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Social Implications of Climate Change Adaptation Management in Awoja Watershed in Eastern Uganda

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Abstract:

The paper presents an analysis of the institutional implications of adaptation to climate change from a social perspective. It particularly analyses the relationships between social institutions and watershed management in a changing climate. The paper notes that while social factor variables influenced changes in management strategies, adaptation management had led to erosions of the traditional social fabric thereby negatively affecting the social and ecological sustainability. The study finds that even where institutions are strong, power inequalities, gender issues, and resource users' diverse interests occur. Thus, the interactions between traditional social institutions and formal natural resource management institutions do not only promote collective action, but also reproduced conflict and worsened social division and marginalization.

1. Introduction

Farmers and their support institutions have evolved proactively to challenges posed by changing resource endowments in order to maintain agricultural productivity (Chhetri, Chaundhary, Tiwari and Yadaw, 2011). Under decentralization, local governments are expected to play a major role in climate change adaptation policy development (Anderson and Ostrom, 2008, Marshal, 2008, Vogel and Henstra, 2015), however, studies draw attention to the struggles of local governments with national adaptation agenda (Agrawl et al, 2013, Nam et al, 2015). Particularly the interface between the social issues and climate change adaptation strategies appear to be accorded little attention. Recent research on climate action suggests that, research methods have not allowed for an in-depth analysis of local vulnerabilities (Adger, 2006; Ribot, 2010). Logan, (2004) showed how participation of actors, influence practice and organizational change.

This study examined how climate change adaptation practices in Awoja Watershed in Eastern Uganda have affected the social and organizational systems within the watershed. The study focused on the determination of the extent to which various emerging social factors influence management of natural resources in a changing climate. A comprehensive interrogation of the implications of these influences on the sustainability of the social and ecological environment was also carried out. Particularly the study investigated the working of local traditional institutions, the community structures, social cohesion and norms governing natural resource management in the context of adaptation to climate change.

The study targeted villages in Katakwi, Amuria and Soroti Districts in Eastern Uganda involved in implementing Disaster Risk Reduction Programs (DDR) in response to floods and draughts arising from climate change. In Amuria district Uganda wetlands have been demarcated to prevent rice cultivation and maintain wetlands' functions as sinks to flood waters. The demarcation has led to displacements of communities and dramatic changes in the livelihoods of those affected by the demarcation. The communities of this sub-region are mainly agro-pastoralists, practicing the Teso Farming System characterized by mixed farming involving large herds of cattle and big acreages of annual crops.

2. Methodology

The study applied a cross sectional survey research design and a factor analysis to determine the extent to which different social factor variables relate with watershed management. According to Amin (2005), a cross sectional survey is such a study that is carried out at one point in time. The design employed both the qualitative and quantitative approaches in a way that enabled triangulation in data collection and data analysis to obtain quality results. The approach of triangulation in a cross-sectional research design was also supported by Amin, (2005), as viable in generating quality results. The use of combined methods also provided for a fuller and comprehensive depiction of the results (Mikkelsen, 2005). A combination of questionnaires, participant observation, focus group discussion, semi-structured interviews and personal life stories were used to collect the data.

2.1. Data Collection Methods

The instruments used in data collection included Documents Review which involved a comprehensive literature review to capture information on legal, policy, administrative and implementation frameworks related to natural resource management at local government levels; Key Informants Interview Checklist/Expert Interviews with face-to-face/one-on-one interviews with civic leaders and leaders of NGOs involved in adaptation to climate change. Semi structured questionnaires were used due to their flexibility to probe for details. Inputs from people at various levels of governance, local government technical (Sub county: Senior Assistant Secretaries, Parish Chiefs, Environment Focal Point Officers, and political wing (LC III Chairperson, Councilors, and members of the Sub-county executive). Information was also collected from CSOs and extra local institutions (members of Parish Development Committees and members of Disaster Risk Management Committees); Focus Group Discussions were also organized in at least two parishes in each of the three sub counties under study in the 3 districts.

2.2. Data Analysis and Interpretation

Data collected through key informant interviews was analysed qualitatively basing on the emerging relevant themes and sub themes. The analysis of quantitative data employed factor analysis, which helped in determining the influence of different social factor variables. The correlation analysis used the Pearson product moment correlation coefficient to determine relationships among variables.

3. Findings

The major findings in this study are categorized into themes; first the relationships between emerging social factors and management of resources in Awoja watershed, secondly, effects of changes in traditional social systems, changes in social institutions and organizations.

3.1. Relationship between Social Issues and Management of the Watershed

The relationship between social issues was established using the Pearson product moment correlation coefficient. The results are presented in Table.1.

Variable		1	2	3
Watershed management (1)	Pearson correlation	1.000		
	Significance (2-tails)			
Social issues (2)	Pearson correlation	0.353	1.000	
	Significance (2-tails)	0.003**		
Climate change factors (3)	Pearson correlation	-0.098	-0.489***	1.000
	Significance (2-tails)	0.315	0.000	

Table 1: the relationship between social issues and management of the watershed

*** implies sig at 0.001, ** implies sig at 0.01, , * implies sig at 0.05

From the correlation results, it can be observed that there was a significant relationship between the social issues and management of the watershed; with a Pearson value of 0.353 at a calculated probability of 0.003. The results however indicated a negative relationship between social issues and climate change factor and this means that as the effects of climate change increases, the norms that culturally influence the resource use tended to be abandoned by community members. The implications of the results are that the intensity of climate change deteriorates social cohesion, social structures and systems. From the interviews, it was found that floods and the subsequent displacements affected the social morals of the community members. Displacements were found to culminate into loss of traditional power where a traditional leader can no longer implement the rules on conservation when people are living in displacement camps as climate refugees.

It was reported in Magoro sub-county in Katakwi district that there had been moral degeneration including prostitution and domestic violence in climate refugee camps or settlements which local community leaders could no longer handle the same way before displacement. It was also reported of people staying with animals in the same houses due to lack of space and this had a likelihood of spreading animal diseases to people.

The results also revealed that there was a positive correlation between social issues and watershed management, which implies that the social fabric was very important in management. It was noted that village committees were important in dissemination of information about climate change and adaptation alternatives, reflective circles introduced by NGOs within the communities were important in decision making. The traditional set up was also still relevant in climate change management especially controlling land use thereby preventing degradation. A regression analysis was also used to ascertain the relationship and the results are indicated in Table .2.

Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-0.027	0.029		-0.91	0.367
Social issues	0.348	0.093	0.353	3.74	0.000
Model summary (watershed management)					
R Square	0.125		Adjusted R square.	0.116	
F (1, 98)	13.96**		Significance (2-tailed)	0.003	

Table 2: Regression measuring how the social issues influence watershed management

The results indicated a level of significance of 0.000 an adjusted R. Square of 0.125. The results therefore indicate that the overall relationship between social issues and management of the watershed was significant.

Most of the factors within the social issues variable showed relationships with watershed management. It should be noted however that the relationship was much stronger in the variable of social family cohesion, contribution of social organizations and involvement of various stakeholders in the management of the watershed, reasons for access to protected areas and interventions in utilization of the watershed.

From the above analysis, the detailed findings from qualitative data triangulations showed that while social factor variables were related to watershed management, adaptation processes were eroding social institutions. These are analyzed below:

3.1.1. Changes in Traditional Access to Resources

The study established that patterns of access to resources had cultural characteristics. While the traditional male dominance to resource access was evident some resources were increasingly being accessed by women as well and vice versa for those traditionally dominated by women. These changes were being precipitated by extreme climate events. For example, an examination on access to forests and woodlands indicated that the men had more access than the women although the access by women had increased compared to the last 10 years. Up to 86 (47.8%) respondents indicated men were accessing the forests and woodlands while women access by women were 58 (32.2%) and the Youth were 31 (7.2%). The respondents indicated that forests were accessed mainly for charcoal burning. It was also revealed that while men were the main groups in charcoal burning women had started violating this norm and were beginning to get involved in charcoal burning. The women explained that charcoal burning was the only remaining activity left to generate money for food, school fees and other social needs following displacement of rice grower's due to demarcation of the wetlands.

The other reason for accessing the forests was said to be the collection of firewood. It was found that while the responsibility of collecting firewood was mainly for the women the men were getting involved in collecting firewood as well; but for sale to charcoal burners, brick makers, schools and hospitals. This commoditization of firewood by men is having negative environmental and social effects as the trees have gotten depleted. Consequently, the women have had to put aside part of their core responsibility of cultivation and roam the woodlands looking for firewood due to its scarcity. It was revealed by one woman in Omugenyia that the women in must spare at least one day in the week to collect firewood. They often move with the children and especially the girl children to hunt for firewood for domestic use. She revealed however that this was a risky activity because in the bush they had many times been confronted by big snakes, wild animals and at times it rains when they are still too far away from any home where they would shelter themselves from the rain.

An investigation about access to wetlands showed that the majority 129 (71.7%) of the men had more access than the women and the youth. Up to 39 (21.7%) said women were accessing the wetlands while the youth was mentioned by 4 (2.2%) of the respondents. The youth were accessing the wetlands mainly for bird hunting and fishing as well. It was actually revealed by residents in Omugenyia that there was increased bird hunting yet Awoja is a Ramsar site with some of the rarest bird species in the world. The extent of bird hunting threatens to extinct some bird species. The birds were mainly hunted for food and for sale to other members of the communities.

It should be noted that all these activities had implications to the management of the wetlands because the enforcement officers are finding it difficult to control them. For the case of sand mines, it was revealed that it was mainly the men 140 (77.8%) and the youth 28 (15.6%) who had access because access by the women was indicated by only 1 (0.6%) that believed that women had access to the sand mines. During the interviews with community members, it was revealed that despite restrictions on sand mining by the local government, the men always collected sand for sale. A community member revealed that the men were collecting the sand on bicycles until they made substantial quantities for sale. All these had implications on the management of the watershed because collecting sand on bicycles looked so insignificant and not be easily noticed but sand mining is degrading the wetlands and compromising their functions.

3.1.2. Changes in Social Cohesion

The study examined how government restrictions to access to wetlands had affected social cohesion and it was found that new people had joined the community due to migration into Awoja area. In the interviews, it was revealed that many people came from neighboring communities to the Teso region looking for pasture, food or work. It was reported that as people come to search or food and grazing land they inter marry with the Teso people and this has reduced the original conflicts that existed with neighboring tribes, particularly the Karamojong. However, migration has led to land scarcity and leading to frequent conflicts. It was reported that land

conflicts had heightened even among family members who have been struggling for the limited land resources to the extent of killing each other at times.

Owing to land scarcity, it was found that some family members had migrated. In Omugenya, it was revealed that most of the young people had moved to other areas to look for business and most of them never come back. The same situation was reported in Angisa where the land had been left with the old while the young have moved to Magoro town and others have proceeded to Soroti town to look for business. It was reported that this movement has affected the girl children highly because as they move to look for work, they may get men, get married and never come back home.

The study further examined the people's experience with sharing resources with tribes from other districts. This sharing of resources was not only with families but also with the other tribes either in the districts studied or with the neighboring communities. The results indicated that the immigrants themselves negotiate how to use the resources with the locals. It was mentioned for example that the cattle keepers from Karamoja have negotiated with the people in Soroti and Katakwi how to co-exist. Communities have accepted to co-exist with immigrants so long as the immigrants are ready to behave as required by the locals. These include the Karamojong putting on clothes, maintaining sanitation, use of toilets and desisting from fighting. This has enabled the immigrants to access health facilities, school, water sources among other resources in the area.

3.1.3. Changes in Traditional Practices

It was found that climate change had instigated many changes in traditional practices within the watershed. For example, the amount of dowry paid had reduced mainly due to reduced numbers of livestock arising from draughts and cattle rustling. Among the Iteso, dowry is paid using cows, goats and money and form a major startup capital for parents who are blessed with daughters. An elder remarked that "people used to pay even more than 10 cows for dowry but today if you get one cow, you thank your God" indicating that it is luck this days to get substantial dowry paid for marriage. In another response, 25(14%), indicated the family planning is now being adopted by the community members unlike it used to be. The women revealed that in the past, family planning was not necessary as land was abundant, food was enough and the cost of services was moderate. However today there is limited land per household for food production and the amount of food has drastically reduced due to drought and floods. This has forced families to limit the number of children they produce.

Respondents also noted substantial changes in traditional food production as well. It was reported by 34(19%) that today, only a few crops are grown for home consumption unlike in the past 10 years. Farmers produce only crops that can mature fast enough to avoid droughts or floods. It was also reported that farmers do not only grow a few crops these days, but cultivate many small plots of different crops to reduce risks of crop failure.

The introduction of new varieties of crops such as Serenut groundnuts, Seso Sorghum and Secow cowpeas was a notable change from the traditional varieties. The new groundnuts do not stay in the food overnight and this has change the eating habits of the people, who were used to preserving cooked food overnight and eating them for lunch after coming back from the gardens the next day. It was revealed by majority of the participants 97(54%) that some crops were no longer grown. These crops included millet and cotton among others because of their long maturity period which does not fit in the current rain patterns. It was also revealed by 2(1%) that spraying was now common and this was aimed at managing the pests and disease that the farmers associate with the changing weather patterns.

The other change that was reported was that cattle rustling had reduced and this was reported by 24(13%). An interaction with respondents in interviews, showed that the Karamojong warriors who used to travel as far as Soroti looking for cows to rustle have now abandoned the practice. Cattle rustling used to involve a lot of fighting and many times the cows would be stolen from Teso region and Teso communities would revenge by raiding Karamojong cows in compensation for their lost cattle. This went on for a longtime. However, it was reported to have reduced especially with the intervention of Government. In Angisa Parish in Katakwi District government had instituted some permanent police guard the cattle as they graze to prevent them from cattle rustlers from Karamoja. It was reported that even community committees had been established amongst the people of Teso and amongst the Karamojong to monitor cattle rustling. If cows get lost in Teso and they were found in a Kraal in Karamoja, the Kraal is fined three cows per cow stolen irrespective of who brought the cow into the Kraal. This has reduced the rate of cattle rustling among the Iteso and Karamojong. It was also expressed that unlike in the past, the Karamajong now needed the Teso region whenever there is extreme drought in their region as they come down to Teso, looking for grazing land and food.

It was also reported that food storage systems had also changed due to climate change. The culture of people keeping their food in big granaries outside the house in the compounds was common in the past 20 years. Every home had additional one to two granaries for food security. However, of the 180 households visited in the watershed, only 4 households were found with granaries. Respondents revealed that there was no food to keep in the granaries and even when you kept food in granaries outside, people would steal them because there are always many people without food. Today their harvests are kept in the houses in sacks or on the floor.

It was also mentioned by a substantial number of respondents that due to limited land and food arising from frequent draughts and floods, the increased costs of services such as education, health and accommodation, the practice of marrying many wives had reduced. Therefore, polygamy had reduced tremendously as mentioned by 20(11%) of the respondents in the survey. It was revealed that in the past men used to marry up to even 4 wives. This was mainly because there was enough land and food. It was revealed that it was even possible for one's wife to suggest that the man should look for another wife to help at home and the women and the children would live in harmony in the same compound, but today, things have changed.

It was also mentioned that the traditional houses built out of mud and wattle had reduced due to the scarcity of tree poles required for this kind of house. Consequently, people have introduced huts of mud bricks because of the limitation of building poles.

3.1.4. Changes in Gender Roles in climate adaptation process

The majority of the respondents 39(22%) revealed that women have more workload and responsibilities. The women were doing much more work compared to the men. Other than preparing the food the women are predominantly working in gardens, thatching houses and others are involved in other activities that were predominantly for the men.

It was found that increased women participation in Village Disaster Reduction Committees was a new trend that had improved implementation of conservation initiatives. Women were found to be more responsive to rules and regulations as indicated by the Environment Officer from Amuria district. It was reported that the village committees were very effective in resolving conflicts, identifying those who violate environmental regulations and at times they hold their own prosecution meetings where fines are placed on those who violate the rules. It was noted that this effort had even become more effective than that of the local government agencies because the village committees had become more by the local people.

During the interviews women revealed that the men spent most of the time drinking and dating other women and were not bothered about the status of their families. It was also revealed by some women that they are forced to thatch the houses because they feel the pressure of leaking houses more than the men who were most times already so drunk that they did not feel the impact of the leakage.

The other changes in the gender roles included; women riding bicycles which was unusual in the past. The practice of women herding, and milking the cows, women being in business and women getting engaged in fishing are all new practices that have come with pressures from a changing climate. It can be noted that the changes in gender roles have mainly affected the women compared to the men. Men were only carrying out software activities such as planning, attending village meetings, participating in community services.

4. Discussions

The results of the study generally indicated two major scenarios in the relationship between social factor variables and watershed management in the context of climate change. While social factors such as cultural influences, restrictions to access and social organization influenced management of the watershed there were changes that occurred in the social institutions consequent to adaptation management. The findings relate closely with those of Logan, (2004) who showed how participation of actors was an avenue for influencing practice and organizational change and how organizations are not stable and fixed objects, but rather something dynamic and performed, provisional and emerge through social practices.

The study found that the challenge of climate change and climate change adaptation had effects on institutional systems as shown by emerging social transformations in the process of climate change adaptation. The traditional leadership powers managed by the clan heads that used to be strong was eroded. Access rights have been altered as a result of new conservation rules such as wetlands demarcation against rice production as in Amuria district and demarcation of the uplands in support of wildlife conservation in Angisa in Katakwi district.

The study finds that despite the compromises and negotiations mounted by the community members, the public law still takes an upper hand because of the coercive power of the state. Daniela (2008) sees state coercion as forced removals, fear and torture, and restricted access to resources as some negative social impacts observed from protected areas as exemplified by over 1,000 San who were forced to relocate from the Central Kalahari Game Reserve in Botswana to settlements on non-reserve land. In another example, local people who tried to resist forceful relocation from Rajiv Gandhi National Park in India were beaten by armed officers (WRM 2000).

Dharam (2006) illustrates how People everywhere compete for natural resources they need or want to ensure their livelihoods and that such competition for use and access over natural resources result in conflicts. He further emphasizes that conflicts also emerge from differing cultural values, social norms and sanctions connected to access over natural resources. In the findings, the phenomenon of former tribal enemies such as the Iteso and Karamojong coming together and inter-marrying, using common services and experiencing challenges together is a case of institutional bricolage (Cleaver, 2001) involving alteration of rules, renegotiation of some regulations and compromises aimed at the common good.

The study also finds that some social cohesion had also changed due to the exercise of power by management institutions in the process of adaptation to climate change. These examples reflect an idea of power as coercion and resulted in negative social impacts as people were forced to behave in a manner contrary to their wishes. These examples relate with what was witnessed in Amuria where even when the locals did not want demarcation to take place because the wetland was a cultural heritage, the state power was so strong that demarcation had to take place. This however did not entirely mean that cultural heritage was lost completely, the clan and community leaders were able to negotiate that the buffer zone was increased by 15ft to the swamp. In Angisa however, it seems the social fabric was being eroded as despite the negotiations, the community members had lost their land and pushed to the camps near the wetlands where drunkenness, prostitution and immorality was evident. The clan leaders lost their power in the camps after failing to provide hope and changes in the community under displacement conditions.

From the above findings, the study observes that there have been substantial changes in the access to land resources and to alterations in social cohesion. Changes in land use as well as the farming systems and patterns have also occurred in which livestock keeping has replaced rice cultivation in the swamps. Clan leaders have lost their power over land resources and liberalization of community land has occurred.

5. Conclusions

In conclusion, there is a significant relationship between social issues and management of the watershed. This is reflected on the effect of social issues on a number of variables such as the effect of clan systems on access and use of resources, the changes in traditional practices in the watershed, conflicts and conflict resolution in the watershed and the changing roles in the resource use in the watershed. Clan systems were still strong in determining resource use within the watershed and traditional leadership continues to exist along the local government and decentralized governance framework in a number of forms. Government officials continue to attribute responsibility to traditional leadership and this has reduced credibility in the local government leadership. There were a number of conflicts stimulated by the tribal interfaces in the use of the resources within the watershed. The conflicts were stimulated by the difficulty in achieving tribal consensus over control of resources as different tribes tended to think together as a block. It was however found that tribes were beginning to learn to stay together in trans boundary areas and this has enabled the different tribes to inter marry, use similar services and experience the challenges together as a community.

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