the data 39.0% responded to have access through inheritance while 31.75% have access through open access which is much related to forest and water resources and women are much more in this group of open access because they are mostly primary gatherers and also do not owe land.

### **Traditional and Modern Institutional Relations in Natural Resource Management**

Despite the fact that the society in the district is culturally inclined in nature, there exist modern institutions of governmental and non-governmental organizations such as District Assembly, Ghana National Fire Service, Forestry Services Department, Non-Governmental Organization, National Disaster Management Organization, Ministry of Food and Agriculture and Environmental Protection Agency that are engaged in and collaborate with traditional institutions in managing these resources for the survival of the people. Data from the field indicates that, 58.5% of respondents confirm the presence of these organizations as against 36.6% who says no because they either do not know about their operations or otherwise. These modern institutions establish some relations with their traditional counterparts because they cannot operate in isolation. Only 4.9% asserted that there are no relations between the two which shows the level of relations that exist in managing NRs in the district as majority indicate the presence and relations between the two. The relations are aimed at sustaining the resources in order to enhance the livelihood of the communities in the district. Gottret 2007, agreed with Long (1997a) that, 'livelihood' best expresses the idea of individuals and groups striving to make a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, responding to new opportunities and choosing between different value positions. This definition fits well with the study as individual families strive for a living together with the community (ies) in total. The presence of modern institutions either by the state or other stakeholders is aimed at ensuring individual families to improve their wellbeing. The traditional authorities also protect these resources for the community for the future generations to come.

### **Traditional Institutions and Modern Management Strategies**

Resource management is neither solely in the hands of one institution be it formal or informal. Resource sustainability can be enhanced if there is fusion of ideologies from both formal and informal settings. Knowledges and technologies are constantly being reworked 'to fit with the production strategies, resource imperatives and social desires of the farmer or farm family in relation to agriculture, Long and Villareal, 1994: 47, cited by Lawrence et al. 2001. This is because governmental strategies are applicable to every community in Ghana.

**Table 4.5: Modern Management Strategies**

<b>Modern Strategies</b>	<b>Frequency</b>	<b>Percent</b>
Yes	24	58.5
No	17	41.5
<b>Total</b>	<b>41</b>	<b>100.0</b>

Source: Field Survey May, 2010

Out of the data gathered, it is revealed that 58.5% of interviewees attest that unlike previously where resource management was solely in the hands of traditional authorities, that is now taking a swipe with modern governance systems. Now there is some collaboration between local knowledge systems and modern management strategies. The state through its decentralization process establishes District Assemblies that set out bye-laws governing their jurisdictions where these local knowledge systems operate. Policies formulated by the central government are

binding on every institution or person in the country. Transcending these policies to the Assemblies means that traditional institutions must abide by them in every field including natural resource management in the form of collaboration. From the data, 14.6% use District Assembly Bye-Laws in NR management and 26.8% use community bye-laws and 14.6% also use Non-Governmental Organization initiatives. This really shows the collaboration in the district in natural resource management. The effectiveness of this fusion of knowledges is much appreciated by both formal and informal institutions in the district.

### **Summary and Conclusions**

#### **Sustainable Management Strategies for Traditional and Modern Systems**

The failure of natural resource management systems in recent years has been greater in magnitude than those observed historically, (Brunckhorst and Coop, 2001). Every environment requires sustainability in order to ensure sustainable development which is, meeting the needs of today without compromising the needs of the future. The carrying capacity that is the ability of an ecosystem to sustain a certain population and distribution of people and animals if exceeded will cause basic natural resources such as soil to degrade or deplete (CIDA, 1992). Sustaining ecological processes and services requires resilience across multiple scales of complex systems that are influenced by human activity (Brunckhorst and Coop, 2001). Therefore, sustainable management strategies are required if peoples' livelihoods is to be enhanced in the study area. The data revealed that 61% of respondents depend solely on natural resources as a livelihood source and 39% also depend on other sources for their existence. It was also revealed that traditional methods of tilling the land is still appropriate in enhancing rural livelihood because, the nature of the soil do not require sophisticated farming implements such as tractor plough among others in the case of land which is the major source of their livelihood. These traditional methods involve cultural rules and regulations formulated by traditional authorities through the institutions available in the various communities. It also came up that, there is collaboration between traditional and modern institutions in the process as policies relating to the environment are embedded in the status books of the country. However, conservation agriculture is been practiced by some farmers particularly the Nandom area where NGOs are engaged in farming practices.

Local institutions still have the opportunity when it comes to natural resource management in the area. This is so because, the use of customary laws by traditional institutions are relevant to the people even till date according to the findings. As a control measure and being able to sustainably manage these resources efficiently, customary laws were and are still used as they fear that modern management principles might take away their resources. Many of them either does not know or are not even aware of modern management principles operating in the area. The data indicated 90.2% of respondents acknowledging the use of customary laws for natural resource management which is indicative of the level of use. Traditional practices are still relevant in today's modern era in managing natural resources despite the use of bye-laws by the assembly as well as the central government.

#### **Possible community-based management options**

Ghai and Vivian, 1992; Ghai, 1994 in Leach et. Al, (1999) observed that, the consensus in the wake of the United Nations Conference on Environment and Development (UNCED) suggests that the implementation of what has come to be known as "sustainable development" should be based on local-level solutions derived from community initiatives. Therefore, any meaningful NRM in the study area should emphasize much on community members' role in arriving at the above assertion. Data from the field revealed that 63.4 percent of respondents feel the two methods be combined to enhance sustainability of natural resources in the environment. NRM can be effective and sustainable if there is a blend of both traditional and modern knowledge systems. This will enable communities to have ownership of their resources. Communities therefore have the options ahead in managing their available resources if they follow these assertions in addition to sensitization of members on the dangers involved in natural resource depletion. Adherence to rules and regulations made by both formal and informal institutions by communities is an option in managing natural resources.

#### **Recommendations**

The study aimed at assessing natural resource management using appropriate strategies in rural communities and how these affect their livelihood systems. In this vain, the following recommendations are made in addressing the findings that emerged from the research.

#### **Effective Collaboration between Formal and Informal Institutions in Natural Resource Management**

Institutions both formal and informal are obliged by law or customs and norms to preserve and conserve resources (natural) within their areas of operation. Modernization and foreign religion according to community members have intruded into the fabric of their institutions today. They recount the effectiveness of traditional norms and ethics that were use some few decades back in curbing immoralities in their communities against environmental degradation. However, these suddenly have been eroded owing to modernity. Formal institutions involvement in natural resource management is sometimes seen as an intrusion in their traditional value systems though some laud the idea. They

often fear that their resources would be taken away from them particularly land which is a major source of livelihood.

Bye-laws formulated by formal institutions such as the district assembly I suggest should take into consideration traditional values and norms that exist in the district. Traditional authorities should always be consulted in the formulation of these laws such that, they can give their inputs pertaining to natural resources conservation and management. If this collaboration is done, sustainability of natural resources would be enhanced hence, livelihoods would be improved.

Communities since creation have evolved strategies in managing resources within their environment through cultural constructions before the advent of Europeans. These strategies have been maintained and seen as effective because of the dangers involve in violating customary laws. There is the need for people to be sensitized to change their attitudes towards culture and take the good aspects of the culture relevant for preserving the environment.

Rural livelihoods are dependent on the environment which is made up of the flora and fauna. They see the environment as gifts of nature from God to enable them end their living. Therefore, any form of means by which rural people are not been able to have total control of their environment is an affront to their survival. Natural resource management should therefore be seen as a collaboration between traditional authorities on the one hand, the state on the other hand as well as community members who owe and control their resources for generations to come.

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