

FOREST MANAGEMENT THROUGH SOCIAL INNOVATION IN RURAL GHANA: THE CASE OF THE WEST GONJA DISTRICT

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Abstract

Environmental degradation and its associated socio-economic consequences reflect the wide gap between the goals of sustainability and present resource management practices. The crucial role of bottom-up strategies in managing natural resources is highlighted in the Millennium Ecosystem Assessment and the Millennium Development Goals. Community/grassroots institutions can build on traditional norms to create strategies which will address environmental challenges from the local level. Environmental management is one key challenge facing Africa’s growing population in the quest for sustainable development. Nonetheless, the continent has a sizeable rural population. The research sheds light on how social innovation can enhance grassroots natural resource management and climate adaptation so as to harmonise environment-society relations. Sharing themes with the Post-2015 Development Agenda of the United Nations, and the New Partnership of African Development (NEPAD) research is of both local and international significance.

Purpose – *to develop* knowledge on the relationship between social innovations and rural forests livelihoods.

Design/methodology/approach – The study uses literature review, interviews and participant observation to assess the subject matter.

Findings – Localised knowledge systems and practices –have evolved in rural niches closely tied to resident communities and their associated livelihood patterns. The remoteness of such communities from central authority makes such innovation less apparent and lacking the needed support. Non-technical innovation is not adequately aided by current policy regimes, regulatory, institutional as well as infrastructural frameworks. Hence in the absence of policy intervention, there is the risk of several missed opportunities.

Research limitations/implications – language barrier: difficulties in translation from local language to English, distrust of local authorities of outsiders.

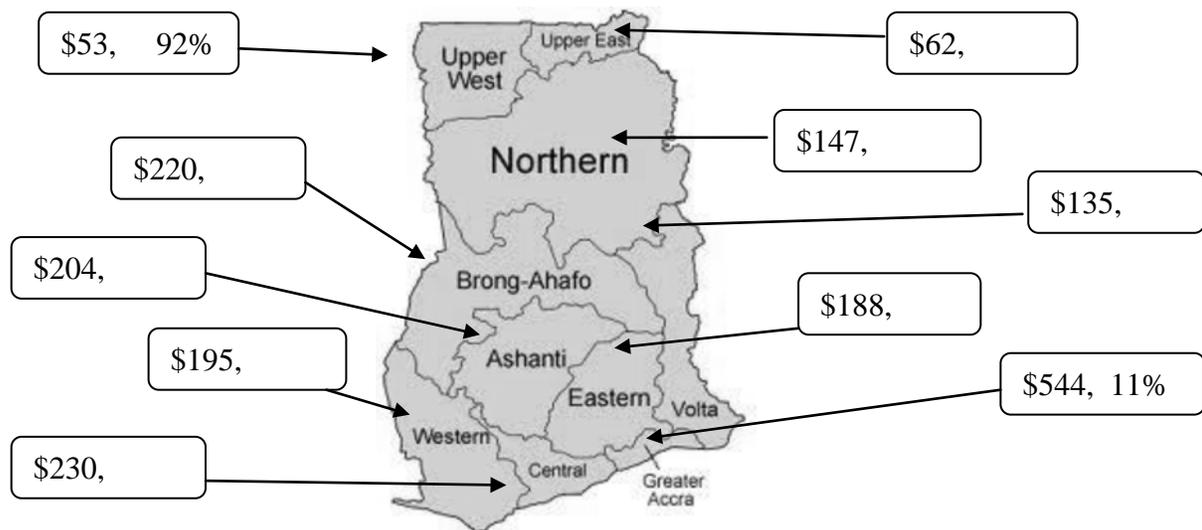
Practical implications – In the absence of policy intervention, there is the risk of several missed opportunities in benefitting from the vital localised knowledge systems and practices which have evolved in rural niches.

Originality/Value – The attributes of social innovation are attuned with solving several of the environmental issues confronting contemporary societies which current systems are not addressing.

Keywords: forest management, social innovation, rural livelihoods, indigenous knowledge

1. Introduction:

Forest degradation complemented by climate change and represents some of the urgent problems of our modern society with Africa being the most affected (Fisher et al., 2010). So much so that, climate change has been called a “*super wicked problem*,” as the more time passes, the more difficult it is to address (Levin et al., 2012). Hence ensuring environmental sustainability features prominently in both the Millennium Development Goals and the Post-2015 Development Agenda of the United Nations. Rural communities in Africa are often poor and thus bear the brunt of climate fluctuations, because of their natural resource-dependence and climate-sensitive livelihoods.



Source: Adapted from Clean Cookstoves (2012)

Fig.1. Proportion of Rural Residents in Regions and Mean Annual Income in Ghana

Fig.1.0 shows that the three northern regions. With the exception of Volta, all have high rural populations. In Ghana, rural areas are markedly poorer than urban regions. Regions with high proportions of rural residents have low incomes and are associated with significant use of woodfuels (Zhou et al., 2011). Consequently, the northern regions in general depend highly on the use of fuelwood compared to other parts of the country (Energy Commission, 2012).

Income from environmental resources, harvested in non-cultivated habitats such as forests are a key for rural livelihoods in forest areas of the tropics, and is mediated by a function of cultural and gender roles (UNDP, 2012). However, our understanding of intra-community characteristics and factors is such that there is the need for further studies to better appreciate the relationships between communities, climate change, poverty and natural resources (UNDP, 2012).

In general, the challenge of loss of biological diversity, weakening of cultural diversity and the poverty phenomenon, are intricately linked thus necessitate a holistic and more comprehensive approach to addressing them (Elbra, 2013). “Sustainable development” as per the United Nations Conference on Environment and Development (UNCED) encourages active involvement of local-level solutions derived from community initiatives (Scoones et al., 1999). This idea has been embraced by governments, donor organizations and nongovernmental organizations (NGOs) — asking for “co-management”, or the sharing of responsibilities in the management of natural resources amongst state and local governments, civic organizations, and local communities (Dyer et al., 2014). Although this notion underpins several community-based natural resource management (CBNRM) projects (Dyer et al., 2014), others argue that CBRM despite its merits often fails in the goal of achieving conservation and sustainable livelihoods (Scoones et al., 1999). Kerr et al., (2010) also add that the twin goal of social development and environmental conservation is frustrating and prone to failure. Nonetheless, people and societies need to take decisive decisions to save the environment. However, the quality of decision-making is an interplay of the decision-making approach through which an agreement is reached. This suggests there is a need for continuous negotiation, learning, adaptation, and improvement (Sayer et al., 2013). *In recent times social innovation has come to the fore as an avenue to stimulate novel strategies that address complex issues alongside enhancing citizen participation. Given its ‘participatory and creative nature, it is well positioned to address environmental challenges, which are multifaceted and often require societal or behavioural shifts towards more sustainable options’* (Science for Environment Policy, 2014). Several models have evolved to define and shed insight on social innovation. These emphasise the significance of processes like group identity formation; redefining a problem to afford a novel approach, stakeholder engagement as well as the existence of a vibrant/good leadership by individual persons or a core group. Despite the usefulness of such frameworks and models they must be complemented by case studies to depict the real-life processes, hurdles and impacts of social innovation in the environmental domain (Science for Environment and Policy, 2014)

Social innovation:

The term *social innovation* can be decomposed into two main themes namely *social* and *innovation*.

a) *Innovation* refers to the “successful exploitation of new ideas” (Steward et al., 2009, p.7). This suggests that an innovation is not just an invention however a new idea that is put to use.

b) Social: an innovation is regarded as social when it results in a social value or something from which the whole society benefits.

Social innovation is therefore ‘a novel solution to a social problem that is more effective, efficient, sustainable, or just than present solutions and for which the value created accrues primarily to society as a whole rather than private individuals’ (Phills et al., 2008; Stanford Business Review, 2014). Social innovation is a potent and priceless tool in the environmental sphere as it ‘involves social groups and communities creating, developing and diffusing ideas and solutions to address pressing social needs’ (Science for Environment and Policy, 2014).

Social innovation manifests as a product, production process or technology, however it can as well be a *‘principle, an idea, a piece of legislation, a social movement, an intervention, or some combination of them’* (Stanford Social Innovation Review, 2015). This suggests that several ideas may be initially proposed but undergo periods of trials to hone them before they are adopted. In the context of this study, social innovation denotes the practices evolved among rural resource users to boost nature conservation and hence address environmental degradation; as well as finding ways to make traditional management systems more sensitive to contemporary climate and environment management concepts.

Research Objective: *to develop* knowledge on the relationship between social innovations, forests livelihoods, and forest management.

Research Questions:

A) To what extent does policy facilitate social innovation for environment at the grassroots /local level?

b) How may identifiable traditional authorities/opinion leaders evolve as climate ambassadors at the community level to inspire nature conservation at the grassroots?

2. Methodology

Research design

This research is undertaken from the case study approach. Kvale and Brinkman (2009, pg 108) argue that immersing oneself in the target population will usher the researcher into the socio-cultural life of the people and afford an inkling of what the subjects may articulate. In addition, this was also to help unveil crucial ethicopolitical concerns which need to be considered at both the pre and post interview phases.

Information gathering

Literature reviews

Some of the main documents perused include Park Management Report of the Mole National Park (2011), Millennium Ecosystems Assessment (2005), Rural Livelihoods and Diversity in Developing Countries by Frank Ellis (2000), Ghana Government Policies on

natural resources. These documents helped understand the status quo on the various themes of the research.

Data Collection

Field work and personal observation

In addition to the secondary data studied, primary data was sought by visiting the field. Thus the case study site was visited which enabled interaction with households, school children, and some key informants as a way of *participant observation*.

Sampling

Given resource constraints as per time and funds, interviews were done with 30 households; 5 NGO's with a record of active participation in the rural energy landscape; 3 tertiary institutions which are into household improved cooking technology for the local market; and two government institutions.

Choice of Interviewees:

The choice of respondents was carefully chosen and was informed by assessing global and country efforts at addressing the household energy challenge. For example, borrowing from past experiences, the United Nations as part of its post-2015 development agenda, has sought to ensure: the roles of *women* are given prominence; *youth and education* play key roles; multi-sectoral approach is used in addressing energy goals; the *private sector* is involved as a vital player in the delivery of its goals (IISD, 2013). Furthermore, the Country Action Plan of Ghana on Sustainable Energy for all identifies the need for collaboration and concerted action between *government, civil society, research community* and the *private sector* (Ghana Government, 2012).

Sampling method

Purposive /snowball sampling: given the time and other resource constraints, a desk study was done to identify key stakeholders who are active in the field of study and were recruited as key informants (*purposive sampling*). Some of the key informants consulted include; a local chief, the district assembly planner (Damongo District Assembly), school teachers at the district level (Damongo LA Primary and Bowena Primary and Junior High School), lecturers at the tertiary institutions dealing with energy/fuel (University of Ghana, Kwame Nkrumah University of Science and Technology, Kumasi Polytechnic), divisional heads of civil society organisations (AROCHA, SIMAVI/New Energy).

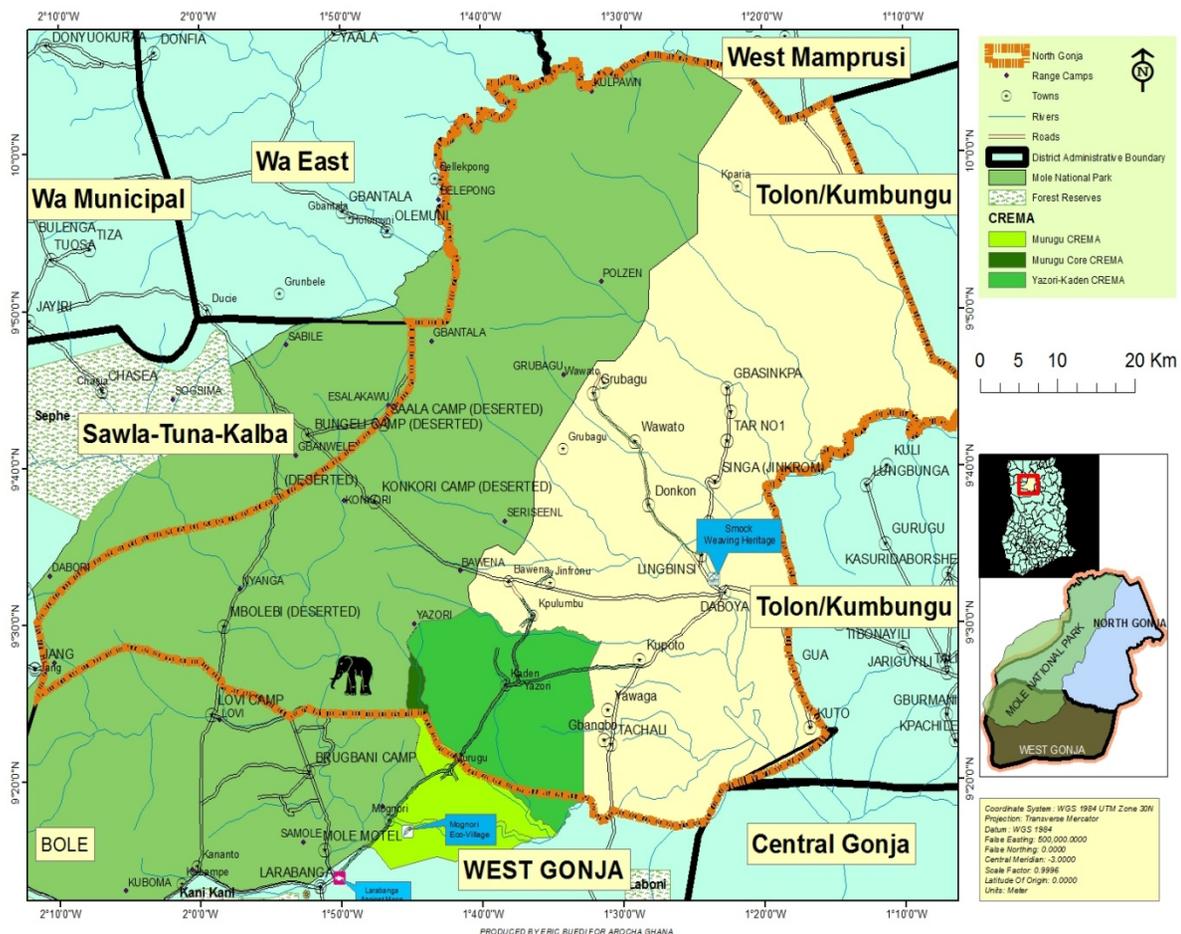
Interviews

The informed consent of the interviewees was sought in each case before being interviewed. In cases where the interviewer preferred the interview in the local dialect, the interview was conducted with the aid of an interpreter. After getting the consent of the interviewer, a semi-structured interview was conducted as per the objectives of the project. Key resource persons from several institutions were interviewed as well as group discussions with school children and facilitated by their teacher. Difficulties or barriers to effective interaction between adults and children could be overcome when kids

are interviewed in natural settings. Group discussions were conducted with school children at the playground. Consent was sought from the local chief and parents.

Interviews with households

A number of households were visited (Fig.2.3), observed and interviewed. These households were within communities where the local AROCHA operates (AROGCHA communities). A household is a social unit which exhibits coresidency, often having a common catering arrangement and jointly shares resources (Ellis, 2000 pg 18). The household is also a basic unit of enumeration used by the Ghana Statistical Service for its Housing and Population Census. The 5 communities visited were Yazori, Murugu, Mognori, Bowena, and Damongo.



Source: AROCHA 2013

Fig.2.1 Map of Case Study Area

Fig. 2.1 showcases the case study area which is a farming community with low rates of literacy and low income.

Ownership of land is communal ‘under the custody of the Tendana (Earth-priest), held in trust by the Chief of the community on behalf of the Divisional Chief (Wasipe-

wura) with overall custody entrusted to the Yagbon-wura, the Gonja King’ (AROCHA, 2007). The *Tendana* in the community acts as the overseer of all natural resources within the communities and thus has immense influence in the use of resources. Generally, the communities are farm/hunter groups preoccupied with rain-fed agriculture. In the protracted dry season, most households partake in small – non-farm farm activities such as : *Shea butter* production, *Gari* (grated cassava in mashed form) processing, which enhance household incomes. These activities are largely household based, cyclic and arduous with women as the main players.

Selection of households: in line with local traditions, a courtesy call was rendered the chief when visiting a community to explain the rationale of the visit. After gaining the consent of the chief, the chief’s household became the first household for interview. Every second household was then chosen in a clockwise manner e.g 3, 5, 7.

Fig.2.2 Schematic Overview of Household Selection in the Villages

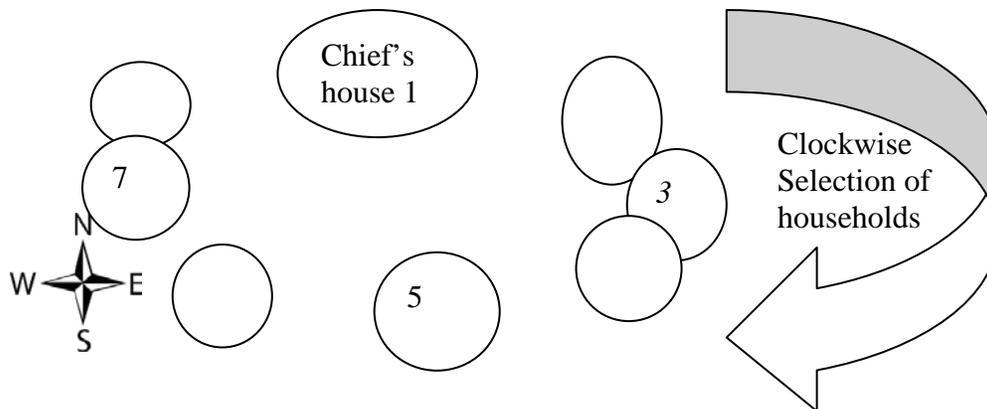


Fig. 2.2 Demonstrates the order of selection of households and the interview process in the rural villages.

The village is composed of mainly adobe houses which are roofed with thatch. Each compound comprised of a husband (head of household), his wife/wives and children in a globular compound. In each household, household head was contacted when present before initiating the interview with the wife. In some cases where the household head was absent, the most senior of his wives served as head and permission was requested from her.

Data Validity and Representativeness: the study aim is to produce knowledge can be used to tackle similar themes in other real-life cases. The Gonja District is a critical case as both Management Plan of the Mole National Park (largest nature reserve in Ghana), as well as key national policy documents on energy emphasize to the harmful impacts of wood fuels on the study area (Energy Commission, 2006). To ensure validity, a number of methods to collecting data were used; group discussions, household/key informant

interviews, and personal observation. Furthermore, to boost triangulation, a number of households from diverse villages were interviewed. In addition, the key informants were chosen from diverse stakeholder groups to provide a comprehensive view of the energy challenge at the rural household level. Finally, the questionnaires were made so as to be easily comprehensible to the respondents.

2.4. Data-Interpretation

Notes were taken in the course of the interview on thematic areas of the study and complemented with interview recordings. The pertinent thematic areas were composed into statements à la *meaning condensation*. Meaning condensation is whereby the meanings as expressed by a respondent are summarized into brief formulations. Long accounts are compressed into concise statements where the major issue articulated is reproduced more succinctly (Kvale and Brinkman, 2008 pg 205).

2.5. Qualitative research and ethics

The key research ethics encapsulated in the Belmont Report of 1979 as per human subjects in research were observed (OHRP, 2012). These include *Respect for persons*: the human dignity of the respondents was respected hence their consent was sought throughout the study. *Beneficence* the respondents were interviewed in safe serene environments. *Justice*: copies of the research were shared with the community leaders since research participants deserve to share in the benefits of the study.

In modern times, *Respect for communities* has emerged as another aspect of ethics, consequently the norms and traditions of the local community were respected.

3.0 Results and Discussions:

3.1 Findings on Key Challenges to Social Innovation as Environmental Tool at the Grassroots

3.2 Discussions

• Policy

Traditional biodiversity conservation is expressed in terms of local rules and regulation and enforced through prohibitions (Oduro, 2007; Janson 2013). Due to the fact that these beliefs were associated to the ancestral spirits or deities, noncompliance invited high penalties for culprits (Janson, 2013) .

Compulsory resting days for the earth serve as restrictions on farming, hunting and fishing. These are periods seen to be sacred as *mother earth* was taking rest. Such taboo days are still widely observed and help to protect natural resources from over-exploitation.

Indigenous natural resources management revolves around these thematic areas (Oduro 2007).

- Preserving specific ecological biomes or habitats (sacred groves and rivers)
- Preserving specific flora or fauna (totem and taboo species); and
- Strict guidelines on the utilization of specific natural resources (closed season for harvesting or hunting).

Social innovations often embed a social component to secure cultural and social acceptance as eventual success depends on the cooperation of people and communities. Thus when citizens and communities initiate and develop an idea it has a higher likelihood to succeed and be sustained (Sabadie, 2013). Such innovative interventions help address environmental challenges as several environmental drivers stimulate social innovations, ranging from biodiversity loss, transport and pollution issues, waste problems, to destruction of ecosystem services (eg pollination and flood protection by wetlands). These environmental drivers have social implications including food insecurity and poor agricultural output due to low soil quality or inadequate pollination. Thus social and environmental issues are intertwined and common approaches are possible. Other examples of environmental social innovation from other places farther afield include ‘wood recycling social enterprises, organic gardening cooperatives, low-impact housing developments, farmers’ markets, car-sharing schemes, renewable energy co-operatives and community composting schemes’ (Science for Environment Policy, 2014pg 6).

Nonetheless, social innovation in the environmental sector is still nascent evidenced by the increasing initiatives, hubs and incubators coupled with a burgeoning body of research and knowledge. Policy is crucial to the development and spread of social innovation in the environment sector as it produces the conducive atmosphere for its emergence as well as realizing its full potential (Biggs, Westley and Carpenter, 2010: Science for Environment Policy, 2014). Policy and scientific research can promote the growth of social innovation in the environment whilst facilitating its learning and development.

• **Local Actors**

In the domain of research and innovation policy, innovations are deemed to be *social* when they employ methods that engage society and intend to profit the larger society instead of personal gain for the innovator. Thus they benefit the community and increase the community’s ability to act.

Due to its fluid nature, several local actors can initiate social innovation in the environment sector with different degrees of formality and organization such as *‘including community groups, NGOs, charities, governments, businesses, academics, philanthropists, combinations of these and more spontaneous gatherings of citizens recruited through social media to tackle environmental issues’* (Science for Environment Policy, 2014 pg 5). The involvement of local actors, as a bottom-up strategy has more advantages for the community vis-à-vis more structured top-down processes such as increased public trust, enhanced decision making on local issues, adopting more environmentally friendly lifestyles, values and practices (Reeves, Lemon and Cook, 2013).

Similarly, in the research study area; ownership of land is communal ‘*under the custody of the Tendana (Earth-priest), held in trust by the Chief of the community on behalf of the Divisional Chief (Wasipe-wura) with overall custody entrusted to the Yagbon-wura, the Gonja King*’ (AROCHA, 2007). The *Tendana* in the community oversees the management of all natural resources within the communities and hence plays a crucial role in the use of resources.

The reverent role of the *Tendana* as a grassroots bottom-up influential actor highlights the strength of social innovation as well-suited for addressing several environmental challenges confronting society which present systems are not addressing viz: ‘*collaboration, participation, co-production, grassroots approaches and cross-sectoral working*’ (Science for Environment Policy, 2014 pg7). However, in modern times the role of traditional authorities such as the *Tendana* has been faced by several challenges especially the erosion of local values. This is because in the past traditional management of the environment was premised on beliefs and norms which were believed to come with huge penalties such as curses when not observed. However the influence of modernity and other religions (e.g. Christianity, Islam) have led to a situation where local people see such laws as backward and do not respect them which has also affected rural biodiversity conservation (Janson, 2013). Similarly, the singular effort of government as a top-down strategy has not been entirely successful. These challenges indicate more effort be geared at opportunities for agency and leverage between local actors such as the *Tendana* and central government through the ministry of forestry so each partner can reinforce the strength of the other in nature conservation and education.

The local actor such as the *Tendana* can also be a bridge over language barrier in environmental education. The rural folklore is replete with the significance of flora and fauna in the daily life of the communities. But conservation programmes coming from central government are all in English rather than in forms which rural people can hardly identify and make meaning of. Hence, given the high level of illiteracy in the fringe communities, this will require increased education using local methods in partnership with the local custodian *Tendana* to help fringe communities appreciate the essence of biodiversity and ecosystems services.

• Gender Roles

Modern environmental projects highlight the necessity of satisfying different user groups in terms of service delivery. There are contrasts between men and women in engaging with the environment which is mirrored the Earth Summit in Rio de Janeiro (UNDP, 2012).

Gender shapes human/environment relations as well as the use and management of environmental resources. Women are deemed to be key local assets which need harnessing for successful environmental resources management (Braidotti et al., 1994). As key managers of the household, communities and natural resources: women obtain peculiar knowledge about their local environment and its natural resources (UNDP, 2012).

Hence the nature of power relations in the family, society influence women’s use of resources. The effect of environmental shocks also differs across genders due to variances in vulnerabilities due to the varying responsibilities of men and women as per the cultural context in which they function (UNDP, 2012). Thus gender equality and women’s empowerment programmes have been recognized as vital to successful environmental conservation and realizing sustainable development (UNDP, 2012).

Similarly, in traditional management of natural resources the soil or earth is given a feminine status: *asase yaa* or ‘mother *earth*’ suggesting its by virtue of her (the earth) fruits and bountifulness that mankind exists (Oduro & Sarfo-Mensah, 2007). Nonetheless, in the study area women and girls are tasked with supplying the households with basic necessities such as food, fuel, and water—thus they depend immensely on natural resources. Men hardly are tasked with gathering natural resources for household use. The responsibility for supplying biomass exposes women and children to indoor air pollution and burdensome workloads. Moreover, environmental degradation tends to increase women’s time for labour-intensive household tasks, like trekking vast distances to fetch woodfuel and water. To cope with the challenge of having to go long distances for woodfuel, households in the area cook large quantities of food in very large pots at a go and the left over can be eaten again the following day. The local meal ‘*tuor zaafi*,’ is simple to cook from corn flour and easily filling as well as satisfying which reduces the need for repetitive cooking and helps limit the need for going out to fetch more fuel.

The Role of Social Innovation in Environmental Management

The traditional African perception of land title enjoined the living to manage and conserve the environment for posterity and being accountable to their ancestors for such stewardship (Abayie-Boateng, 1998; Janson, 2013). Varied and feasible knowledge structures have evolved over time. The application of local knowledge through community and social action can produce adaptive and flexible solutions that are suitable to solving environmental problems (Burgess *et al.*, 2003).

Forest conservation is one such environmental challenge. The ecosystem services supplied by forests are vital for climate adaptation and rural agriculture which is vital to rural livelihoods (Greenberg *et al.*, 2011). Boisvenue and Running (2013) surmise that ‘*ecosystem services are often provided in direct proportion to forest productivity*’ and are essential to sustaining wellbeing of the communities. Thus linking conservation to the livelihood and culture of local communities is a viable approach (UNEP, 2005).

There is a common dependence between biological diversity and culture as numerous cultural practices rely on specific elements of biodiversity for their continued existence and expression. Furthermore, key ‘*ensembles of biological diversity are developed, maintained and managed by cultural groups, with language and knowledge as the media for their management*’ (UNESCO & UNEP, 2002). Consequently, when languages and cultures are ignored, we directly limit the sum of our knowledge about the environment and the numerous benefits that humankind can derive from it. Culture fashions people’s world view, and by shaping their priorities-has consequences for

conservation and consumer choices; which also steers their conduct whether suitable or not (as per conservation). Thus when there are local actors such as the *Tendana* who make the effort to conserve nature at the local level with powers that stem from local culture (bottom-up) it is a boost to efforts of central government (top-down). *Thus Social innovation is a potent and valuable tool in the environmental sector as it unites social groups and communities to create, develop and diffuse ideas and solutions to address urgent social needs* (Science for Environment Policy, 2014).

References

- AROCHA.2006.Baseline Socio Economic Survey Report of Murugu and Mognori Communities
- AROCHA . 2007. Baseline Socio-Economic Report Of Kaden And Yazori Communities
- Baland, J.-M., Platteau, J.-P. 1996. *Halting degradation of natural resources: Is there a role for rural communities?*, Clarendon Press for FAO, Oxford
- Atuquayefio D.K; Fobil J.N .2005. *An Overview of Biodiversity Conservation in Ghana, Challenges and Prospects*. West African Journal of Ecology Vol 7
- Biggs, R., Westley, F.R. & Carpenter, S.R.2010. *Navigating the Back Loop: Fostering Social Innovation and Transformation in Ecosystem Management*.
- Boisvenue C., Running S.W.,2013. *Controls on Provisioning Services and Forest Productivity: Responses and Risk under Changing Environmental Conditions*
- Borrini-Feyerabend, G.1996. *Collaborative Management of Protected Areas: Tailoring the Approach to the Context*. IUCN, Gland, Switzerland
- Burgess, J., Bedford, T., Hobson, K., Davies, G. & Harrison, C. (Un) sustainable consumption. In Berkhout, F., Leach M. & Scoones, I. eds. 2003. *Negotiating Environmental Change*
- Dyer J., Stringer L.C., Dougill A.J., Leventon J., Nshimbi M., Chama F., Kafwifwi A., Muledi J.I., Kaumbu J.-M.K., Falcao M., Muhorro S., Munyemba F., Kalaba G.M., Syampungani S., (2014) Assessing participatory practices in community-based natural resource management: Experiences in community engagement from southern Africa
- Elbra A D. (2013) The forgotten resource curse: South Africa's poor experience with mineral extraction
- Ellis F .2000. Rural Livelihoods and Diversity in Developing Countries Oxford University Press
- Energy Commission..2006a.. Strategic National Energy Plan 2006-2020. Energy Supply to the Economy. Annex II of IV. Electricity. Energy Commission, Accra, Ghana
- Fisher M., Chaudhury M., McCusker B. 2010. *Do Forests Help Rural Households Adapt to Climate Variability? Evidence from Southern Malawi*
- Fishpool, L.D.C and Evans,M.I.,eds. 2001: *Important Bird Areas In Africa And Associated Islands, Priority Sites for Conservation*. Newbury and Cambrigde,UK : Pisces Publications and Birdlife International (Birdlife Conservation Series No.11)
- Ghana Government .2012. Sustainable Energy for All (SE4all)-Ghana Action Plan Holmberg J, Thomson K, Timberlake L(1993): Facing the Future: Beyond the Earth Summit
- Global Alliance for Clean Cookstoves .2012.Ghana Market Assessment *Sector Mapping* – AccentureDevelopment Partnerships
- IISD.2013. UNFCCC Expert Meeting on Technology Roadmaps Bulletin - <http://www.iisd.ca/download/pdf/sd/crsvol205num4e.pdf> accessed on 30/03/2013
- Janson, M.. 2013. Islam, Youth and Modernity in the Gambia: The Tablighi Jama’at.
- Kvale S.,Brinkmann S .2008. Interviews-Learning the Craft of Qualitative Research Interviews

- Levin, K., Cashore, B., Bernstein, S. and Auld, G.2012. Overcoming the tragedy of super wicked problems: constraining our future selves to ameliorate global climate change. *Policy Science* 45, 123-152.
- Oduro W., Sarfo-Mensah P .2007.*Traditional Natural Resources Management Practices and Biodiversity Conservation in Ghana: A Review of Local Concepts and Issues on Change and Sustainability*
- Office for Human Research Protection .2012. *The Belmont Report*
<http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html> accessed on 12.11.12
- Phills, J.A., Deiglmeier, K. and Miller, D.T., 2008. Rediscovering social innovation. *Stanford Social Innovation Review*, 6 (4), 34-43
- Reeves, A., Lemon, M. & Cook, D. 2013. *Jump-starting transition? Catalysing grassroots action on climate change. Energy Efficiency.*
- Sayer, J., Sunderland, T., Ghazoul, J., Pfund, J.-L., Sheil, D., Meijaard, E., Venter, M., Boedhihartono, A.G., Day, M., Garcia, C., van Ooster, C. and Buck, L.E. (2013) Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses.
- Sabadie.2013. Technology and Innovation for Social Change
- Science for Environment Policy .2014.Social Innovation and The Environment
- Scoues I, Mearns R, Leach M, 1999. Environmental Entitlements: Dynamics and Institutions in Community-Based Natural Resource Management
- Stanford Social Innovation Review (2015): Rediscovering Social Innovation
http://www.ssireview.org/articles/entry/rediscovering_social_innovation accessed on 11.02.2015
- Steward, F., Liff, S. and Dunkelman, M.. 2009. *Mapping the big green challenge:*
- UNESCO & UNEP., 2002. *Cultural Diversity and Biodiversity for Sustainable Development*
- UNDP.2012. *Gender and Natural Resources Mangement:Livelihoods, Mobilityand Interventions*
- UNEP .2005. *Millennium Ecosystem Assessment Report*
- Zhou, Z., Dionisio, K.L., Arku, R.E., Quaye, A., Hughes, A.F., Vallarino, J., Spengler, J.D., Hill, A., Agyei-Mensah, S., Ezzati, M. (2011): Household and Community Poverty, Biomass Use, and Air Pollution in Accra, Ghan
- Van de Ven, A.H. and Johnson, P.E., 2006. Knowledge for theory and practice