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Special Section:
Assessing Risk Governance Performance in the Face of Global Change

Assessment of Coastal Governance for Climate Change Adaptation in Kenya

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Key Points:
- The capitals assessment framework provided a systematic approach to building a governance baseline for responding to climate change
- Existence of national frameworks designed explicitly to enable adaptation is a major strength but require complementary local capacities
- A more comprehensive use of evidence in decision making can help in defining adaptation pathways

Supporting Information:
- Supporting Information S1
- Table S1

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Abstract The coastline of Kenya already experiences effects of climate change, adding to existing pressures such as urbanization. Integrated coastal management (ICM) is increasingly recognized as a key policy response to deal with the multiple challenges facing coastal zones, including climate change. It can create an enabling governance environment for effective local action on climate change by facilitating a structured approach to dealing with coastal issues. It encompasses the actions of a wide range of actors, including local governments close to people and their activities affected by climate change. Functioning ICM also offers opportunities for reducing risks and building resilience. This article applied a modified capitals approach framework (CAF), consisting of five "capitals," to assess the status of county government capacity to respond to climate change within the context of coastal governance in three county governments in Kenya. The baseline was defined in terms of governance relating to the implementation of the interrelated policy systems of ICM and coastal climate change adaptation (CCA). The CAF framework provided a systematic approach to building a governance baseline against which to assess the progress of county governments in responding to climate change. It identified gaps in human capacity, financial resource allocation to adaptation and access to climate change information. Furthermore, it showed that having well-developed institutions, including regulatory frameworks at the national level can facilitate but does not automatically enable adaptation at the county level.

1. Introduction

Increasing climate variability and change are among the greatest challenges of the 21st century. This is partly attributed to the diversity of its impacts on human and natural systems, as well as the complexities around dealing with its causes. According to most climate models, the intensity and frequency of extreme climate events are projected to increase in the future with significant disparities in terms of regional impacts and sectoral risks (Intergovermental Panel for Climate Change [IPCC], 2013). Consequently, adapting to climate change is a must for all nations, whether to deal with the negative consequences or take advantage of potential opportunities.

Coastal zones merit special attention in adaptation efforts. They are exposed to a range of climate-related hazards, including droughts, floods, sea-level rise and storm surges, rising sea temperatures, and ocean acidification (Church et al., 2013; Wong et al., 2014). At the same time, coastal areas are home to a large and growing proportion of the world's population (Merkens et al., 2016; Neumann et al., 2015). Moreover, the concentration of human activity on the coast has heavily impacted the natural environment, often leading to resource degradation (Agardy et al., 2017; United Nations Environment Programme [UNEP], 2006). The combined effects of high and increasing population density in coastal zones, increasing pressure on resources, and superimposed climate hazards requires urgent policy responses.

Integrated coastal management (ICM) is increasingly recognized as a key policy response to deal with the multiple challenges facing coastal zones, including climate change (Falaleeva et al., 2011; Hurlimann et al., 2014; Wong et al., 2014). ICM is a form of adaptive management that takes into account the various pressures, threats and opportunities facing coastal areas, and brings together stakeholders in search of appropriate solutions. It departs from conventional approaches whereby problems were addressed within specific

sectors without considering linkages with, and implications for, other sectors. ICM facilitates adaptation because of its use of adaptive management and best available knowledge to inform decision-making; inclusion and participation to ensure public support for adaptation; improving coordination between different actors and institutions at different levels and avoiding fragmentation of laws and overlap of institutional roles (Tobey et al., 2010).

Addressing the challenges posed by climate change in coastal zones requires effective local governance. Governance encompasses the actions of a wide range of actors, including the state, civil society, and the private sector (Adger et al., 2003; Lemos & Agrawal, 2006). Because the effects of climate change are experienced locally, local actors are often best suited to address them through initiatives designed to reflect local circumstances. ICM can create an enabling governance environment for effective local action on climate change by facilitating a structured approach to dealing with coastal issues, from identification and prioritization of these issues through to preparation, implementation and evaluation of response strategies (Measham et al., 2011; O'Mahony et al., 2015; Sales, 2009; Tobey et al., 2010).

Local government is an important actor in responding to climate change since it is closest to coastal communities and their activities and therefore has a responsibility to facilitate adaptation. Moreover, many of its functions such as spatial planning and provision of services and public infrastructure offer opportunities for reducing risks and building resilience. Local government is also an important channel for implementation of national climate change responses. A growing body of literature has highlighted and analyzed the role of local government in responding to climate change (Amundsen et al., 2010; Baker et al., 2012; Gero et al., 2012; Measham et al., 2011; Pasquini et al., 2013, 2015; Pasquini & Shearing, 2014). These studies have provided important insights into the challenges facing local government action in climate change. However, few studies offer a means to monitor local government progress in coastal climate change adaptation (CCA).

Celliers et al. (2017) propose a capitals approach framework (CAF) designed specifically to assess the status of local government capacity to respond to climate change within the context of an integrated system for coastal governance. The CAF provides a means to qualitatively and quantitatively assess capability of local governments to address climate change impacts on the coastal zone. This framework draws on the concept of capitals, understood as the assets, capabilities, properties or other valuables of a governance system which collectively represent its good functioning (Bebbington, 1999; Goodwin, 2003; Máñez et al., 2014). This article applies the CAF to assess local coastal governance for climate adaptation in Kenya. It aims to demonstrate the usefulness of this approach to monitoring progress of local governments in responding to climate change using a scoring system to illustrate governance performance (Máñez et al., 2014).

2. Methods

2.1. The Kenyan Context

The 2010 Constitution of Kenya, decentralized government and devolved powers and resources to 47 new county governments (Government of Kenya, 2010a); while 2013 marked the official launch of decentralization with the election of county governors and the establishment of county assemblies. County governments are therefore a new form of local government in Kenya and many are still gradually building their institutions. Kenya has six coastal counties. A total of 14 functions, including local development planning and storm water management have been devolved to county governments. Climate change and coastal governance cuts across the mandates of national as well as county governments.

Coastal Kenya increasingly experiences rainfall induced flooding and droughts (Government of Kenya, 2010b). Coastal flooding from sea-level rise is projected to affect 10,000–86,000 people a year as well as lead to coastal erosion and wetland loss at an annual cost of $7–58 million by 2030, rising to $31–313 million by 2050 (SEI, 2009). Coastal erosion and salt water intrusion already require substantial management interventions (Comte et al., 2016; Mwakumanya et al., 2009; Mwakumanya & Tole, 2003). The shoreline is also vulnerable to natural extreme events such as tsunamis which are expected to increase in frequency and intensity with climate change (Tychsen et al., 2008).

This study focused on three of the five coastal counties: Kilifi, Mombasa, and Kwale (Figure 1). These counties were selected based on their mixed rural and urban composition, a range of vulnerability factors,

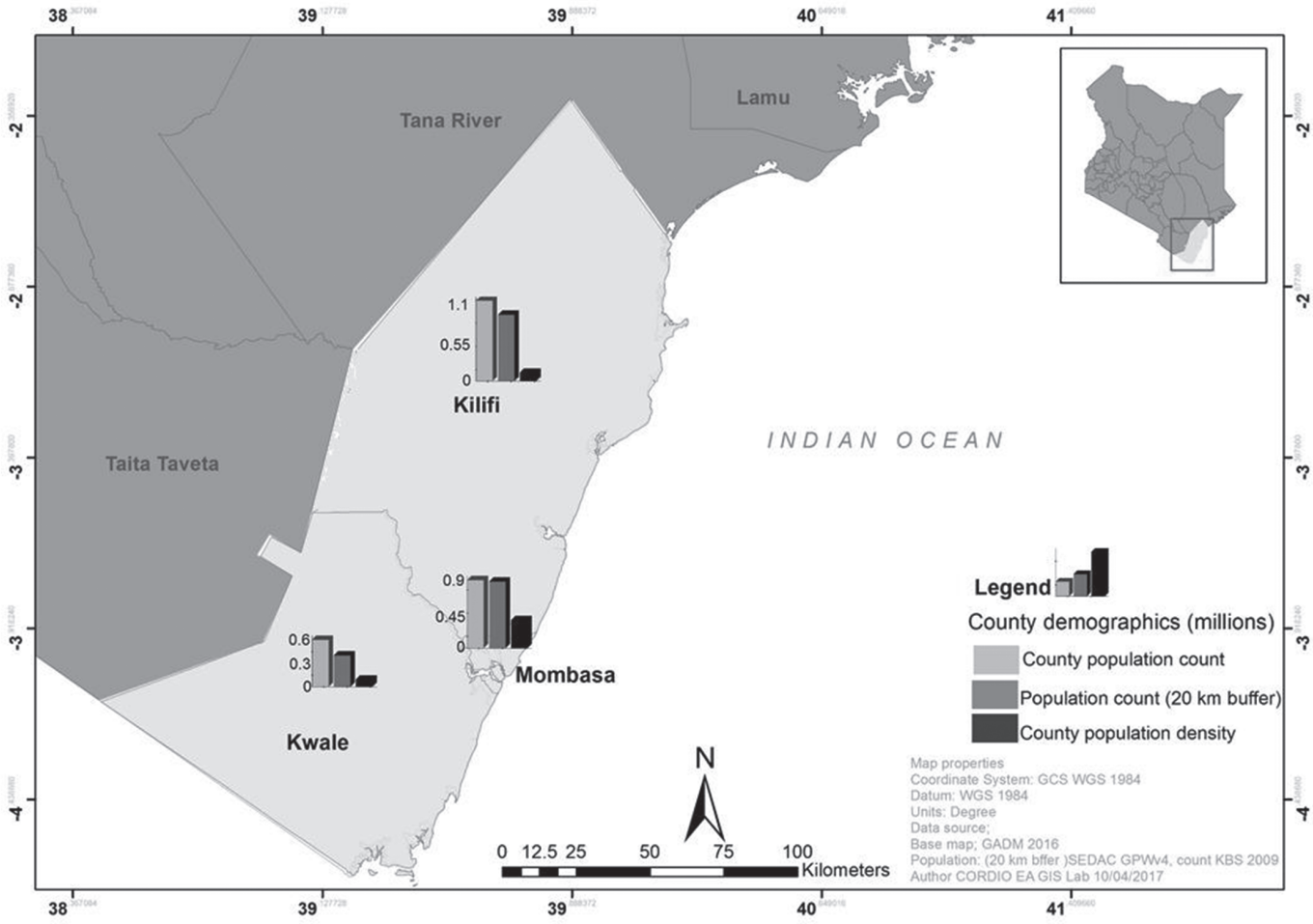

Figure 1. Location of the three counties along the coast of Kenya.

contrasting economies and accessibility to the research team. Data on the county contexts is available in Table S1 (Supporting Information).

2.2. Capital Approach Framework

A local coastal governance baseline assessment was adopted from a CAF consisting of five "capitals" originally proposed by Máñez et al. (2014). The five capitals (financial, social, political, human, and environmental) correspond to key governance structures, factors, and processes presumed to be fundamental in securing support for sustained action toward the adoption of adaptation measures at a local level and in the context of coastal zone management. Absence of these factors can indicate areas of concern or constraints to achieving adaptation.

The framework was first presented, negotiated and adopted in inception workshops held in Kwale, Kilifi, and Mombasa counties. Participants were invited from county governments, government institutions, nongovernmental organizations (NGOs), and civil society. The inception meetings resulted in agreement on a process to undertake a governance baseline assessment of coastal counties. The capitals and their expounding factors are described in Table 1 while the full framework, including the indicators has been provided in TS2.

Ancillary or explanatory information were drawn from a review of existing management instruments such as relevant national and county strategies, legislation, and key policies referring to climate change and coastal governance (TS3). The CAF was operationalized as a structured questionnaire of hierarchical design, that is, from capital to factors, to indicators, each level providing greater detail. Key informants were identified at

Table 1.
Capitals and Factors Used to Establish a Local Coastal Governance Baseline of Three Counties in Kenya

Capitals	Factors
Financial capital: the wealth and financial resources that are bounded in economic systems, production infrastructure as well as banking industries	F1. Nature and strength of the local economy F2. Funds for adaptation F3. Funds for disaster preparedness F4. Funds for coastal management F5. Buffers against climate risks F6. Ability to mobilize external funding
Social capital: relations, networks and shared norms and values that qualify and quantify social interactions effecting productivity and well-being	S1. Internal collaborations S2. External collaborations S3. Mandated cooperation S4. Stakeholder participation S5. Knowledge and information
Political capital: governmental processes performed by politicians following a political mandate as provided by the voting majority. It includes the ability to implement policies, laws, rules, norms and standards	P1. Regulatory framework P2. Institutional organization, political support and leadership P3. Transparency
Human capital: skills and knowledge, including social and personal competencies, knowledge to be gathered from formal or informal learning, the ability to increase personal well-being and to produce economic value	H1. Human resources H2. Leadership H3. Knowledge and skills
Environmental capital: describes the goods and services provided by the environment or natural resources	E1.Vulnerability of the natural system E2. Environmental management strategies E3. Knowledge and information

the inception meetings, or through referrals, and came mainly from county governments ($n = 20$) and other actors such as national agencies, NGOs, and civil society ($n = 18$). The assessments were primarily conducted through face to face interviews that lasted 2 h on average. Telephone interviews were used during follow ups, particularly where subsequent appointments could not be secured. Workshops and planning meetings in counties provided further insights into the counties' engagement with coastal management and climate change issues.

2.3. Data Analysis and Reporting

Data, collected as responses to the structured questionnaire and ancillary data, were captured in a database, organized by capital, factors, indicators, and source of information. The indicators were then aggregated and summarized per factor and finally per capital. This was achieved through an inductive process, where segments of text in interviewee responses and data from various documents were systematically organized and analyzed to identify themes, trends and divergences at the indicator level (Marshall & Rossman, 1999). The aggregated information and factor summaries provided a narrative detailing the state of the five capitals per county. The aggregated qualitative information was further synthesized per factors using assessment criteria to allow a quantitative analysis and representation as a color-coded, traffic-light system. The summarized factor information was evaluated using logical criteria developed by the research team, and assigned values: *low* (1), *moderate* (3), and *high* (5) (see example in Table 2), but intermediary values (2 and 4) were also assigned where appropriate. No weighting were applied to the scores, and these were aggregated for all capitals to provide an overall evaluation. Calculating percentages of the composite factors allowed comparisons across capitals, although this will not be presented here.

Data aggregation, interpretation, and analysis was iterative and involved a panel of two project team members responsible for data collection, six additional members, including the Regional Coordinator of Environment (NEMA), the senior marine officer and two external experts who are social scientists involved in coastal governance. Key findings were presented to, and discussed with, individuals and groups that participated

Table 2.
Example of the Criteria Developed for Two Indicators Forming Part of Political and Human Capitals to Establish a Local Coastal Governance Baseline of Three Counties in Kenya

			Assessment categories		
Capital	Factors	Indicators	Low/limited (1)	Moderate/ medium (3)	High/ advanced (5)
Political	Institutional organization, political support and leadership	Degree of control over budget and budget allocation. Degree of local political support for climate change issues. Clear national/local policy direction on climate change issues. Degree to which local government responsibilities for adaptation to CC are clear. Degree of CC and ICM institutionalization in the local government structure.	No identification and creation of internal institutions for ICM or CCA. All ICM/CCA actions driven outside of municipal mandate	Recognition of specific ICM/CCA functions within the Local government with positional power to affect change though inactively involved due to resource limitations	Strong institutionalization of ICM and CCA within Local government structure. Budget line-items associated with ICM and CCA mandates
Human	Leadership	Existence of climate change "focal points", "champions" or "officers". Degree of formality of the above	No champion or focal point; or existence of self-proclaimed champions with no powers to effect change or commission action even within their sector	Informally recognized focal points championing for action within the institution with limited powers to act within the respective sector but no powers to effect change or coordinate other sectors	Formally appointed focal points identified and mandated to champion for action within the institution with powers to coordinate different sectors and engage with external actors. Several other champions actively advocating action within the institution

in the assessment. The results were also presented for discussion to individual government staff members to ascertain the accuracy and completeness of the summaries and the qualitative evaluation.

3. Results

The results of the assessment of 20 factors describing five capitals are summarized in Figure 2. The qualitative findings from the assessment have been used to expound on the scores with regards to CCA in the county governments.

3.1. Financial Capital

The economic diversity and strength of the three counties varied. Mombasa had a more diversified and stronger economy, less reliant on resources affected by climate change such as agriculture (F1). In the first financial year (2013/2014), the local revenue collected in Kwale was half of the revenue in Kilifi, and less than a quarter of the amount reported in Mombasa (Table S2). Coastal tourism was important to all counties

Capital Assessment Framework		County Governments		
Capitals	**Factors**	**Mombasa**	**Kwale**	**Kilifi**
Financial	F1. Nature and strength - local economy	3	1	2
	F2. Funds for adaptation	2	3	3
	F3. Funds for disaster preparedness	2	2	2
	F4. Funds for coastal management	1	1	1
	F5. Buffers against climate risks	1	1	1
	F6. Ability to mobilize external funding	2	2	2
Social	S1. Internal collaborations	3	3	3
	S2. External collaborations	1	2	2
	S3. Mandated cooperation	4	4	4
	S4. Stakeholder participation	4	4	4
	S5. Knowledge and information	2	2	2
Political	P1. Regulatory framework	3	3	3
	P2. Institutional organization, political support and leadership	2	3	3
	P3. Transparency	3	3	3
Human	H1. Human resources	3	1	1
	H2. Leadership	2	2	2
	H3. Knowledge and skills	1	2	2
Environmental	E1.Vulnerability of the natural system	3	1	1
	E2. Environmental management strategies	3	3	3
	E3.Knowledge and information	2	2	2
		47	45	46

Figure 2. Traffic-light scoring of five capitals used to establish a local coastal governance baseline of three counties in Kenya.

despite poor performance due to security issues (perceived terrorism). Other important sectors in the counties include trade, financial services, manufacturing, agriculture, fisheries, forestry, and mining. Rain-fed agriculture contributes 80% of household income in Kwale and Kilifi counties making their economies more vulnerable to the impacts of climate change.

Funding allocation and expenditure data on CCA, coastal management and disaster preparedness were not readily available. Strategic planning and dedicated funding for CCA (F2) was absent from all counties. County plans and budgets had no mechanisms for differentiating adaptation funds from general development initiatives. Activities reported as measures to adapt to climate change were mainly from the agriculture, water and infrastructure sectors and focused on drought and flood issues. This included rain water harvesting, capacity building on alternative livelihoods and climate smart agricultural technologies, construction of storm water drainage systems and upgrading of roads. Funding allocated to these initiatives was reported as inadequate in all the counties with negative implications on the scale of projects being implemented. Supplementary interventions were being implemented by national government agencies and institutions such as World Bank, Food and Agricultural Organization, Plan International, and World Vision. These were dominant in Kwale and Kilifi though funding for these actions was mostly not channeled through county governments.

The devolved environmental management functions were fragmented between county departments. Overall, "coastal zone management" was perceived to be a function of national government with most conservation initiatives funded by national government agencies and NGOs. Generally, counties did not set aside funds for coastal issues such as shoreline change management (F2). Measures to address shoreline change consisted mainly of privately constructed sea walls intended to secure hotels against accretion, erosion and high tides. The effectiveness of these measures was limited and often created additional problems.

Disaster management is a shared function. Both the national and county governments are required to mainstream disaster risk reduction in all sectors and to prepare adequately for disasters. Funding for disaster preparedness (F3) was limited and fragmented within county departments with the most explicit allocation being a drought contingency fund. A county can establish an emergency fund according to the Public

Finance Management Act (2012), though the expenditure is restricted to a maximum of 2% of its annual development budget in any financial year. This had been allocated in all the counties in the 2014/2015 budgets. Anticipation of a response to disasters was more prevalent than preparation. There remains a high dependence on state actors, particularly the National Drought Management Authority (Kwale and Kilifi) and humanitarian agencies such as the Kenya Red Cross Society (all).

Despite inadequate funding, awareness of climate financing was low and none of the counties had applied for funds from national coffers (F6).

3.2. Social Capital

The ability of various departments to identify cross-sectoral issues for collaboration was moderate. Climate-related risks were unevenly prioritized across departments and some (such as tourism) demonstrated little understanding of their responsibility for CCA. Internal collaborations (S1) were facilitated by regular or ad hoc meetings of departmental heads and task-based committees. In Mombasa, for instance, different county departments were involved in preparation of the County Green Economy Strategy Implementation Plan. Kilifi and Kwale counties had established interdepartmental county-level steering committees on drought.

All counties appear to recognize the importance of external collaborations (S2) and partnerships with other stakeholders. The County Integrated Development Plans (CIDPs) of all three counties and Drought Contingency Plans (Kilifi and Kwale) identified a wide range of stakeholders needed to support their implementation, some of which had been involved in the preparation of these plans. Concern for unsustainable exploitation of natural resources and recurrent droughts in Kilifi and Kwale, attracted several externally driven initiatives involving the counties. However, limitation in human and financial resources was cited as the reason for low levels of collaboration with external actors.

Several national-level policies and legal instruments include provisions to promote and strengthen cooperation between different levels of government and stakeholders on coastal management. Cooperation (S3) between national and county governments is mandated by the Constitution of Kenya (2010) and ICM is established by the Environmental Management and Coordination Act of 1999. Activities to be implemented by county governments in collaboration with other stakeholders have been identified across several domains in the ICZM Policy (2015) and ICZM Action Plan (2011). However, counties remain marginally involved in ICM, a processes led by national government agencies. Coastal county governments are currently not represented on the national ICM Steering Committee.

Stakeholder participation (S4) in county government decision making is one of the principles of devolution and is clearly stipulated in legal instruments such as the Constitution of Kenya (2010), County Government Act (2012), and Public Finance Management Act (2012). Some of the key areas of stakeholder participation include development planning, budgeting and approval of projects with significant environmental and social impacts. All the counties had established channels to facilitate stakeholder involvement in budgeting and planning. None of the counties has yet established stakeholder forums for a coastal management, but there were deliberate efforts to involve various actors and community groups such as Beach Management Units in local decision-making.

Participation in networks dedicated to exchange of climate change knowledge and information (S5) was limited to previous (individual) involvement in national platforms such as Kenya Climate Change Working Group. The contribution of these groups in county decision making processes was negligible.

3.3. Political Capital

The regulatory frameworks (P1) for climate change and ICM in Kenya are comprehensive at the national level. There is a Climate Change Response Strategy (2010), a Climate Change Act (2016), and a National Adaptation Plan (2016). A Climate Change Policy is in the advanced stages of preparation. The Climate Change Act (2016) mandates the implementation of the Climate Change Action Plan and the integration of climate change in CIDPs and sector plans. Establishment of county-level adaptation plans has been prioritized in the National Adaptation Plan. The second medium-term plan used to implement the nation's development blueprint (Vision 2030) incorporated climate change and forms the basis for planning at both levels of government. A guideline has been established for preparing CIDPs and is explicit on inclusion of

the climate change context in these plans. Actual integration was modest with CIDPs mentioning climate change impacts and responses in very generic terms.

The primary frameworks for ICM have been listed above (S3) and are complemented by a Shoreline Management Strategy (2010), an Integrated National Land-use Guideline (2011), and resource based frameworks aligned with ICM. The uptake and implementation of these national-level guidelines and directives was low in all counties. This was attributed to limited awareness of their existence and the role of county governments in their implementation, and inadequate structures to mainstream them into local planning. County governments have legislative powers to enact complementary laws at the county level but are yet to do so on issues relating to climate change.

None of the counties have internal structures to lead and coordinate climate change or coastal management issues. Political support for climate change issues (P2) remains inconsistent, though appears to be higher in Kwale and Kilifi, where the impacts of drought are pronounced and visible. There is a persistent lack of awareness of, and relatively low concern with, climate change issues affecting coastal zones. This may also be partly due to the lack of awareness at community (voter) level to articulate these issues for prioritization. Weak political prioritization of climate change issues is equally reflected in the lack of CCA strategies and plans in all counties.

Counties are required to provide adequate and relevant information to stakeholders in a timely manner to facilitate their involvement in decision making (P3). This was facilitated partially through public engagement processes (S4). All the counties also had information offices and websites used to disseminate stipulated public documents.

3.4. Human Capital

Employment in senior and middle level technical positions requires a minimum of a bachelor's degree. At the time of the assessment, all counties reported having insufficient numbers of technical staff to meet escalating demands. This was particularly evident for skills critical to coastal management and adaptation including land-use and urban planning, engineering and marine resource management (H1). For example, both Kilifi and Mombasa had two certified physical planners while Kwale was sharing the services of a planner from Mombasa County pending the official induction of its new planner. The engineers had limited to almost no expertise in coastal engineering. Training on how to apply existing skills to address cross-sectoral issues such as climate change and coastal management seems to be lacking in existing staff capacity development programs. The staff turnover is low and may help in retaining these skills if developed.

Limited expertise could be accessed from external sources, including services provided by consultancies, and support by the national government through seconded staff. For example, Mombasa was set to benefit from a physical planning team supported by a Japanese International Corporation Agency (JICA) funded project.

All counties had staff in selected departments conversant and interested in climate change issues. However, none had formally or informally defined units or "focal points" within departments to lead climate change issues (H2). This is set to change in the near future as the Climate Change Act 2016 established that each county should nominate a member of its executive to act as a focal point for climate change issues.

The access to, and use of science-based knowledge products for long-term planning (H3) was limited in all the counties. Most decisions were reactive measures in the most vulnerable sectors (water, agriculture). Only Mombasa had a significant number of studies estimating the effects of sea-level rise on the county over the next few decades but this was not comprehensively reflected in the county's plans, and the specifics were largely unknown to county staff. The most frequently used information were in the form of seasonal forecasts generated by the meteorological department, and monthly drought early warning bulletins prepared by the National Drought Management Authority (Kilifi and Kwale). Vulnerability assessments had been conducted during preparation of a drought contingency plan in Kwale and a multi-hazard (drought, flood and conflict) contingency plan in Kilifi. Both activities involved county staff from the affected sectors.

3.5. Environmental Capital

The three counties are endowed with important coastal ecosystems such as coral reefs, mangroves, beaches, sand dunes, and estuaries. These ecosystems occur in varying extents and are under considerable human pressure, particularly as a result of urban development (Mombasa) and high dependence of the local population on natural resources (Kwale and Kilifi). The threats were higher in Kwale and Kilifi due to high poverty levels. The vulnerability of the natural system to climate change is compounded by these pressures (E1). Several national laws and policies on the environment have been established and are applicable to county governments (E2). However, challenges such as poor facilitation, inadequate enforcement staff and political interference, were reported as hindering the effective implementation of these legal and policy frameworks.

The significance of ecosystems, including their coastal protection roles, and the human induced threats facing them were well-articulated by county interviewees. However, there was a general lack of awareness and knowledge of how climate change is likely to affect coastal and marine resources (E3). None of the counties had explicitly incorporated enhancing key ecosystems as a component of their climate risk reduction strategies.

4. Discussion

This article applied a CAF to assess the status of local government capacity to respond to climate change within the context of coastal governance. The need to monitor CCA progress is increasingly recognized (Bours et al., 2015), but is constrained by the complex nature of adaptation processes and lack of indicators (Ford et al., 2013; Ford & King, 2015). The CAF provided a systematic approach to building a governance baseline against which to assess the progress of local governments in responding to climate change. It captured both internal and external factors pertaining to different capitals that represent the good functioning of the governance system where local governments operate. The analysis focused on what local governments are already doing in terms of adaptation and the factors that may affect future action.

The evaluation of financial capital and the composition and diversity of economies indicated the differences in exposure of climate-sensitive sectors, particularly that of agriculture. This explains the focus of adaptation on that sector. Most adaptation actions are still reactive or in response to existing and recurrent impacts. Pasquini et al. (2015) also demonstrated impacts experienced as a key factor in determining actions taken at a local level. Planned or anticipatory actions that explicitly address anticipated climate change impacts recieved less priority. This is particularly true for slow-onset impacts such as sea-level rise.

The dominance of reactive adaptation initiatives targeted at agriculture is common in Africa given the reliance of large sections of the population on this sector (Ford & King, 2015). Counties need to shift to more integrated and transformational adaptation initiatives in high risk sectors such as agriculture and water, as opposed to the current fragmented and incremental activities that have proven unsustainable during consecutive drought periods. Furthermore, counties need to prioritize diversification of their economies, with emphasis on underexploited and less climate sensitive sectors.

In Kenya, the weak prioritization of climate risks affecting the shoreline is also shaped by the perception that coastal management is the sole responsibility of national government. Also, large portions of the coastline are owned by private interests, particularly hotels, which undertake their own remediation action to safeguard their property. Despite limited financial resources, county governments have powers to use their internal development funds to address climate change issues. In addition, they can put measures in place to tap the climate finance flowing into the country through established funds such as the National Adaptation Fund and the Green Climate Fund.

Although counties demonstrated willingness to collaborate and coordinate actions across different departments, and to involve stakeholders in planning, this is not generally extended to dealing with climate change issues. Coordination of adaptation actions across different sectors, along with involving perspectives of different stakeholders is essential to identify synergies, avoid duplication of efforts, and ensure support for their implementation (Bours et al., 2015; Gupta, 2010; Gupta et al., 2010; Jones & Clark, 2013).

Existing responses to climate change are often ad hoc and piecemeal, lacking in strategic, integrated planning across county departments. Even so, long-term planning and integrating CCA across government

scales remains an essential function of national government (Bauer et al., 2012; Bauer & Steurer, 2015; Biesbroek et al., 2010). In Kenya, there are national-level CCA plans, but these have so far had little impact in the mainstreaming of climate change in county-level planning. ICM could provide the coordination mechanisms to respond to climate change impacts cutting across different domains, but participation of counties in ICM processes has been limited so far.

Legal and policy frameworks, and organizations can either enable or constrain adaptation (Amaru & Chhetri, 2013; Dovers & Hezri, 2010; Moser & Ekstrom, 2010; Tompkins et al., 2010). The Kenyan Climate Change Act includes provisions to strengthen the engagement of counties in adaptation. This is complemented by various climate change plans and strategies, as well as regulatory frameworks for related areas such as environmental management and planning. Similarly, there is an ICM policy and action plan. The assessment shows that having well-developed institutions, including regulatory frameworks can facilitate but does not automatically enable adaptation (Celliers et al., 2013; Roberts, 2010; Ziervogel et al., 2014). For example, counties hardly recognized ICM as a framework to facilitate coastal management or adaptation despite it being in place for several years. The enabling effects of the Climate Change Act may equally take some time to facilitate adaptation if issues impeding implementation of existing policy frameworks are not addressed.

Expertise needed to plan for adaptation is clearly insufficient in all counties, with some differences in levels of expertise available. Managing climate risks requires knowledge on impacts, vulnerability, and adaptation options (Bryner, 2006; Dany et al., 2016; Lemos et al., 2012; Smith et al., 2009; Wellstead, 2015). The CAF demonstrated that counties have no systematic approach to making evidence-based decisions on adaptation. Most activities being implemented are a response to community demands and largely informed by expert knowledge of county officers. These are often valid, but counties run the risk of underestimating the gravity of some climate risks and poorly conceptualizing responses, potentially leading to maladaptation (Klein et al., 2007). However, the requirement to engage local communities in decision-making coupled with the presence of NGO's, networks and resource user-groups provide opportunities to enhance the capacity of communities to understand and articulate climate change issues. This in turn has the potential of driving re-alignment of local priorities with projected climate risks for coastal zones, and gaining local support for coastal adaptation. For instance Kwale County Natural Resource Network through initiatives such as the Vertical Dialogue for Low Emission Development Project (V-LED) is actively involved in climate change and natural resource management dialogues in Kwale.

While there are individuals within counties interested in climate change issues, there are no champions with sufficient power and influence to provide a strong impetus for adaptation, provide strategic direction, and sustain momentum over time. Similarly, counties lacked institutionalized climate change coordination structures and formally mandated climate change focal points. Without strong leadership, the ability of counties to respond to climate change is diminished, and presents a major barrier to adaptation (Gupta et al., 2010; Measham et al., 2011; Meijerink & Stiller, 2013; Moser & Ekstrom, 2010; Smith et al., 2009).

Counties understand the importance of coastal ecosystems in coastal protection and recognize that they are being degraded due to unsustainable use. However, they do not fully appreciate the links between climate change impacts, ecosystem degradation and increased risk of climate-related disasters, and lack a coherent strategy to manage coastal ecosystems for disaster risk reduction and climate adaptation while realizing the economic benefits. The central role of ecosystems in CCA and disaster risk reduction is widely recognized in the literature and international climate policy, namely the United Nations Framework Convention on Climate Change (Locatelli, 2016; Munang et al., 2013). Assessments of some of these ecosystems show their enormous environmental and socio-economic value which could potentially provide an incentive for improved management if effectively incorporated into decision-making (Government of Kenya, 2017; Obura et al., 2017). In addition, approaches such as payment for ecosystem services can be useful in enhancing stewardship at the community level to complement county initiatives aimed at poverty alleviation and promoting sustainable use of resources.

There are a number of key recommendations resulting from the understanding facilitated by the CAF. The development of human capacity to conduct integrated vulnerability assessments; cross-sectoral CCA planning; integrated coastal zone management; marine spatial planning; and coastal engineering is an urgent requirement. The incremental improvement in the level of ICM implementation is a no-regrets adaptation

measure that may be pursued. The CAF has also shown that there is a need for resource allocation and more robust initiatives to enhance disaster preparedness and risk management.

At a county level, there is opportunity to improve participation in networks which can allow increased access to information and knowledge in climate change and coastal management, as well as enhance sharing of information between county governments and other actors. This can in turn promote a better understanding of the priority climate risks for coastal zones, range of ecosystem services and resource allocation. In addition, engagement with researchers and other actors can foster strong collaborations useful in developing more robust county plans through innovative approaches such as co-generation (Porter et al., 2015; Ziervogel et al., 2014). Information sharing can be improved by documenting adaptation responses, successes and failures, as well as coastal management initiatives to monitor progress, avoid duplication of efforts and identify priority areas for intervention.

Despite the potential of the CAF to establish a governance baseline on local government engagement in coastal climate adaptation and to monitor progress over time, a number of challenges were evident. Collecting information on some of the indicators was challenging because counties were newly established and in the process of recruiting staff and planning activities. It was difficult to guarantee an adequate level of county staff participation in assessment workshops and interviews because of competing demands on their time. Collecting data on the indicators from existing documentation, workshops and interviews was time consuming and costly. In some cases, quantitative data did not exist at the county level (Schernewski et al., 2014).

Tracking adaptation is complicated by a lack of differentiation between general development activities and adaptation activities. While counties are undertaking various activities that may contribute to adaptation, these are often not designed with adaptation as one of the primary objectives. This also makes tracking allocation of funding for adaptation activities challenging. A less resource and time-intensive assessment would require counties to have internal mechanisms to account for adaptation activities and adaptation funding. Another challenge to documenting coastal adaptation was the lack of clarity on the definition and extent of coastal zones and the role of county governments in shoreline change management.

Similar to other assessments using performance scores or indexes (Ford & King, 2015) the results may be useful for characterizing, comparing, monitoring and communicating information. The scoring criteria used were context specific and generated by the researchers. If applied in a different context, by different researchers, the results of the CAF framework would not be easily comparable. Furthermore, the simple aggregation of scores assumes that all factors have equal weight, which is clearly not the case. The value of the CAF therefore is not to enable cross-country comparisons, but to produce a baseline of adaptation as a starting point to discuss actions required to strengthen coastal governance, and in this case the role of newly devolved coastal counties in adaptation to climate change.

5. Conclusions

Coastal counties in Kenya are already undertaking CCA in a poorly structured and non-integrated manner. Significant disparities between the counties were not detected as the counties generally faced similar issues and were still developing their organizational structures following decentralization. The CAF can be particularly useful to monitoring progress over time. The CAF can help to identify interventions to strengthen local government ability to respond to climate change more holistically. For example, low scores on allocation of funds for adaptation cannot be addressed by simply making more funds available without strengthening adaptation decision-making approaches, including a more comprehensive use of evidence in the identification and prioritization of risks and selection of adaptation options.

The assessment process, which involved workshops and interviews with county staff, contributed to raising their awareness on particular issues such as coastal climate risks and the ICM concept. Ideally, in the future this type of assessment should be simplified to enable county staff to collect and analyze data in order to inform responses to climate change. A self-assessment can be an important tool for adaptive management, introducing performance targets, clear operational procedures, effective performance monitoring and consequences for poor performance. These kinds of assessments have been successfully introduced in South Africa as a means to improve water management (Carden & Amitage, 2013; Eales, 2010).

The county governments will be embarking on preparation of the second generation of CIDPs, as well as other sectoral strategic plans hence a perfect opportunity for integrating coastal management and adaptation priorities in county planning documents, while aligning and synchronizing them with the existing national ICM frameworks. The current challenges and constraints faced by local governments should be seen as opportunities for innovating new ways in which local governments can be capacitated to engage in ICM and to being able to translate the best available knowledge into appropriate local actions.

A more comprehensive institutional assessment using the CAF can be conducted focusing on all actors within the coastal governance unit, to provide a complete picture on the dynamics of climate change governance along Kenya's coast.

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