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A communication framework for climatic risk and enhanced green growth in the eastern coast of Ghana

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ABSTRACT

Progresses made in global responses to climate change shows that adaptation is gradually finding its way into development planning, yet delays are generally expected from competing priorities of several sectors, policy and knowledge challenges. To understand these dynamics, a pathway for enhanced climatic risk communication, which is a form of a non-structural adaptation, was analyzed in Ghana's coastal zones. Two learning platforms, the Community-based Risk Screening Tool for Adaptation and Livelihoods (CRiSTAL), and U-Learning (Theory U-Process) were used to engage the state level policy-making process in governing development within coastal zones in the face of increased climatic risks and climate change impacts. Local livelihood priorities showed that a national level development planning framework that excluded local contexts of climatic risks face possible maladaptation. Subsequently the process that was engaged in the local contextualization of climatic risks and development in selected Districts culminated in the consensus framework, Coastal Zone Green Growth (CZGG), informed mostly by concerns over clean energy usage and ecologically compatible use of coastal resources. Therefore the CZGG potentially provides co-benefits for enhanced ecosystem services, livelihoods and adaptation. Thus, it constitutes a denominator for measuring climatic risks and adaptation to potentially inform the policy-making process towards sustainable coastal zone management practices. Except for the desired goals of CZGG being far reaching and futuristic, they overlapped with goals of the adaptation strategies of the local population, which are similar to development goals. Therefore communicating localized contexts of coastal climatic risks of which sea level rise is seen often as remote to planning, could strengthen risk management in integrated coastal zone management (ICZM) and enhance resilience of vulnerable communities. However, this will require the designation of a body which is accustomed to the local issues to facilitate, harmonize and coordinate multi-sector actions and diverse stakeholders' interests for the CZGG to become a reality in contributing to ICZM in Ghana.

1. Introduction

Coastal zone resources comprise of human-modified landscapes which include natural resources, agro-ecosystems and valuable ecosystems that deliver critical services to both humans and the environment (Dovie, 2015; Seto, 2011; Stocker et al., 2010). Significant scientific progress has been made globally in understanding coastal systems and processes such as accelerated sea level and storm surges (e.g. Sreeja et al., 2016; Thompson et al., 2014; Chui and Terry, 2013; Appeaning Addo, 2009). The Inter-Governmental Panel on Climate Change (IPCC) in its fifth assessment report (AR5) confirms with high confidence that climate change is the most serious form of global environmental change (IPCC, 2014). The IPCC predicts increased heavy precipitation events, which are very likely to increase in frequency to subsequently augment floods globally (Wong et al., 2014). The floods will affect life and livelihoods in human settlements in all areas such as in coastal zones, and will intensify the already existing severe socioeconomic conditions especially for poor people (Bates et al., 2008; Stocker et al., 2010). Although the pattern of flooding across all continents has been changing and impacts particularly felt differently depending on location and time (Najafinasab et al., 2015; Jonah, 2015; Nicholls, 2004), coastal zone planning remains static in most countries. This is partly due to continued pressure from human populations in area of habitation (e.g. Fatorić and Chelleri, 2012) and lack of under-

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standing of the interface between coastal resources and human dimensions of planning which hardly examines coastal risks as partly the problem of climate change (Codjoe and Afuduo, 2015). The limited access to basic facilities, inadequate income diversification and absence of social and natural capital are further driving the adaptive capacity of the already vulnerable populations that rely on family networks and migration as observed in Pakistan to respond to climatic risks (Salik et al., 2015).

Differences in priorities at various levels of governance and interests have notably undermined coastal zone planning and inclusion of global level challenges such as climate change (Moss et al., 2013; Measham et al., 2011; Tompkins et al., 2008). Generally there is difficulty in translating climate change issues into local planning contexts to overcome the administrative boundaries and externalities that characterize "regional planning model" (IPCC, 2014; Macintosh, 2013; Dominguez et al., 2012; Adger et al., 2007). A right based approach to planning as an alternative planning model emphasize access to livelihood resources but in a sustainable manner (Broto et al., 2015), which ties with the emerging concepts of Green Economy and Green Growth (UNEP, 2011). Therefore a planned adaptation as part of a coastal zone planning framework represents enhanced ecosystem services, promoting sustainable resource use, improved local economies and livelihoods. Thus, towards achieving reduced exposure of coastal systems and increased efficiency, rapid ecologically sensitive inputs or waste inputs, towards the health of the physical environment as determinant of ecosystem health and human well-being (Barbier, 2014; Sterner and Damon, 2011; Barton, 2009). Green economy is defined as the increased investment in natural capital towards sustaining alternative models for economic and social development that result in green or sustainable growth (Munang et al., 2011). The green economy principles integrate environmental and social considerations in macro-economic planning and policy-making in consonance with climate change, whilst maintaining and enhancing ecological systems for continued provision of services, such as food and fiber (Spalding et al., 2014). Because coastal zones are critical ecosystems, poor land use planning can lead to maladaptation of both humans and the environment. Maladaptation refers to adaptation measures that fail to reduce vulnerability and rather increase it (UNFCCC, 2007). For example the case of the overtopping of sea defense walls in parts of the Keta shoreline of Ghana (Appeaning Addo, 2009), which create pools of water in settlements from high velocity flows that inundate large areas (McGranahan et al., 2007) and cause further harm to settlements. Similarly, measures that prevent or avoid maladaptation may be structural and involve physical infrastructure or non-structural that includes soft measures such as policies and legislation, and the withdrawal of laws such as prohibitive forest legislation and relaxing building regulations and codes for swamp development can inadvertently increase destruction of mangroves (UNFCCC, 2007).

Therefore the failure of development planners to understand the specific interests of society in integrating climatic risks in their planning process undermines adaptation and mitigation efforts (Measham et al., 2011; Halsnæs and Trærup, 2009; Tompkins et al., 2008; Halsnæs and Verhagen, 2007). Whilst AR5 acknowledges advances made globally to respond to the impacts of climate change by adopting planned adaptation in the development planning processes, no such evidence exists for coastal zones on non-structural measures which the paper seeks to explore. Therefore, there is need for a learning process that engages those whose livelihoods are at risk and managers of local resources, and simplifying how climate change issues in coastal zones are contextualized in the planning process in bringing about change. Therefore there is a huge gap in knowledge on the state of climatic risk within the coastal zones which also provides an opportunity to develop new approaches to envision Integrated Coastal Zone Management (ICZM) in Ghana. It will involve strengthening citizenry participation in adaptation decision making with duty-bearers yet currently existing platforms are haphazard and less effective to support this infusion. Subsequently, this study was designed to analyze and understand different interpretations of climatic risks for informing a process-based local level planning and climatic risk communication framework.

1.1. Vulnerability of coastal zone resources to climatic risks

Coastal zones constitute cultural and biological systems and therefore having major stake in coastal zone management (Fatorić and Chelleri, 2012; Leichenko and O'Brien, 2008). Significant increases in the stress on coastal resources and risks of coastal flooding have been reported in the last decade, which is partly the result of population growth, driven further by rural – urban migration for city jobs which include street hawking, market porters, industry and hospitality assistants, yet characterized by poverty (Dovie, 2015; Stocker et al., 2010). Whilst the fragility of coastal systems already raises difficulties about which planning model is more suitable for coastal zone management the added pressure of climate change will introduce elements of uncertainty in development policy instruments (Bates et al., 2008; IPCC, 2007; Nicholls et al., 2007). In Africa in particular, as poverty drives the population to urban coastal areas (Small and Nicholls, 2003), Ghana's migrant population to coastal areas face increased exposure and increased risks from flooding due mainly to limited adaptive capacity associated with poor economic conditions (Codjoe and Afuduo, 2015). The IPCC acknowledges that although adaptation measures are available locally within coastal zones, the options have to be urgently weighed for their relevance (Wong et al., 2014). This is because some of the measures usually take root in global frameworks such as the National Action Plans of Adaptation (NAPA), and is often structurally challenged with the extent of engagements, dialogue and consultation, thus depriving the local context of planning, described sometimes as institutional traps (Biermann et al., 2012; Lebel et al., 2011). In Ghana, the National Climate Change Adaptation Strategy (NCCAS) for instance replaces NAPA which is for least developed nations, to match the Medium Term Development Plan (MTDP) and governance systems of institutions and having a stake in planning (GoG/UNDP/EPA, 2010). However, higher-level political objectives may connect and appeal better to local stakeholder interests if such plans originated from local contexts (Karrasch et al., 2014; Nursey-Bray et al., 2014; Larsen et al., 2012).

Ghana's Third National Communication (TNC) to the UNFCCC emphasized continual warming of the climate accompanied by rainfall uncertainty and unpredictability (GoG, 2015). Over 25% of Ghana's population live in coastal zones which are also highly urbanized and often prone to oceanic disasters (Ghana Statistical Service, 2013). Of this, 2.4% live in areas covering 1,110 km^2 which is at risk of sea-level rise (Ghana Statistical Service, 2008), in the face of increased predicted precipitation for most of southern Ghana (Minia, 2004). The TNC further confirms the south-eastern coast of Ghana as most receptive to the adverse impacts of accelerated sea level rise of which the inundation of farms, fish stock reduction, infrastructure loss, and freshwater pollution have been the major impacts (GoG, 2015). Yet Ghana like many countries in the South relies heavily on climate sensitive sectors such as agriculture including fisheries, forestry and energy which are highly requiring of adequate planning attention (World Bank, 2010). In spite of this, the biophysical environment did not receive the needed attention in planning until 2009 when the Ghana Shared Growth and Development Agenda (GSGDA) was launched (GoG, 2010a,b).