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Emerging Economic Interests as a Threat to Sustainable Watershed Management in Eastern Uganda

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Abstract:
Under decentralized local governance, sustainable use of natural resources is largely mediated through formal and informal institutions. However, in a changing climate, interventions in watershed management often overlook the impacts of emerging economic interests on the social and ecological system. In some cases, the poor even bear the costs while the rich reap the benefits. This paper shows that the actual implementation of natural resources regulations can be quite complex due to competing emerging economic interests. Using a political ecology framework, in a cross-sectional research design and factor analysis to determine influence of different economic factors, the study brings on board the link between emerging economic interests and watershed management and the impacts of such interests on the social and ecological environment in the watershed.

1. Introduction

The importance of watersheds largely associated with the direct consumptive use value and the essential life support processes (ecological) are the least recognized. In Uganda, by the year 2000, an estimated 2,376.4km^2 of wetland area had been reclaimed for agricultural, industrial and related activities (NEMA 2000). The underlying cause of wetlands destruction is the insatiable desire of both the rich and the poor to derive livelihood from the wetlands. This is exacerbated by the high annual population growth rate of 3.3% (UBOS, 2002), and pressure from more land for construction. The communities that access these wetlands and their adjacent catchment areas use them for agriculture and extraction of various raw materials, fishing, charcoal and all forms of cultivation.

The unleashing of humanity's productive energies has created a world of unparalleled and unequal consumption that has left a trail of resource depletion, land degradation, environmental pollution and species extinction that has led to shifting of political, social and economic interests (IJNEP 2014). Attempting to mediate or reverse such contradictory forces has been the source of intense and bitter social struggles across the world as observed by (Mart Iner-Alier 2002). Throughout the world, poor farmers tend to be associated with marginal lands and low yields (Rockstrom et al., 2003).

According to Karma (2011), watershed management is always aimed at finding a solution to the real human, resource and environment related problems, in particular those related to water resources have rapidly been exposed to competing demands. Most of the time, we get caught into the dichotomy of economic development and environment, and well-conceived participatory, integrated watershed management is often constrained by the ambiguity between conservation and development. Watershed management is an integrative way of thinking about various human activities that occur on a watershed that have effects on the ecological systems within the watershed. This view is related to that of Moktan, (2008) when he argues that sustainable use of watershed resources will only be achieved by adopting an integrated approach that recognizes the mutually dependent interaction of various basic elements of a watershed system, with the direct involvement and participation of the different actors and stakeholders in the exploitation of the watershed resources.

The local communities living in the watersheds are the key stakeholders as their activities impact on and are being impacted on by changes taking place in the watersheds especially in view of climate change (Kaltenborn, 2010). Gordon, (2004) note that community livelihood strategies are inextricably linked to the surrounding watershed resources, and recognizing their rights to access and use can confer some sense of ownership and empowerment as equal partners in the process. It is necessary to bring all the communities within a watershed to work together and show the benefit through entry point activities. Without controlling their participation especially in the exploitation of resources, any effort or investment in watershed management will not be able to achieve the desired outcome. Ffolliott, (2002) explains that past efforts in watershed management was limited to watershed delineation. This sets an aerial context for rural development activities rather than tackling real watershed problems. The aspect of economic interests in watershed

management was also emphasizes by Roder (2002) when he highlighted that success stories and good practices from one watershed may not be easily replicable or transferable to other watersheds because each watershed has its own challenges. He explains that some watershed has greater challenges than others especially in the context of climate change and this makes the economic interest also vary in different aspects.

In view of the above literature it can be deduced that economic factors are important in watershed management. However, there has been limited understanding of how the emergence of local economic interests influence resource management decisions. This study of resource management in Awoja watershed aimed at analyzing the social and ecological implications of emerging economic interests in climate change adaptation.

Geographically, Awoja is classified under the Lake Bisina wetland System (Nature Uganda, 2005) covering three districts of Kumi, Katakwi and Soroti. For long, the wetland had been a breeding ground for different indigenous fish species, and birds that were reportedly depleted in and along various other lakes of Uganda. Because of the insecurity in the region, there was shortage of agricultural land in the late 1990s (DSOER, 2004). Post war agricultural activities saw increased human settlements amid the dominant wooded savannah and cultivated gardens (AmanigaRuhanga and Iyango, 2010). The wetland also became a home to migrant cattle farmers in search of lush pastures in what is considered communal grazing lands (Egeru and Majaliwa 2009; DSOER 2004). Despite the problems associated with living near wetlands such as disease, scarcity of arable land resulting in competition for the communal grazing land, and floods, the benefits seemed to outweigh the costs for the people (AmanigaRuhanga and Iyango, 2010). There's been an influx of farmers moving their farming activities to the lowlands closer to the Gweri wetland especially during the long drought seasons for moisture pasture and fertile lands. The recent decades have also seen an increase in both intensity and frequency of floods especially around the wetland. Frequent draughts have led to an increase in wetlands cultivation. The cultivation of paddy rice seems to have gained economic importance as a result of this phenomenon (Nabikolo *et al*., 2013; Amaniga Ruhanga and Iyango, 2010).

All these changes to the Gweri wetland ecosystem have been variously attributed to climate change, commercialisation and food demand pressures around the Gweri wetland area (Nature Uganda 2005). It has also been suggested that high poverty levels, decline in agricultural land from increasing populations, climate change and variability, lack of alternative sources of income among others are likely to have induced increased human activities within wetlands (Egeru and Majaliwa 2010; NEMA 2004). This study set to determine the relative importance of economic factors at play in this watershed to avail policy relevant information for informed wetland policy formulation and implementation. Major areas of focus included the understanding of the extent to which increased commercialisation seem to compound flood related push factors Furthermore, a focus on how degraded ecosystems due to increased human activity brought on by changes in demand for commodities influence and compromise resilience to climate change.

2. Methodology

The study applied a cross sectional survey research design since it involved a number of people from a heterogeneous population in culture, political and economic interests. According to Amin (2005), a cross sectional survey is such study that is carried out at one point in time. One point in time indicates that the study is carried out at once and the researcher does not hope to come back later in the future to compare if there have been variations in the results of the study carried out. The design employed both qualitative and quantitative approaches and triangulation in data collection and data analysis that helped to obtain valid results. The approach of triangulation in a cross-sectional research design was also supported by Amin, (2005), as viable in generating quality results. A combination of questionnaires, participant observation, focus group discussion, semi-structured interviews and personal life stories were used to collect information.

The study population comprised of households within the watershed and local governance institutions: formal and informal; particularly those involved in the implementation of climate change adaptation activities. Resource user communities in the areas adjacent to the wetlands systems that constitute the Awoja basin were directly targeted. Local council committee members were also involved in the study. The study involved household heads as the main target group and ensured that households near the wetland were included. Focus group discussions were held with households within the upland and those near the wetland for purposes of generating varying views for comparative analysis. Systematic random sampling (involving randomly selecting the first household with the subsequent households selected at an interval) was used to select a total of 180 household respondents. One sub county was selected purposively per district ensuring that at least a sub county near the Awoja wetland has been selected from each of the 3 districts of Soroti, Katakwi and Amuria. This was important because these sub counties have experienced various challenges associated with climate change in the area. This was meant to capture differentials in watershed degradation resulting from variations in physical infrastructural endowments, vulnerabilities and livelihood assets.

2.1. Data Collection

Data collection exercise employed a number of methods in order to obtain valid results. These too are discussed as follows;

2.1.1. Documents Review

This involved a comprehensive literature review to capture information on legal, policy, administrative and implementation frameworks related to natural resource management at local government levels. It also reviewed relevant information and other studies from various sources. Some of the documents reviewed included: The National Climate Change Policy (NCCP, 2012), the Local Government Act (1997), The Decentralization Policy, Wetlands Protection Act, Development Plans, Annual Budgets, Monitoring and Evaluation Reports and many others.

2.1.2. Key Informants Interview Checklist/Expert Interviews

This was used to collect primary data that was used to evaluate the policy development processes, including the principles in the framing of policies governing natural resource management. The tool was also used to measure variations between policy frameworks and real governance practices in a changing climate and the influence of stakeholders on institutional practice.

Face-to-face/one-on-one interviews with civic leaders and leaders of NGOs involved in adaptation to climate change were carried out to achieve the above. 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)

2.1.3. Focus Group Discussions

This was organized at 3 levels. First it was conducted in at least two parishes in each of the three sub counties under study in the 3 districts. Each parish level FGD had at least 8-12 people selected with the help of Local Government and NGO partners at the sub county. Efforts were made to cover variations among women, youth and the elderly. This was meant to measure community perceptions on local participation in resource management. It was also used to measure social inclusiveness of policies, and institutions governing adaptation in the study area. Secondly, FGDs were conducted at institutional levels to determine the organization profiles, institutional linkages, institutional interactions and changes in policy and practice among institutions involved in adaptation to climate change. NGOs, CBOs and Local Government partners in climate change adaptation involved in the institutional profile study.

2.1.4. Household Survey Questionnaire

Data from qualitative study was used to focus the design of the household survey questionnaire. The aim of the quantitative survey was firstly, to measure the influence of political, economic and social drivers on watershed management. Secondly the survey also determined the social and economic status of communities in Awoja (livelihoods assets, education, etc.). A model that allowed the prediction of how a political, economic and social factor influence management decisions was generated as observed in the subsequent chapters.

3. Data Analysis and Interpretation

Qualitative data analysis focused on proper management of the data that was collected thorough interviews with Key informants and Focus Group Discussions. It is important to highlight that qualitative analysis started right from the field where some relevant information was collected and organized immediately to avoid loss of data. This ensured that all applicable questions were asked and their responses accurately recorded. Qualitative analysis therefore concerned analysis of data gained from in-depth interviews with key stakeholders, FDGs with Household heads, Observation and Pictorial.

For quantitative analysis, the variables in the economic interest were subjected to factor analysis after which correlation and regression analyses were generated to determine the relationships among variables. The study also presents an analysis of respondents' views linked to descriptive statistics in a bid to bring out the detailed discussion of distribution of responses in order to enhance comparison of responses across the different variables. This paper therefore in general reflects the analysis of the relationship between economic interests and watershed management, analysis of the factors influencing cultivation in the wetlands, analysis of increasing demand for land resources, benefits of resources to different stakeholders, changing economic trends in the watershed, management options to improve economic benefits, effect of competing economic interests, discussion and conclusions.

3.1. Findings

The findings were generated through triangulation of methods and data sources including relationship tests and the descriptive results arising from the different instruments. The views of respondents are also expressed verbatim were it was found of value to the study.

The relationship was tested using the Pearson Product moment correlation coefficient and the regression analysis. The results are presented in the following Tables1,2 and 3.

From the correlation results in Table 1, there is a significant relationship between the economic interests and management of the watershed; that is a Pearson value of 0.507 at a calculated probability of 0.000. The results however indicated a negative relationship between economic interests and climate change factor and this means in the context of climate change there is economic rush for resources that compromises appropriate watershed management. This means that in the process of adaptation, there arises the need to use resources unsustainably such that resource conservation becomes a challenge in the bid to balance livelihoods and reducing the level of vulnerability.

VARIABLE		1	2	3
Watershed management (1)	Pearson correlation	1.000		
	Significance (2-tails)			
Economic interests (2)	Pearson correlation	0.507***	1.000	
	Significance (2-tails)	0.000		
Climate change factors (3)	Pearson correlation	-0.098	-0.082	1.000
	Significance (2-tails)	0.315	0.555	

Table 1: Pearson correlation of the relationship between economic interest in the context of climate and watershed management
**** implies sig at 0.001, ** implies sig at 0.01, , * implies sig at 0.05*

A regression analysis was also used to ascertain the nature of the existing relationship and the results are indicated in Table .2.

Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-0.086	0.032		-2.73	0.008
Economic interests	0.398	0.083	0.507	4.78	0.000
Model summary (watershed management)					
R Square	0.257	Adjusted R square.	0.246		
F (1, 66)	22.81**	Significance (2-tailed)	0.000		

Table 2: Regression to measure how economic interests influence watershed management

As can be observed in Table 2, the results indicated a level of significance of 0.000 an adjusted R. Square of 0.246. The results indicate that the overall relationship between economic interests and management of the watershed was significant. The study also examined the influence of economic factors on a factor by factor basis and the results are presented in Table 6.3.

Local political process factors	r	Sig
EE1-Factors promoting cultivation in wetlands	0.425***	0.000
EE2-Local government benefits from the watershed	0.379**	0.002
EE3-household changes in terms of needs	-0.095	0.441
EE4-changes in economic trends in HH in the watershed	0.482***	0.000
EE5- household changes in terms of assets	0.253*	0.038
EE6-civic society benefits from the watershed	-0.013	0.916

Table.3: Correlation between watershed management and the economic interest determinants (factors)
Factors obtained after data reduction, factor analysis and factor loadings
**** implies sig at 0.001, ** implies sig at 0.01, * implies sig at 0.05*

As can be observed in table 3, watershed management had significant relationships with a number of factors including factors promoting cultivation in wetlands, changes in economic trends, local government and civil society benefits from the watershed. All these had an effect on the management of the watershed in the form of compromises in implementation of rules with variable consequences on resource sustainability in the watershed.

3.1.1. Economic Factors Influencing Cultivation in the Wetlands

The study examined respondent's views of the factors that were influencing cultivation in the wetland and the findings indicated that 33(18.3%) believed it was due to increasing economic value of the wetland, 14(7.8%) indicated lack of alternative enterprise, 55(30.6%) indicated it was due to government policy, 61(33.9%) believed that it was due to population pressure and 17(9.4%) were of the view that it was as a result of drought. Interactions with household heads during the interviews revealed that there were actually many reasons leading to increasing cultivation of the wetland: It was found that cultivation of the wetland was part of the tradition of the people of Soroti and Amuria. Community members felt that the community a right to use the wetlands as they had depended on the wetland since humanity started existing in the area. They felt the restriction by government on use of the wetland was just a recent intervention and that it was not practical just to ask people to leave the wetland in a wake of a day when they had used it for years. They said rice production in the swamp is an emerging economic opportunity for the poor to generate money for school fees and other social requirements. This was an expression of dissatisfaction that government did not provide the necessary economic alternatives before demarcating and evicting people from the wetlands. From discussions with community members, it was further revealed that people were moving to the wetlands because land in the upland had become limited due to the population pressure. It was mentioned in Omugenya Parish in Soroti District that the population pressure on land had arisen because of migration following the recent insurgencies in the area. It was reported that even after the war, the majority of the people who settled in the area have refused to go back. Increased population in the area has created pressure on the land leading to a rush to the wetlands. This rush was motivated by the rice production, an enterprise which is short term but with high economic benefits.

The community members also revealed that the Awoja watershed has become a center of immigration due to the worse climate conditions in other areas. The area has remained green and attractive compared to other areas, thereby drawing migrants from as far as Karamoja region and the only destination available for such immigrants particularly cattle keepers is the wetland. The findings generally indicated that the use of the wetland has become increasingly more lucrative than ever.

Discussions with respondents also showed that perceptions of the communities on the status of the wetlands were a factor determining the continued use of the wetlands. While the majority of the respondents rated the status of the wetland as bad 89(49.4%), a substantial number 70(38.9%) indicated that the wetland status was still moderate and 21(11.7%) said that the wetland was still good. During the face-to-face interviews with the people of Omugenya Village and Omusia, it was revealed that the level of wetland fertility had gone too low. It was revealed that even when no demarcation of wetland took place in Omugenya, the community had left the cultivation of rice voluntarily due to the declining fertility of the wetlands. It was revealed that people had cultivated the wetland until rice could not yield anymore. As a result, rice production had been abandoned. However, the Chairperson explained that people are monitoring the wetland closely and he was sure they would return after the wetland has regained its fertility. According to the Chairman, the depletion of soil fertility in Omugenya swamps is a live experiment that has helped to demonstrate the merits of demarcation of wetlands. In Wera parish where the wetland had been demarcated, it was observed that that the status of the wetland especially in Amuria was still good, the one in Soroti-Omugenya Parish was bad because it had been over cultivated while that of Angisa in Katakwi was still in good condition because it had not been cultivated but used for grazing.

Another reason for cultivation of the wetlands was lack of control arising from compromises by the authorities on the use of the wetlands. For example, cultivation of the wetlands in Angisa Parish in Katakwi district was just beginning. The cultivation was being done particularly by commercial farmers coming from Magoro town. They were not being stopped because according to the Chairperson of Angara Village in Angisa, the wetland was still accessible by everybody as government had pushed people away from the uplands to the wetlands and demarcated it for wild life. The Chairperson noted that in the whole of Katakwi, of the wetlands that were not demarcated, the one of Angisa was the only one still fresh and he expected more people to invade it for rice production. He also explained that the government was not bothered much because Angisa is far from towns, usually heavily flooded and the government had no much interest in the swamp and this could be the reason nothing had been done about protecting the wetland.

3.1.2. Coping with Increasing Demands for Land Resources

An enquiry into the socio-economic strategies for copying with the increasing need for land and indicated that some community members were increasingly practicing intercropping involving 2-3 crops on the same piece of land to take advantage of the available markets for produce. One community member revealed she grows sorghum and sweet potatoes on the same land. She explained how the remains of last seasons' sorghum are buried while creating the sweet potato mounds, thereby helping the soil to regain its fertility for the next seasons. They also revealed that they usually use mixed cropping to avoid the need for more land. It was reported for example that they mix groundnuts and beans with maize for optimum economic benefits from the land. Cassava is also mixed with groundnuts and this has helped the community members to cope with economic demands within the limited land.

It was also revealed by a majority of respondents 125(69.4%), that other non-agricultural activities including trade were being promoted. It was found that women were getting involved in all forms of trade especially moving from market to market. A lady respondent in Omugenya revealed that she takes cereals such as maize, beans and groundnuts to markets and buys clothes that she then sells to the households within the watershed. She moves from house-to-house promoting her goods and can exchange clothes with produce such as beans, sorghum and maize, which she sells in the markets within and outside the watershed. This has enabled her to pay school fees for the children. She has also joined a savings association and the little money she gets is saved so that it can accumulate. It was revealed by the respondents that these days when you see any lorry going to the markets, you will find that 90% of the traders seated on the top of the lorries are women. The study enquired whether the males were involved in similar activities but it was found that the men were always at home and rarely go to the markets to sell goods. It was found that gender roles within the communities had changed arising from scarcity of land and food associated with climate change. It was found that the women had taken over some of the economic activities that used to be predominantly for men. It was also found that some men had abandoned cultivation and resorted to drinking leaving cultivation to women alone. It was also mentioned by the respondents 7(3.9%) that due to high demands for commodities women had started carrying out some processing of products to increase their value. For example, groundnuts were being packed in paper bags which increases self-life and economic value. In the same way soya bean is also packed to make transportation easy. Small scale processing had turned into business for a number of people especially the ladies and has become an important alternative to cultivation because they use the profits to buy the cereals from other community members as well as from outside their home area. This has released pressure on the land thereby reducing over cultivation of the wetlands.

The other means of copping with increased need for land that was identified during the face-to-face interviews was that of fishing. It was found that even women have taken up the fishing activity. During the study, women could be observed fishing in the swamp. It was also reported that women were major fishers in Lake Opeta and this had helped them to take care of their families.

An investigation on the most profitable activities that enabled best coping showed that cassava was the most profitable. This was followed by livestock enterprise and sorghum. Other enterprises of value however were fish farming, Groundnuts, Maize, Millet, Rice, Simsim and Sunflower. Respondents indicated that while in the past, rice was the main profitable enterprise this however had changed greatly especially after the swamp in Amuria was demarcated. During the interviews, they revealed that whenever there is a harvest, a few kilograms are sold on each of the crop depending on the problem to be solved. If the need is high, then a mixture of crops is sold to solve the problem.

The above findings show increasing economic interests on land use with variable effects on livelihoods. While diversification of enterprises and adoption of new non-farm livelihood activities are emerging, increasing pressure on land and the environment is a threat to sustainability of both the environment and human livelihoods.

3.1.3. Benefits of Watershed Resources as a Driver for Exploitation by Different Stakeholders

The study analyzed the extent to which economic benefits to various stakeholders supported and or undermined sustainable management of the watershed. The study found that one main benefit from the watershed to local government was basically taxes and fines. Most taxes are in the form of licenses levied on those dealing in grain business either at the source or when they are taken to different towns within the country. It was further established that government was getting a lot of money from fines as mentioned by 39(21.7%) of the respondents. These fines included charges levied on people who break environmental rules such as bush burning, bad fishing, land conflicts and many others. Other benefits by government include those from tourism and the major tourism resources in the watershed include flood created lakes, lakes such as Lake Opeta, bird watching and the unique terrain of the Awoja watershed itself, and the land use practices in the area.

The study also established that the business community were benefiting a lot from the economic stress caused by a changing climate. It was found that businessmen come from as far as Mbale district to come to the markets within the watershed. The business community has created awareness about their products they sell during market days and people are always waiting for those products in the markets. The community often sell their raw produce to the business community at exceedingly low prices during harvests only to buy them back from the hoarding businessman, at very high costs at times of food stress especially during droughts. It was found that the business men had good market intelligence and are excellent speculators about production trends in relation to draughts and floods. This information includes knowledge of the available products in the community, the products demanded by the communities and the available production opportunities. This has helped the business community to sustain their business activities that has enhanced profit and income for the business community as was indicated by 30(16.7%) of the respondents. The implications of high prices are the fast depletion of food and cash reserves of community members. This has led the communities resorting to increasing use of natural resources for survival.

The study also examined the civil society benefits from the activities in the watershed and the results indicated that the civil society benefit most from funding for research. This was qualified during the face-to-face interaction, where respondents felt that the NGO's had benefited a lot in the watershed. Community members revealed that NGOs were getting a lot of money claiming they are solving community problems. It was revealed that most NGOs were involved in climate change management and yet nothing much was being done. The Chairman Omusia village revealed that the NGOs claim they were involved in solving the effects of climate change yet on the ground there is nothing visible that had been done. He felt that the problems of the community were being used as opportunities for NGOs to make a lot of money other than providing solutions to the problems they were going through. It can be observed however that there is a section of respondents 4(2.2%) who indicated that the NGOs had not benefited much from the watershed as many NGOs had withdrawn from the area especially after the end of the Lord's Resistance Army war and after cattle rustling by the Karamojong had been curbed by government. Most of the NGOs had come to the area to solve problems of displacements of populations due to the wars and later transferred into climate change managers which has not worked well out for them compared to the relief services they were involved in during the wars. Never-the-less it was observed from the results that the NGOs had substantially benefited from the watershed either directly or indirectly.

The other important benefit was tourism and its linkages. Community members felt that the Teso people themselves had turned out to be tourism assets. They mentioned that many people come to Teso to watch how people respond to floods. A respondent from Angisa reported that at times people come in helicopters to watch how they are suffering during floods. 'While they may drop food for us, the real intention is to see how we behave and how we are managing the challenge of floods'. Therefore "we have turned into tourism assets and the government may not be bothering about our challenges since it is earning from what we are going through" he said. The Chairman of Angisa further explained that many school children have been brought to Angisa to watch how we live. One teacher explained to me that we are a special group because there is no community that lives in concentrated camps when there is no war.

It is not only external stakeholders but a good number of the households have also benefited in one way or the other. The study examined how the households had changed in terms of assets, and the results indicated that they had bought livestock and these were 51(28.3%). On the other hand, respondents revealed that they had acquired basic household assets and during the face-to-face interviews, these included mattresses, kitchen ware, clothes and others. It was mentioned by a number of households that they had acquired either a bicycle or a motorcycle and that having a bicycle was an essential part of life because they needed to collect water and firewood from distant places. It was actually found that many women and girls knew how to ride a bicycle because they were the ones responsible for collection of water. During the interviews, it was revealed that the men were obliged to buying bicycles to their wives because if they did not, it would mean that the men would collect the water themselves even when it was traditionally a responsibility of women. The men had to buy bicycles for the women because if the men had to collect the water, other members of society would laugh at them for doing a woman's role. Hence this had made the number of households with bicycles increase as a means of adopting to the climate change effects within the area.

The above results show that households had on the average, changed though there are some households that were marginalized by the emerging economic hardships and had no noticeable change in living standards and some had regressed.

Discussions on the implications of the benefits above to sustainable management of the watershed showed that while the local revenues were being collected from fines and taxes, these funds were not being used for environmental protection and to prevent

degradation of the watershed. Similarly, respondents felt that the contributions of NGOs were not commensurate with the funding they were getting to address environmental and climate change issues in the watershed.

3.1.4. Effects of Competing Economic Interests by Different Resource User Groups

A decade ago, cattle-herders were using the Gweri wetlands as a grazing area in peaceful co-existence with rice-growers, fishers and other traditional users of the wetland's resources. Whereas historically there has been some competition over these resources among the different actors in the Awoja wetland system, the competition in the Gweri wetlands has become fiercer over the past decade with the changing climatic conditions and the advent of multiple interest groups. Interviews among key informants living adjacent to the Gweri wetlands revealed two major trends that are responsible for the increased tension between different land-use groups over the past decade: climate change, and the commercialization of rice cultivation.

The first trend is *increased climate change hazards*, or more specifically, the effects of a combination of gradual and extreme climate change. Gradual climate change has lowered the water levels along the banks of rivers and swamps, increasing conflicts over water between people involved with different enterprises. The fishers can no longer keep the deeper waters to themselves, while cattle-herders who for generations have left their cattle to roam the wetlands freely for pasture find that their grazing areas have been taken over by crops. This restricts the movement of cattle, causing livestock herding to become more difficult with increasing livestock encroachment on cultivated fields.

The second trend is the *expansion of the commercial tractor cultivation of rice*. Well-off interest groups located outside the community in collaboration with commercial rice-growers are clearing large areas of the wetlands for cultivation. They are also claiming ownership of the wetlands, which for generations were considered to be communal land that belonged to entire communities on which no single individual could claim tenure rights. The Environment Officer Amuria revealed that the increase in drought in the area has made the wetlands a desired resource. He noted that after elimination of cultivation in the wetlands in Amuria, people have resorted to buying goats and cows and dumping them in the swamp. Despite this form of land use, one Chairman of the environment committee indicated that he still contends that the activities that can be allowed in the wetlands should include sugarcane growing, tree planting and fish farming which may co-exist in the wetland.

In the absence of strong government institutions, local institutions compete for authority to interpret traditional land tenure laws and to enforce local government regulations. Such local institutions include the traditional clan structures and enterprise associations, for example, of cattle-herders. In the Gweri wetlands, the focus of this study, institutional arrangements to manage the wetlands is today competing and giving rise to contestations in the interpretation of land-use management regulations. The competing institutions are a reflection of a wider conflict between different socio-economic constellations and environmental forces within the community. Local-level government bureaucrats are divided between enforcing environmental policies and local bylaws that seek to protect both the wetlands and the commercial interests of the local elite involved in commercial rice cultivation in them. The weakness of local government institutions that are responsible for conservation of wetlands is revealed by their being compromised by interest groups involved in commercial activities in the wetlands. Yet, there is awareness that conservation of wetlands is important if the issue of adaptation to extreme climate change events such as floods and droughts is to be addressed.

The following themes below summarize the findings of how competing economic interests have constrained sustainable utilization of resources in Awoja watershed, thereby providing insights into the factors that are driving increasing utilization of wetlands for rice cultivation and degradation of the wetlands.

3.1.5. Commoditization and Expanding Markets for Rice

The study noted increased commoditization of rice in the areas. It was revealed that rice had become more marketable than any other crop in the area. It was highly needed by the institutions (learning institutions) and for domestic use. As a result, everybody was going to the wetland. It was revealed that upland rice had been introduced as an alternative but it did not do well and thus coupled with the fact that people were already used to cultivating the wetland, they withdrew from upland rice. The Awoja wetlands are located near to Soroti municipality, along the transport corridor from Mombasa to South Sudan. It was revealed that strong market demand has emerged for rice in South Sudan following new trading opportunities with the Sudanese after their recent independence. The area has also seen the growth of contract farming arrangements along the rice value chain. This has been boosted by the government's promotion of rice through JICA, a Japanese agency that has been distributing seed to farmers and demonstrating how to grow upland rice as well as paddy rice. As a result, community members have continued to encroach on the wetlands to grow rice ever since demarcation. Finally, it was revealed that, as a result of drought in the neighboring areas, especially the Karamoja region, the population has increased within the region. It was reported that most of the in-migrants are interested in buying rice to send back to their home areas and this has increased the demand for rice in the area and increased the need for land.

3.1.6. Elite Capture of Local Public Wetland Management by Institutions

The study uncovered poor implementation of existing natural resource management policies and regulations due to elite capture of local government institutions. For example, members of local government committees are also directly involved in cultivating rice in the wetlands. It was found that non-poor farmers and the local economic elite mostly pursue rice cultivation. According to a local opinion leader, one of the reasons why local government institutions do not enforce environmental regulations is that they receive bribes from well-off rice cultivators to gain access to the wetlands. Another complicating factor is political patronage, where local leaders protect some political supporters and fear taking action so as not to lose the support of the economic elite during next elections. The lack of the political, human and financial resources to support local natural resource management organs has been

another constraint on policy implementation.

The various institutions that manage wetlands in the watershed have different interests, which, as the findings show, have not been harmonized with the capacity of the wetland. Many NGOs came together after the 2007 floods to offer relief assistance to flood victims. Now they have graduated to tackling development and income generation. While formally coordinated by the DRR committee under local government auspices, coordination has declined with time, and many are now pursuing activities that are not necessarily in line with wetland conservation. The DRR is charged with planning for disaster response at the sub-county and district levels. While the committee is duplicated at the parish level to oversee compliance with environmental rules and regulations, it faces an uphill task, as well as challenges of legitimacy arising from unclear rules and regulations. They are also subject to intense economic interests from commercial rice-growers and millers and are often easily compromised affecting implementation of environmental rules and regulations.

3.1.7. Economic Interests, Inaction and Inability to Implement Rules and Regulations

Another trend that was identified was mainly over the behavior of enforcement staff towards implementation of environmental regulations. It was found that enforcement staff favored relatives and friends to the extent that they were not usually punished whenever they are caught breaking environmental regulations. One respondent in an interview at Omugenya explained:

→ 'Even when a person is reported to the environmental enforcement staff, he sleeps in the police cell for only one day or a few hours and in the morning, he returns even without being prosecuted. This had created enmity amongst the community members and there was no meaning in reporting cases of violation of environmental rules'.

Failure to prosecute was perpetrated by the problem of bribery where officers received money or sectarianism where the officers do not want their relatives and friends to be prosecuted and often withdraw complaints by conniving with the police.

It was also revealed that enforcement officers were also participating in using the resources even where it was prohibited. During the interviews, the Chairman Omusia Parish revealed that he also had cows and also grew some rice in the wetlands in the and admitted it was difficult for him to adequately enforce the laws concerning wetlands management. It was also revealed that local leaders were usually compromised in a number of ways including giving them gifts such as food stuffs like chicken, crop harvests and many others. Another challenge was the relaxation of regulations in order to fit the people's conditions. This was affecting the perception of the community over the rules to the extent that even most important ones were not being respected.

It was also revealed that enforcement officers feared to create enmity amongst the population. It was revealed that this was because there are the people they stay with and cannot afford to have problems with them. They do not want to confront the community members because of the assistance expected from the community. The second behavior that was identified was that of the local or political leaders who lived amongst the community. It was found that instead of guiding the population on resource use, the councilors were just looking on for fear of compromising their support from the population. It was revealed that in any case, they were also using the same resources even when they were prohibited for environmental conservation. The situation hence was that both the bureaucrats and the political leadership had compromised their roles for different economic interests.

3.1.8. Economic Interests and Resource Allocation

An examination of the aspects that have not gone well in the allocation of resources in the watershed in the face of competing economic interests indicated that demarcation of wetlands has not been uniform. While there was demarcation in Amuria, the district had failed in the equitable allocation of land. During the interviews, it was revealed that cultivators had been given little land in the wetlands compared to cattle keepers and the community members considered this as a war against cultivators the majority of who are the poor. It was also reiterated that the leaders were being compromised and community members noted that this was not good. It was reported of people being displaced in the demarcation process and not relocated. This challenge was particularly notable in Angisa where people had been removed from their land and they were not re allocated alternative land thereby ending up in camps. Community members further complained of not being consulted in a number of land related decisions and this was a big problem within the watershed.

4. Discussions

Competing economic interests are a major factor contributing to the variables associated with resource degradation in Awoja Watershed. This has had varying implications to the livelihoods within the watershed as it has generated losers and winners in resource access accompanied with a series of ecological alterations with ability of furthering the impact of climate change and reduce sustainability. While competition for wetlands have been occasioned by commoditization of rice as an emerging enterprise, frequent draughts and floods is a major source of increasing resource scarcity and changes in resource distribution variables. The results indicate that the competing economic interests have made a number of people more vulnerable especially after the demarcation where the competition in the upland has become so stiff leading to the marginalization of the poor many of whom were relying on rice production in the lowlands. This situation relates to the prediction of Steinmann, (2008) which showed that whenever more powerful agencies are allowed to address emerging societal problems, including those involving the environment marginalization of some groups might not be avoided. The struggle for natural resources was noted by Horowitz (2012) when he observed that in the search for economic sovereignty, people have the right to define their own food and agriculture systems irrespective of the ecological implications.

The study results reflect that even with institutional restrictions on access to natural resources, the population cannot desist from using some of the restricted resources such as wetlands due to increasing economic value of the wetland and lack of alternative enterprise. This state has resulted into weak and un-uniform policy implementation actions which have all combined to escalate competition for resources in Awoja watershed. The unfortunate part of is that this situation has tended to leave a number of society members' vulnerable and their resilience reduced tremendously.

The study results agree much closely with those of Karma (2011) when he found that watershed management is always aimed at finding a solution to the real human, resource and environment related problems, in particular those related to water resources rapidly being exposed to competing demands. Due to the fact that the economic interests are at times a survival drive, most of the time we get caught into the dichotomy of economic development and environmental conservation needs. Basing on the results generated by the research, watershed management can as well be conceived as an integrative way of thinking about various human activities that occur on a watershed that have effects on the ecological systems within the watershed. With this perspective, we can plan long-term, sustainable solutions to many natural resource problems, and find a better balance in fulfilling the current needs while leaving a sound resource legacy for generations to come. This future view of resource use ogres well with Moktan, (2008) when he argues that sustainable use of watershed resources will only be achieved by adopting an integrated approach that recognizes the mutually dependent interaction of various basic elements of a watershed system, with the direct involvement and participation of the different actors and stakeholders in the exploitation of the watershed resources. The actions of one actor must be considered in comparison with the others, because what some stakeholder are doing affects others in one way or another since it has an impact on the water shed ecological system. Hence the aspect of economic interests cannot be ignored because it has a close connection with the different aspects of the management of the watershed for sustainable utilization.

5. Conclusion

The paper shows that climate change adaptation brings about emerging economic interests. Increasing economic interests have resulted into the rush for the available resources after demarcation especially in Amuria and Soroti districts and in effect reducing a range of essential environmental services, including water supply for a large upland area including Soroti town, as well as negatively affecting biodiversity and wildlife. An equally dramatic effect is that expanding commercial rice cultivation has reduced the wetlands' capacity to act as a sink for extreme floods and thus increase the area affected. Secondly, the expansion of commercial rice cultivation is creating land-use conflicts with cattle-herders, who for generations relied on the wetlands as communal grazing grounds where cattle roamed without restriction. Conflicts arise between cattle-herders and commercial rice- growers, as the traditional free-range cattle-grazing is incompatible with the advent of rice and horticultural crop cultivators. The other notable implication of competing economic interest was that there was overgrazing in the wetland, increased access to wetland, demarcated wetlands highly encroached and the vegetation which in the past protected wetlands has been cleared. It was noticeable in this study that it is hard to protect the wetlands because they are the only remaining source of food especially due to prolonged droughts and the difficulty in making predictions about whether conditions at any time within the year.

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