

Watershed Governance for Food Security in the Sio River Basin: A Paradox of Kenya's Devolution System

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Abstract

Institutional and political inefficiencies in Sub-Saharan Africa hinder the implementation of Integrated Water Resource Management approaches. In Kenya, decentralization as a political and institutional tool was designed to strengthen the mandate of county governments and grassroots stakeholders in river basin management to bolster food sector. However, it has been easier for the central government to decentralize powers to the county governments than to strengthen county watershed management framework. To address this paradox, this study examined the effectiveness of watershed governance for sustainable food security in the Lower Sio River Basin of Busia County in Kenya. Data was collected from 387 households using structured questionnaires, focus group discussions, key informant interviews and document reviews. Descriptive and chi square analysis were employed to analyze the data. Results showed strong relationship between knowledge of the departments tasked to coordinate watershed management activities and the level of food security at household level $p < 0.001$. High variation among the households' food security status and knowledge of the county environmental protection policy, water services provision policy at $p\text{-value} = 0.000$. Watershed management plans and policies did not develop synergy. Thus, there is need for decentralization to strengthen details on watershed governance for sustainable food security in the river basin.

Keywords

decentralization; food security; river basin; watershed governance



I. Introduction

Watershed management challenges in river basins of Sub-Saharan Africa and in other parts of the world are increasing due to rapid urbanization, poverty and food insecurity, growing energy demands, and climate change (Komakech 2013). As a result, watershed management approaches have been the main target in food security policies (Government of Kenya 2011). However, effective watershed management depends on sustained political commitment and investment by the local and national governments (Food and Agriculture Organization (FAO) 2017). Despite the fact that Integrated Water Resource Management (IWRM) has been widely accepted in managing watershed resources, efforts at all levels of implementation are often hampered by inadequate or inefficient political and institutional environments (Ballweber 2006). To address hindrances in IWRM, watershed governance approach has been used to promote; political, institutional and legal reforms, and refocus the role of government in transforming governance from top-down managers to facilitators of local action (Brandes 2006).

In Kenya, decentralization as a political and institutional tool is expected to strengthen the mandate of county governments in watershed governance and facilitate the involvement of stakeholders at different levels in the food sector. However, it has often been easier for the central government to decentralize powers to the county governments than to ensure that the county governments have the needed resources, capabilities and accountability necessary for watershed management. In addition, devolved development efforts that have existed for over a decade such as Constituency Development Fund Projects (CDF) have not adopted watershed management approaches to ensure sustainability (Namenya 2012). Furthermore, failure to recognize the economic value of water has resulted in its unsustainable use and degradation of its natural base (Kagombe et al., 2018).

In western Kenya, a recent study in the Upper Sio River catchment in Bungoma County showed that despite the existence of several stakeholders necessary to enhance food security under the county governance system, food insecurity remained a challenge to human development (Wabwoba 2018). In Busia County, the Lower Sio River basin has continued to experience land use and land cover changes which have exerted negative ecological impacts affecting the community livelihoods (Obando, Bamutaze, and Makalle 2007). In addition, 54% of the households in the watershed were reported to be food insecure (Government of Kenya 2013a). At the national and county levels, there is need to consider using evidence from field experiences and implementation of oriented research to influence policy dialogue, decision making and investment priorities in the watersheds (Food and Agriculture Organization (FAO) 2017; Liniger et al., 2017). It was on this premise that the study sought to determine the effectiveness of watershed governance for food security in the Lower Sio River basin.

II. Research Methods

2.1 The Study Area

The Lower Sio River is a transboundary basin that lies between latitudes 00N and 100N and longitudes 300E and 360E (Figure 2.1) along the Kenya- Uganda border. The mainstream of Sio River stretches approximately 78 km from the source in Kenya to the mouth in Uganda (Albinus, Makalle, and B. 2008). Funyula, Matayos and Nambale Sub-counties in Busia County, through which the stream flows, were selected as a hydrological unit. In addition, the basin has high poverty levels of 65.9% with 93.5% of the households in Funyula Sub-county depending on rain-fed on-farm and off-farm activities for their livelihoods (Namenya 2012). The basin has a high population density exceeding 300 persons per square kilometre (Government of Kenya 2010a) and cattle density of 38 per square kilometre, and continue to increase pressing heavy demand on the watershed resources – water, soil, vegetation (Obando et al. 2007).

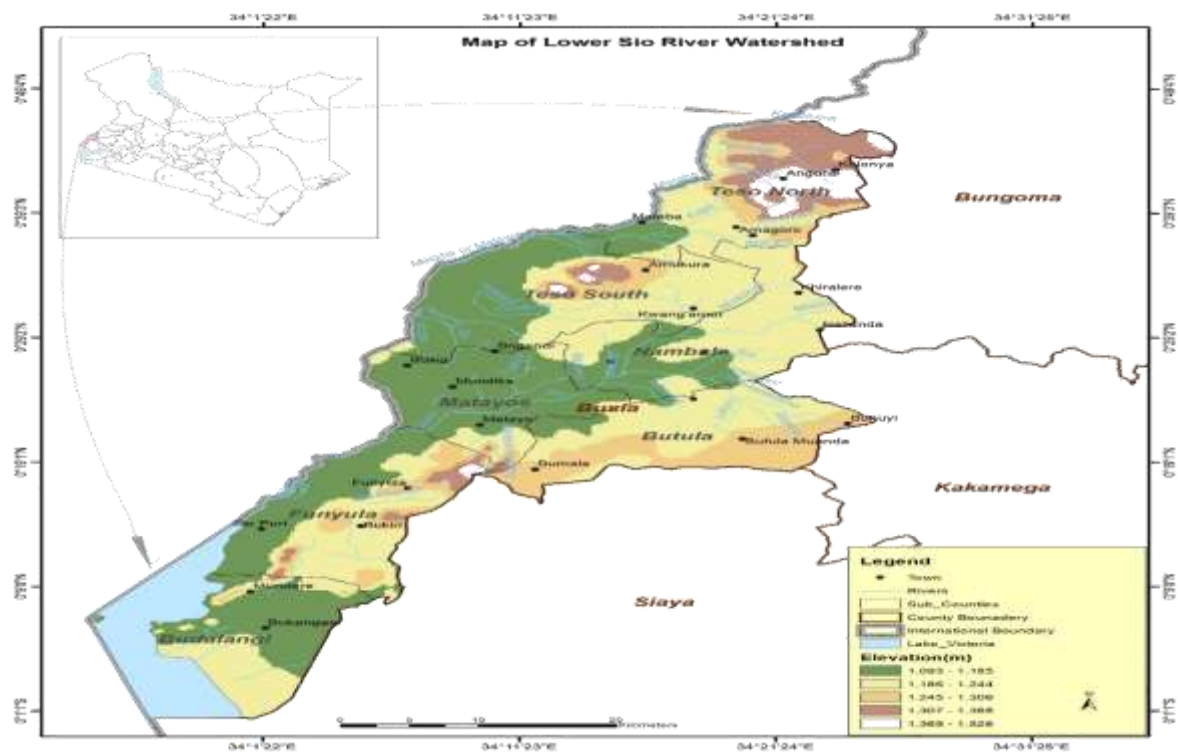


Figure 1. Map of the Lower Sio River Basin

2.2 Research Design

The study adopted cross-sectional survey designs combined with both qualitative and quantitative methods, whereby probabilistic and non-probabilistic sampling techniques were used in the study. Survey studies are used to obtain information about existing phenomenon (Serem, Boit, and Wanyama 2013). Therefore, this design was found useful in gathering, summarizing, presenting and interpreting data on Sio River basin.

2.3 Sampling Methods

Purposive sampling was used to select the three sub-counties of Busia County, Kenya; Nambale, Matayos and Funyula through which River Sio traverses thus forming a common hydrological basin. Quota sampling was used to select respondents who constituted focus group discussion teams. Primary quantitative data was basically drawn at the individual household level. A two-level multi-stage sampling was conducted to select a representative number of households. In the first level, simple random sampling technique was used to select at least 10% of the locations hence two locations from each of the sub-counties whereas in the second level, two sub-locations from each selected location were identified using simple random sampling technique.

Proportionate sampling was used to distribute the samples in the sub-locations based on their population in the sample frame. The list of households from each sub-location obtained from Kenya National Census of 2009 Census was updated using the list of households at the respective chief's offices. Finally, a simple random technique was used to select the households that formed the unit of analysis while the household heads formed the unit of observation during data collection process. A sample size of 387 was obtained using (Yamane 1967) formula for small populations.

2.4 Data Collection

The quantitative data collection essentially necessitated semi structured questions, open and closed ended questions. The procedure for qualitative data collection was done using a focus group discussion guide administered in various community groups in the basin. Key informant interview guide was used to obtain data from national and county governments' departmental officers and representatives of non-governmental organizations. The primary data was collected from the respondents in the period between October, 2017 to October, 2018, while secondary data presents was accessed from documents that existed between the same period. To test the validity of data collection instruments, a pre-test study was conducted in thirty-nine (39) households of the total calculated sample size (10% of 387) in Esikulu Sub-location, Matayos Sub-county which was excluded from the main study.

2.5 Data Analysis

Frequencies were run to all variables to check for missing cases if any as well as for explanations. The constructs of dependent variables (food security) were recorded whereby a higher score meant a correct or more positive answer (0-1 for binary; (yes, no). The items that measured the dependent variable (food security) were summed up to compute for an index score of food security. The food security index score using Modified Bloom's cut-off point, was created for the purpose of performing inferential statistics. Further, independent variables concepts' values were summed up and computed to form different independent index scores for the specific concept. All the 17 variables used to measure food security were included in the calculation of food security index score. This is because the variables showed tight coherence with a Cronbach's alpha 0.9 or higher which is considered sufficient. Depending on the number and nature of independent variables (for the dependent, all the 17 variables), index scores were summed up and recalculated to a score of 0-100 through multiplying by 100 and dividing with the number of variables. Further, a binary food security variable was generated on a scale of 0 to 1 where '0' indicated households that scored 0-49% and '1' indicated households that scored 50-100%.

Bivariate analysis was done to ascertain the association and level of significance between the generated groups of households with food security and food insecurity and each variable for the household's background and watershed governance determinant factors. In running chi square tests by the groups for households' watershed governance determinant factors, p values were used to show the level of significance between the groups of households.

III. Results and Discussion

3.1 Households Socio-demographic Characteristics

Descriptive analysis of the demographics of the study respondents showed that out of 387 targeted households, 52.5 % (203) were female while 47.5% (184) were male. The study found that majority (46.3%) (179) had attained the basic primary level of education, 33.9% (131) had the secondary education while 8.8% (34) had attained the tertiary level of education. However, it was also noted that some respondents, 11.1% (43) lacked formal education. Further, majority (68.7%) (266) of the households depended on farming as their main occupation whereby 4.1% (16) and 5.4% (21) were on-farm and off-farm labourers respectively. While 12.7% (49) practiced small businesses, 4.1% (16) were civil servants and 2.3% (9) were employees in the private sector respect.

3.2 Co-ordination in Watershed Management

Results showed a significant differences between the food secure and food insecure households regarding their knowledge on departments tasked to coordinate stakeholders in the basin ($p < 0.001$; Table 1) findings from Pangani River Basin, showed that an effective coordinated management of water resources at a river basin, depends on the presence of an institution whose regulatory mandate and tasks are known and accepted by a majority of stakeholders (Komakech 2013). However, our finding did not show so and implied that under the current devolved system, such institutions of watershed management were unknown to the primary stakeholders. This suggested an uncoordinated watershed management in the basin; which goes against the tenets of IWRM and devolution in Kenya.

Table 1. Food security and food insecurity households' knowledge on the departments tasked to coordinate watershed management activities

Departments	Food insecurity (n=214)	Food Security (n=173)	Difference	χ^2	p-value
County Department of Agriculture and Livestock Development (CDALD)	12.1	32.4	20.3	48.408	0.000***
County Department of Environment, Water and Natural Resources (CDEWNR)	7.5	15.0	7.5		
National Environment Management Authority (NEMA)	7.0	0.6	-6.4		
Water Resources Authority	0.9	0.6	-0.3		
National Government Ministry of Agriculture (NGMoA)	2.3	6.4	4.1		
National Government Ministry of Environment and Natural Resources (NGMoENR)	1.9	2.3	0.4		
Don't Know	67.8	42.8	-25		

It emerged from the informant interviews that there was limited integration and collaboration between the community, non-governmental and governmental organizations; most organizations working in the basin had duplicate projects.

One of the key informants said:

“To harmonize the work of all stakeholders operating in the agriculture sector at the county level, the CDALD has been developing a Sector Co-ordination Concept which has since stalled due to differences in political interests at national and county levels.”

Studies in governance indicate that institutional fragmentation across jurisdictions, unequal power among river basin actors in different jurisdictions, a potential for high levels of political conflict, and differences in a culture of decision making contribute to problem contexts and can undermine efforts to make the science and policy interface work better

(Armitage et al., 2015). A male respondent in a group discussion in Nang’oma location said:

“The devolved services at the county level are characterized by political interests, tribalism and nepotism. The county leaders are blamed of taking development and more so watershed conservation interventions to their home communities and in areas where they received much support during the elections.”

In regard to water resources management in Kenya, the Water Act of (2016) provided for the creation of Water Resources Authority (WRA) (Government of Kenya 2016).

Unfortunately, WRA, an institution mandated to manage all water resources in the country, did not have a decentralized and operational office at the county level at the time of the study. The authority is mandated to monitor water resources alongside administration of water regulation. As part of institutional decentralization and to ensure effective water resources management at the grassroots in Kenya, the Water Act (2016) also provided for the establishment of Water Resources User Associations (WRUAs) under WRA (Government of Kenya 2016). This was inherent in ensuring that water users participate in decision making concerning the management of local water resources in sub-catchment areas for the benefit of all. The main mandate for the WRUAs was to prevent and solve conflicts over water.

The study did not find the presence of any active operational WRUA in the basin during the period of study. Nevertheless, WRUAs were expected to report to WRA, a national government agency, and not the CDWENR. Although the gap was identified in the previous Water Act of 2002, the revised Water Act of 2016 still presented a governance gap (Government of Kenya 2016). WRUAs are formed under an Act of the National Parliament and remain the grassroots agency of WRA which draws its mandate and allocation of financial resource from the national government. On the contrary, CDWENR draws its mandate and financial resource allocation from the County Government Act of 2012 (Government of Kenya 2012). Consequently, the formation, operationalization and monitoring of WRUAs at the grassroot level remained a challenge. To regularize the formulation and responsibilities, facilitation and ownership of WRUAs at the county level, there is need for WRUAs to be formed under an Act of the County Assembly and report directly to CDWENR in collaboration with WRA.

Further, results showed that 61.8% (229) of the households did not know the newly formed departments, after devolution, that were mandated to enhance watershed management for food security activities in the basin. Our finding showed that although departments such as CDALD and CDEWNR were formed at the county level under the devolved system of governance, their formation, mandates and functions had not been understood by the primary beneficiaries. There was significant difference between food secure food insecure households regarding their knowledge of the CDALD, and CDEWNR as new departments created to enhance watershed management for food security ($p < 0.001$, Table 2). Similarly, the households' knowledge of NEMA and WRA showed a significant difference between the food secure and food insecure households. This implied that the limited knowledge of CDALD, CDEWNR, NEMA, and WRA coupled with ignorance of the new departments formed displayed the poor status of households regarding the management of the water basin and hence the overall food security in the basin. In order to adjust systems social and environmental issues so as to implement right decisions at a basin level, institutions need to be changed, adjusted, expanded, or created for consistency with the watershed governance system (Koontz et al. 2015).

Table 2. Food secure and food insecure households' knowledge regarding new departments created to enhance watershed management for food security

Department	Food insecurity (n=214)	Food Security (n=173)	Difference	χ^2	p-value
CDALD	9.8	38.2	28.4	44.080	0.000***
CDEWNR	8.4	29.5	21.1	28.984	0.000***
NEMA	12.1	6.9	-5.2	2.936	0.087*
WRA	2.8	6.4	3.6	2.878	0.090*
NGMoA	4.7	6.9	2.2	0.914	0.339
NGMoENR	5.6	3.5	-2.1	0.987	0.320
Don't Know	77.1	42.8	-34.3	47.733	0.000***

3.3 Water Resources Management Plans as Governance Tools

Results in Table 3 revealed that plans were ‘Stand-alone’ whereby no plan at the basin level referred to the other despite their existence at the same time period in the same basin. Key governance issues such as common vision and goals, harmonization of implementation, resource mobilization, collaborations, community capacity building were separately addressed in the plans. Empirical evidence from Morocco shows that watershed management plan is a result of a complex and time-consuming interactive process involving baseline studies, demonstration actions, specialized studies and significant interventions by line agencies under their regular programme of action (Food and Agriculture Organization (FAO) 2017).

Table 3. Watershed Management Plans and Governance issues

Plan	Key Management and Governance Issues
Busia County Integrated Development Plan	<ul style="list-style-type: none"> • Linking watershed resources management and legislative issues to the socio-economic development of the communities. • Acknowledged the need for capacity building and resource mobilization to enhance watershed resource management. • Called for the integrative approach, guided by the participation of all key stakeholders in watershed resource management. • Acknowledged the need to monitor the impact of development on watershed resources. • Called for equitable distribution and sustainable management of land resources as well as forestry and wildlife resources for improved livelihood and food security. • Called for promoting, conserving and protecting the environment and improving access to water for sustainable development.
Lake Victoria North Catchment Management Strategy	<ul style="list-style-type: none"> • Outlined a broad vision for the catchment in line with the national vision for catchment management. • Used a rights-based approach and poverty reduction to formulate the management objectives. • Classified the catchment management unit as part of decentralization of the management interventions. • Estimated the water balance and water demand management, water allocation and water use management. • Outlined water resources protection issues, catchment protection and conservation strategy. • Areas for institutional development and collaborations were identified. • Resource mobilization and development of water infrastructure and finally, monitoring and information management.
Sio-Siteko Community Wetland Management Plan	<ul style="list-style-type: none"> • Management vision for the community wetland activities. • Formulated wetland management objectives for the community. • Formulated management actions and activities for the community. • Formulated an implementation strategy for community monitoring and evaluation framework.
Yala Swamp Environmental Management Plan	<ul style="list-style-type: none"> • Outlined the vision and objectives for the stakeholders in the environmental management of the swamp and its environs • Outlined the management interventions for the Yala Swamp ecosystem • Outlined the resource mobilization strategy, implementation matrix and the monitoring and evaluation framework.

Although four plans indicated that the formulation processes were participatory, they all targeted Sio River basin ecosystem. The study also noted that there lacked proper implementation structure and monitoring framework for all plans either from bottom-up or top-down levels of planning thus contributing to failure or non-implementation and resulting in poor watershed governance. In group discussions, the primary beneficiaries reported were not aware of the existence of such plans. The Sio-Siteko Wetland Management Plan had lasted for more than five years prior to the study period. The main challenge reported on the plan was that only six sites were sampled for community participation meetings during its formulation. The sentiments were acknowledged in the interviews with the local leaders at Nang'oma Sub-location. The chief of Nang'oma Location said: -

“It was perceived by the organizers of community fora that after training and meetings with the selected immediate neighbours of the Sio River stream, who border the riparian land together with the area local administrators; the chiefs and assistant chiefs could use their ‘barasas’ and other networks to reach other households, especially those who resided on main tributaries of the river. However, without facilitation, inadequate training on the wetland management issues and without follow-ups, the intended spill-over effect was never realized. This is the reason why almost all household in the Lower Sio River are not aware of the plan and the plan has never been implemented.”

On the other hand, the interviews with the County Principal Environment Officer confirmed that there was lack of ownership of the plan although key departmental heads were involved in its formulation. It was also noted that the plan lacked a practical implementation framework including a committee to oversee its implementation. As a result, the principal environment officer said: -

“There are arrangements to review the plan and make it more adaptable by the county government system before its implementation.”

Fiona and others (2013) argued that developing the action plans and concretizing them in work plans enabled the stakeholders to collectively agree on practical solutions to the problems in the basin (Fiona et al. 2013). Studies on watersheds in Ecuador, Morocco and Mauritania proved that well-planned actions and mobilization of different funding sources facilitated the inclusion of all possible partners in plan formulation process. As a result, local people and associations, technical line agencies, local authorities, NGOs, universities and international partners were brought together (Food and Agriculture Organization (FAO) 2017).

3.4 Watershed Management Policies and Food Security

The majority 70.8% (274) of the households in the watershed did not know any new policy created at the county or national level that enhanced watershed management for food security. More findings indicated that 20.9% (81) acknowledged the presence of the county environmental policy while 11.4% (44) acknowledged the presence of water services provision policy. Out of the interviewed respondents in the study, 7.2% (28) observed that agricultural development policy existed as a new social policy to guide watershed management activities towards food security. The findings are similar to (Makarius C.S.L., Meire, and N. 2015) who found that in Pangani River Basin in Tanzania, the majority of the smallholder farmers and their water users’ association leaders did not know or were not aware of water rights policies.

Table 4. Food security and food insecurity households regarding knowledge on the new social policy created under devolution

Policy	Food insecurity (n=214)	Food Security (n=173)	Differences	χ^2	p-value
County Environmental Protection Policy	5.1	40.5	35.4	72.121	0.000***
Water Services Provision policy	4.7	19.7	15.0	21.304	0.000***
Agricultural Development Policy	5.1	9.8	4.7	3.130	0.077*
Don't know	87.4	50.3	-37.1	63.673	0.000***

Results in Table 4 indicated that there was a high variation among the households with food security and households with food insecurity on knowledge of the county environmental protection policy, water services provision policy as well as those households who indicated that they did not know any new social policy at p-value=0.000. These findings implied that the knowledge of the new social policy on watershed management and food security activities was important in determining the status of households' food security. Research emphasis the need for development policies to be based on local customs and community practical knowledge rather than imposing state centrally-driven policies (Mohamed, 2019).

3.5 Collaboration in Watershed Management

Based on the study findings, there are various actors involved either directly or indirectly in watershed governance and food security activities. The actors include: Community members and groups, National Government departments and authorities, County government departments, programmes co-funded by international donors and Kenya National Government, International and local non-governmental organizations, financial institutions, private business enterprises and research institutions. Previous studies established that throughout the basin, households were largely composed of farmers (Namenya 2012; Namenya Naburi Daniel, Mugalavai, and Obiri 2018), who had mobilized themselves into common interest groups by the help of own initiatives and actors from non-governmental organizations.

The findings from key informants' interviews including the Assistant County Commissioners, Chiefs, and Assistant Chiefs showed that there was a gap left in enforcement and implementation of national environmental conservation and agriculture development regulations at the grassroots created by the devolved system of governance. It was revealed that the former district, division and location level agriculture committees under the provincial administration were used to ensure that all stakeholders in agricultural production were coordinated and activities regulated. However, the committees were abolished under the county governance system. It was reported that the grassroots committees were well integrated into the National, Provincial, District, Division and Location Agricultural Boards during the centralized system of government and mandated to make agricultural, soil and water management decisions at different level of jurisdictions. The board committees were all inclusive and comprised of the representative of farmers at the location and divisional committees, district agricultural officer and other key agricultural stakeholders at each level. Another gap singled out, was the abolishment of the famous Chiefs Act in Kenya. Assistant County Commissioner at Funyula Sub-county said: -

“The Chiefs Act gave the Chiefs and their Assistants powers to enforce soil and water conservation and management activities such as terracing, building of gabions and maintaining 30 Meter Buffer zone in the riparian zones. They also prevented farmers from

harvesting and selling food crops before maturity such as green maize as a measure to food security. Currently, under the national and county governance system, the Chiefs and their Assistants do not have same powers to enforce soil and water conservation and management activities leading to the increased destruction of soil and water resources and food insecurity in most parts of the basin.”

According to the interviews with the Assistant County Commissioners, the current National Government Co-ordination Act (2012) does not expressly give any powers to the establishment, roles and responsibilities of the chiefs and their assistants’ thus promoting negligence of watershed conservation at the community level. Interviewed chiefs and assistant chiefs also blamed the county system for neglecting water resource conservation responsibilities in the created administrative sub-counties, wards and villages under devolution. The Chief at Musokoto Location said: -

“We and our assistants’ responsibilities were taken away by the county ward administrators and village administrators who do not understand very well their roles in soil, water management and food security. The wards and villages administrators are to blame for the basin degradation and promoting exclusion and partisan interests at the expense of service delivery.”

Under devolution, Harahap et al., 2018 observed that village government must be fast and responsive in paying attention to everything that the community needs. Furthermore, the interviews revealed that existence of Intergovernmental Act (2012), spell out how the national and county governments were supposed to work together to ensure good governance and service delivery to the citizens of Kenya under devolution. However, the working relationship between the National Irrigation Board (NIB) and the County Directorate of Irrigation (CDI). The NIB was created by an Act of parliament as an independent institution mandated to carry out irrigation for large-scale schemes countrywide while CDI is a creation of the County Government Act 2012 under an Act of the County Assembly (Government of Kenya 2012). Therefore, it was revealed that the NIB operates in the county using same community members and resources that are under the jurisdiction of the county government. However, the county government could not hold the board accountable for irrigation activities in the county nor the board had a mandate to work with the CDI to implement projects such as the Lower Sio River Irrigation Project. This revealed need to harmonize irrigation policies and legislations to have an arrangement that integrated existing governance structures at the county and national levels to decentralize provision of irrigation water for crops as in the case of domestic water provision under the Water Act of 2016 (Government of Kenya 2016).

In addition, the interviews revealed that under irrigation practices, Irrigation Water User Associations (IWUAs) were formed at the community level as key community structure in the management of irrigation waters. However, IWUAs were neither supported by the county nor national legislations. It was considered to be a subset of WRUAs which was an establishment of the Water Act (2012) now Water Act, (2016) at the community level (Government of Kenya 2002, 2016). Based on the interviews, this was a potential source of conflict in the basin over the use and management of water resources due to different interests among irrigation and non-irrigation water users.

To make it worse, it was revealed that the CDI was not supported by any legislation at the county level making it difficult for resource allocation. It was not clear if CDI belonged to CDALD or CDEWNR for its mandates and resource allocation at the county level. The County Director of Forestry also confirmed an absence of Community Forestry Associations (CFAs) to help in watershed management through forest resource management despite the report that the tree cover in the basin was below the required 10% (Government of Kenya

2013b). Key informants were concerned that harmonization of national and county level irrigation legislation required for the efficient and effective provision of water for crops were issues to be considered in the Draft National Irrigation Policy. FAO observed that managing collaborative action and planning at the watershed level is an increasingly popular approach for balancing local needs, global challenges and addressing both environmental protection and food production goals (Food and Agriculture Organization (FAO) 2017).

3.6 Watershed Management Capacities for Food Security

The Chi-square test presented in Table 5 showed that watershed management knowledge and resources created by various actors enhanced the legitimacy, and public support for households' food security interventions hence highly significant differences ($d=23.4$; $p\text{-value}=0.000$) with households' food security. This finding implied that households with food security attributed their status of food security to the watershed management knowledge and resources.

Table 5. Food security and insecurity households' measurement comparison association amongst the watershed management knowledge variables

Watershed Management Knowledge	Food Insecurity (n=214)	Food Security (n=173)	Difference	χ^2	p-value
Watershed management knowledge and resources created by various actors enhance the legitimacy of, and public support for food security interventions, (Yes, response)	18.2	41.6	23.4	25.595	0.000** *
Non-State Actors bridge the watershed management gap between government agencies and various governance levels (global – national, national – local, global – local), (Yes, response)	11.7	29.5	17.8	19.201	0.000** *
Is there political will for support of Non-state Actors in watershed management and food security activities in this basin?, (Yes, response)	22.9	25.4	2.5	0.337	0.562
Are there conflicts among actors in watershed management and food security that may lead to exclusion of other actors?, (Yes, response)	14	10.4	-3.6	1.150	0.284
Are watershed management policies and programs mutually reinforcing food production and distribution in the Lower Sio River basin?, (Yes, response)	6.5	22.5	16	20.723	0.000** *
The overall score for watershed management knowledge					
Mean(SD)	14.67 (19.76)	25.90 (26.94)	11.22(7.18)	F=33.38 5	0.000** *

Watershed management gap bridged by Non-State Actors between government agencies and various governance levels (global – national, national – local, global-local) showed highly significant differences with household food security at p-value= 0.000. Further, there was no significant influence of political will support for Non-State Actors in watershed management and status of households' food security. (Elias et al., 2015) citing earlier studies in Ethiopia found that the implicit goal in establishing uncontested monopoly over Ethiopia's agricultural extension system was driven by the lust for obtaining legitimacy and acceptance from smallholders whose support was instrumental in averting threats and boosting prospects for unhindered regime survival and security under the façade of periodic electoral exercises.

IV. Conclusion

In this study we examined the effectiveness of watershed governance for food security at river basin level under devolved governance. Overall, the findings of this study have shown that despite transformation from centralized to decentralized system, watershed governance remains a challenge in food security at river basins in Kenya. The study revealed relationships between households' food security and households' food insecurity with. The results obtained suggested that majority of the households in river basins do not have knowledge on relevant departments, plans and policies mandated to coordinate watershed management and food security interventions after the abolishment of the centralized system of governance. Watershed management plans and policies do not exhibit required synergies to provide solutions to food insecurity while collaborations among actors lack a monitoring framework. Therefore, attributes revealed in this study form a prerequisite for community participation, responsiveness, accountability, inclusiveness, legitimacy and rule of law in watershed management for food security. Overall this study provided governance challenges that need to be addressed by policy makers at the county and national government levels to ensure sustainable food security at a river basin under the devolved system of governance.

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