Journal of Integrated Coastal Zone Management
Revista de Gestão Costeira Integrada

http://www.aprh.pt/rgci/pdf/rgci-648_Ngoran.pdf | DOI: 10.5894/rgci648

Exploring the Challenges of Implementing Integrated Coastal Management and Achieving Sustainability within the Cameroon Coastline*

Suinyuy Derrick Ngoran[@, 1]; XiongZhi Xue[2]; Anthony Banyouko Ndah[3]

ABSTRACT

Integrated coastal management (ICM) has been accepted as a strategic management approach in achieving sustainable development in coastal areas. As such, many coastal nations, both from the developed and less developed countries have surmounted many challenges of the coastal milieu with a successful implementation of ICM and now enjoy a sound environment and a viable economy. However, a country like Cameroon with a coastline of about 402km still faces a lot of challenges in implementing ICM. According to Article 55 *et seq* of the Constitution, which lays down the general guidelines in matter of decentralization in Cameroon, the State is supposed to devolve upon regional and local authorities, under conditions laid down by law, powers over matters essential to their economic, social, health, educational, cultural and sports development. In reality, devolution of power still remains a nightmare, stifling sustainable coastal development. This paper, therefore, addresses the challenges faced by the State of Cameroon in implementing ICM. The work identifies predicaments/gaps in environmental planning and also makes relevant recommendations in bridging such gaps. In order to attend a desirable degree of sustainability within Cameroon's coastline, real implementation of ICM can only be achieved if sectoral lines are effectively minimized through the enforcement of the decentralization process.

Keywords: Integrated Coastal Management, Sustainable development, Decentralization, Capacity building

RESUMO[§]

Explorando os desafios da implementação de Gestão Costeira Integrada e alcançando a sustentabilidade no litoral dos Camarões

A gestão integrada do litoral (ICM) tem sido aceite como uma de gestão estratégica para alcançar o desenvolvimento sustentável nas zonas costeiras. Como tal, muitas nações ribeirinhas, tanto de países desenvolvidos como menos desenvolvidos, têm superado muitos desafios existentes nos ambientes costeiros através de uma implementação bem sucedida de ICM e desfrutando agora de um ambiente saudável e uma economia viável. No entanto, um país como a República dos

[@] Corresponding author to whom correspondence should be addressed.

[1] Xiamen University, College of the Environment and Ecology, Department of Environmental Sciences and Environmental Engineering, 361102, Xiamen, Fujian Province, China. e-mail: <derrick_ngoran@yahoo.co.uk>

[2] Xiamen University, Coastal and Ocean Management Institute (COMI), College of the Environment and Ecology, 361102, Xiamen, Fujian Province, China. e-mail: <mailto:xzxue@xmu.edu.cn>

[3] Universiti Brunei Darussalam, Faculty of Arts and Social Science, Environmental Studies Program, Brunei. e-mail: <mailto:tonyban83@gmail.com>

[*] *Submission: 15 OCT 2015; Peer review: 28 NOV 2015; Revised: 18 DEC 2015; Accepted: 5 JAN 2016; Available on-line: 6 JAN 2016*

[§] Portuguese versions of title, abstract and captions by Ana Gomes on behalf of the Editorial Board

um litoral de cerca de 402 quilómetros, ainda enfrenta uma série de desafios na implementação do ICM. De acordo com o artigo 55 e seguintes da Constituição, que estabelece as directrizes gerais em matéria de descentralização nos Camarões, o Estado deve dotar as autoridades regionais e locais, nas condições estabelecidas por lei, de poderes sobre assuntos essenciais para o desenvolvimento económico, social, de saúde, educacional, cultural e desportivo. Na realidade, a atribuição destes poderes continua ainda a ser um pesadelo, asfixiando o desenvolvimento costeiro sustentável. Este artigo aborda os desafios enfrentados pelo Estado dos Camarões na execução ICM. O trabalho identifica impasses / lacunas no planeamento ambiental e faz também recomendações pertinentes no sentido de colmatar essas lacunas. Para atingir um grau desejável de sustentabilidade na costa dos Camarões, a implementação da ICM só pode ser alcançada se as linhas sectoriais forem efectivamente minimizadas através da aplicação de processos de descentralização.

Palavras-chave: *Gestão Costeira Integrada, Desenvolvimento Sustentável, Descentralização, Criação de Capacidades*

1. Introduction

The coastal zone of any nation is one of its most valued and contentious areas of real estate, commercial and expanse for industrial development (McKenna *et al.*, 2008). The coastal zone has the greatest aggregation of environmental resource and a physical system in comparison to any other types of bio-geographic units in the world (Sorensen, 2002). Approximately 50% of the world's population lives within 150 kilometers of a coastline (Ngoran, 2014; Ngoran *et al.*, 2015). In the face of mounting pressures, more is needed to build a truly sustainable way of life in the coastal zone. This requires the integration of action in three key areas: economic growth and equity; conserving natural resources and the environment; and social development. Therefore, sustainability interfaces with economics through the social and ecological consequences of economic activity. Sustainable development as defined in important international conferences and by numerous authors is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Ngoran & Xue, 2015; Mebratu, 1998; Van Marrewijk, 2003). It calls for the improvement of the quality of life for the world's population without increasing the use of natural resources beyond the earth's carrying capacity. Based on this definition and numerous studies around the world, the achievement of sustainable development still faces numerous challenges. This is either because of the difficulties inherent to applying sustainable development principles or the misunderstanding and/or misapplication, especially in developing countries.

The coast of Cameroon (figure 1) is of immense biogeochemical and socio-cultural and economic significance. However, unsustainable utilization, poor management and the negative impacts of climate change pose serious challenges to sustainable development. In particular, major resources (mangroves and fisheries) and major socioeconomic activity (Fishing) are directly threatened (Ngoran *et al.*, 2015). The latter is further complicated by the rapid rate of urbanization and a complex politico-administrative setup which is a major source of tension within the coastal milieu and a major

Challenge to sustainable development. As a direct result of these diverse pressures, the physical, chemical, biological and general health of the coastal ecosystem has been negatively affected and the integrity of the ecosystem is seriously endangered. Directly and indirectly, these pressures have significant negative social and economic impacts on the economy of Cameroon. This is due to the fact that Cameroon coastal cities serve as the economic power-house. With continuous degradation of the natural system on the Cameroon coastline, down-warping economy, poverty in all its facets is bound to increase and thus necessitating urgent attention and effective solutions.

In order to curtail the above raised coastal challenges as orchestrated by anthropogenic activities, a multiplicity of different management strategies has been advanced. These management lines include; ecosystem based management which lays more emphasis on transfrontier issues rather than administrative boundaries (Christie *et al.*, 2009; Boesch, 2006; Curtin, 2010), marine spatial planning that is geared at resolving sea use conflict by analyzing and assigning compatible human activities in geo-reference maritime locations (Curtin & Prellezo, 2010; Calado, 2010), marine protected areas; an approach which involves the restriction of human interference within demarcated portion(s) of the sea/ocean in order to protect such designated environments (Pollnac *et al.*, 2001; McClanahan *et al.*, 2006), and functional zoning among others. Despite the multiplicity of coastal management approaches, proponents of sustainable coastal management hold integrated coastal management (ICM) at a very high esteem; reason being that, it looks at the triangular relationship between the environment, the economy and the society (Chua *et al.*, 1992; Xue *et al.*, 2006). The core of this study is therefore to examine the challenges of implementing ICM and how this stifles the attainment of sustainable coastal development in Cameroon.

The rest of the paper is structured as follows; section 2 looks at the methodology and section 3 the study area. Section 4 addresses the coastal challenges, 5 section tallies on the discussion part whereas section 6 draws a logical conclusion.

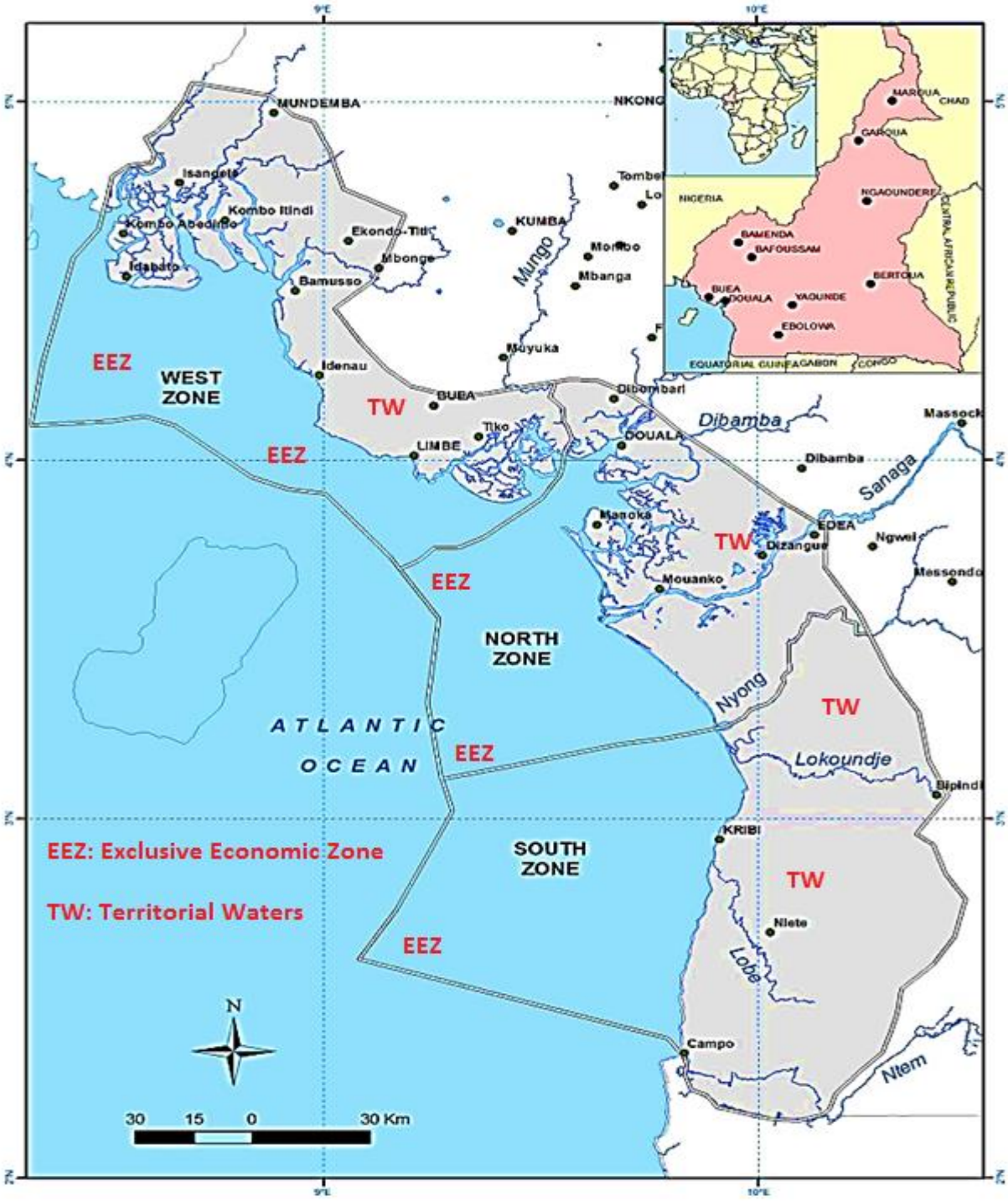

Figure 1 - Location of study area

Figura 1 – Localização da área de estudo

2. Methodology

Existing literature was retrieved from various ministerial departments dealing directly or indirectly with the coastal stretch. The related texts handling concerns of decentralization were obtained from various government ministries.

Data on mangrove status were made available by Ministry of Environment and Nature Protection and Ministry of Forestry and Wildlife in Cameroon. Moreover,

monographs from different ministerial departments were carefully analyzed in order to establish the gaps in management as a result of the sectoral approach.

Annuals from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Deutscher Entwicklungsdienst (DED), the Douala Rural and Urban councils and the Cameroon's Poverty Reduction Strategy Paper were other important sources of information. Existing scientific literature on ICM from the Xiamen University Library was also of paramount importance to this study.

3. Overview of Coastal Issues in Cameroon

3.1. Socioeconomic Setbacks

3.1.1. Urbanization and Industrialization challenges

The coastline of Cameroon being the industrial hub harbors more that 70 percent of the country's industry (Ndjama *et al.,* 2008). Additionally, the most fertile soils are located within the country's coastal milieu. The presence of industries and fertile soils along the coastal stretch serves as a pull factor not only to the hinterland population of Cameroon but also to the population from neighboring countries such as Nigeria, Chad, Gabon, Central Africa Republic, Equatorial Guinea and Congo. Unfortunately, the coastal cities of Cameroon (Douala, Kribi, Limbe and Tiko) face the challenge of accommodating this increasing population as well as catering for their employment needs. The result has been a surge in unemployment rates as well as sprawling habitats. Sprawl and weak socioeconomic status of the population has significant ramifications on coastal resources ranging from poor waste disposal to wanton cutting of mangrove (Figure 2 and 3).

Figure 2 - Poor waste disposal in Quartier Etage Bonaberi, Douala.

Figura 2 – Depósito de lixo em Quartier Etage Bonaberi, Douala.

The concentration of industries along the coast also presents a lot of challenges. Over 80 percent of Cameroon's industry is located in Douala, which is the economic capital of the country. Most of these industries are in their infancy and therefore discharge unwanted material to the immediate environment that ends up polluting the coastal milieu. The occasional occurrence of oil spills from the Société Nationale de Raffinage

Figure 3 - Wanton cutting of mangrove for commercial purposes.

Figura 3 - Corte não controlado de manguezal para fins comerciais.

(SoNaRa), Limbe petroleum plant (located in Cape Limbo) and the Chad – Cameroon pipeline in Kribi, severely impact marine life (Eyebe *et al.,* 2012). Added to oil spills, is the problem of unregulated ballast water discharge which is gradually gaining grounds. Ballast water has the potential of altering micro-ecological habitat in coastal settings, thereby giving room to the propagation of invasive species that can cause considerable economic and environmental impacts (Carlton & Geller, 1993). Fertilizers and chemicals leached from the plantations (cocoa, banana, tea, rubber and palm), have led to increasing eutrophication.

Moreover, the extraction of sand for the building of houses in the coastal zone is on a rise. This activity is mostly carried by the locals without taking into consideration the low topography of the coast. The resultant effect has been seawater intrusion, recurrence of landslides and flooding (Figure 4).

Urbanization and industrialization in reality do not present a potential threat to the implementation of ICM. However, urbanization and industrialization processes that are not well circumscribed by sustainable policies, well formulated and implementable laws are bound to bash ICM implementation into failure. Therefore, it is necessary that decision makers, scientists and other

intervening stakeholders in Cameroon should endeavour to understand the multi-facet problems of unregulated urbanization and industrialization both in short and long term in order to ensure a successful ICM implementation.

Figure 4 - Sand Mining Boanassama Beach, Douala

Figura 4 – Exploração de areia em Boanassama Beach, Douala

ploys over 41 million people worldwide, most of whom are from the developing states (Figure 5). Fish also constitutes an important source of protein, especially for the poor (Finegold, 2009). Unfortunately, the over-exploitation of fishery resources and the use of destructive fishing practices have resulted to a precarity in fish availability. A study conducted by Srinivasan *et al.* (2012) pointed out that Europe and North America are largely the cuprites of fallen fish stocks due to rapid industrialization and early over-exploitation. The latter coupled with population growth in Asia and fast technological change present a bleak future in the availability of fishery stocks. Concerns are also on declining stocks in the Atlantic coast of Cameroon due to foreign overfishing. Additionally, the challenges of fisheries management and poor coastal development in Cameroon are numerous and complex. However, the most common problems are largely attributed to a sectoral and centralized system of governance, little or no collaboration between the management sectors, gaps in the fisheries legislation, scientific research and insufficient expertise in the fisheries (Ndah, 2011)

Dwindling fish stocks on the coast of Cameroon further exacerbate poverty among the fishing communities most of whom are involved in artisanal fishing with very conservative ideas. Advocates of ICM will therefore need to address the challenges linked to the livelihood sustenance of these fishing communities, let alone the gaps in the system of governance.

3.1.3. Ethnic setbacks

3.1.2. Overfishing

Fishery resources contribute significantly to the development of many coastal nations. The fishery sector em-

The population in Cameroon is highly heterogeneous, comprising approximately 250 ethnic groups. Cameroon grass-fielders constitute the majority at 38 percent of the total population (the Bamoun and the Bamileke). The coastal tropical forest peoples, including the

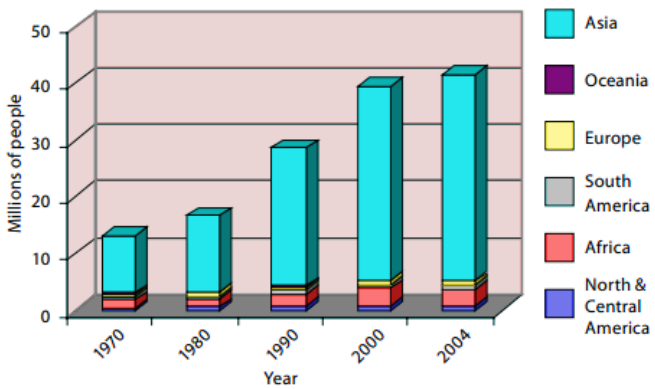

Figure 5 - Employment in fisheries and aquaculture. Source: Finegold, 2009

Figura 5 - Emprego na pesca e da aquicultura. Fonte: Finegold, 2009

Douala, Bassa, and many smaller entities account for about 12 percent of the population. In the southern rainforest, ethnic groups include the Ewondo, Bulu, and Fang and the Maka and Pygmies and account about 18% of the population. The Fulani account for about 14% of the population and the Kirdi account for about

18 percent[*]. The country's ethnic and linguistic diversity is highly projected by politicians as developmental assets. Interviews granted at the ministry of culture indicated diverse ethnicity presents draw backs to development, especially in the domain of power sharing. Easterly & Levine (1997) point out that ethnic diversity can potentially breakdown the economy of a country when different fractions of country feel relegated to the background or largely dominated by a particular tribe. Abbot et al (2001) pinpoint that, attitude and behaviour are key pillars of ethnicity that act as a fridge to development. Therefore, for sustainable coastal management plan in Cameroon, there is need to address ethnic diversity.

3.1.4. Stakeholder participation

Achieving integrated management along the dimensions proposed by ICM is perhaps the most difficult challenge in managing oceans and coastal environment in Cameroon. Bringing together and harmonizing the perspectives of conflicting sectoral government agencies, of different levels of government (each with its own interests, mandates, and perspectives), and of different disciplines (each with different language, outlooks, and methodologies) characterizes the most challenging set of tasks. To achieve integrated management, it is very important to have incentives that promote continued collaboration among ICM entities (Cicin-Sain et al. 1998). Unfortunately, such incentives are nowhere near reality on the coast of Cameroon. Equally important is to offer training and education programs which underscore the interrelationships among coastal and ocean activities, uses, natural systems, and physical processes, and which develop the correct mindsets and skills that coastal managers/decision makers will need in their work (Cicin-Sain *et al.*, 1998). Again, the latter is effectuated on a negligible scale in Cameroon. As Hildebrand (2002) vividly puts it, Water-salty or fresh - is not glue that can join all the stakeholders that have a vested interest in coastal resources and environments. It will always be a challenge to find common ground between stakeholders with vested interests in the non-sustainable development and exploitation sectors (*e.g.*, oil and gas, ports, intensive tourism, mariculture, large-scale commercial fisheries, and hazard-protection works) and pro-conservation stakeholders that promote sustainable development and protected areas.

3.2. Political challenges

3.2.1. Lengthy bureaucracy and corruption

Bureaucracy characterized by a clear division of work with boundaries of responsibilities is imperative for effective coastal management. Most African countries with fragmented institutions are setbacks to governance and management. According to Platteau (2009), the institutional legacy of African countries that was inherited from the colonial masters, still present a lot of loopholes to effective administration. In Cameroon, sustainable coastal management is stifled by lengthy, unclear/inexplicit working procedures. Moreover, the reluctance of most civil servants in exercising their duty further complicates and slows down development within the coastal span. The resultant effect has been rampant corrupt practices as the population tries to circumvent slow administrative modalities. This presents a big impediment in implementing ICM in Cameroon since most bureaucrats tally on their personal gains rather than of the entire nation (Figure 6).

[*] http://www.encyclopedia.com/topic/Cameroon.aspx

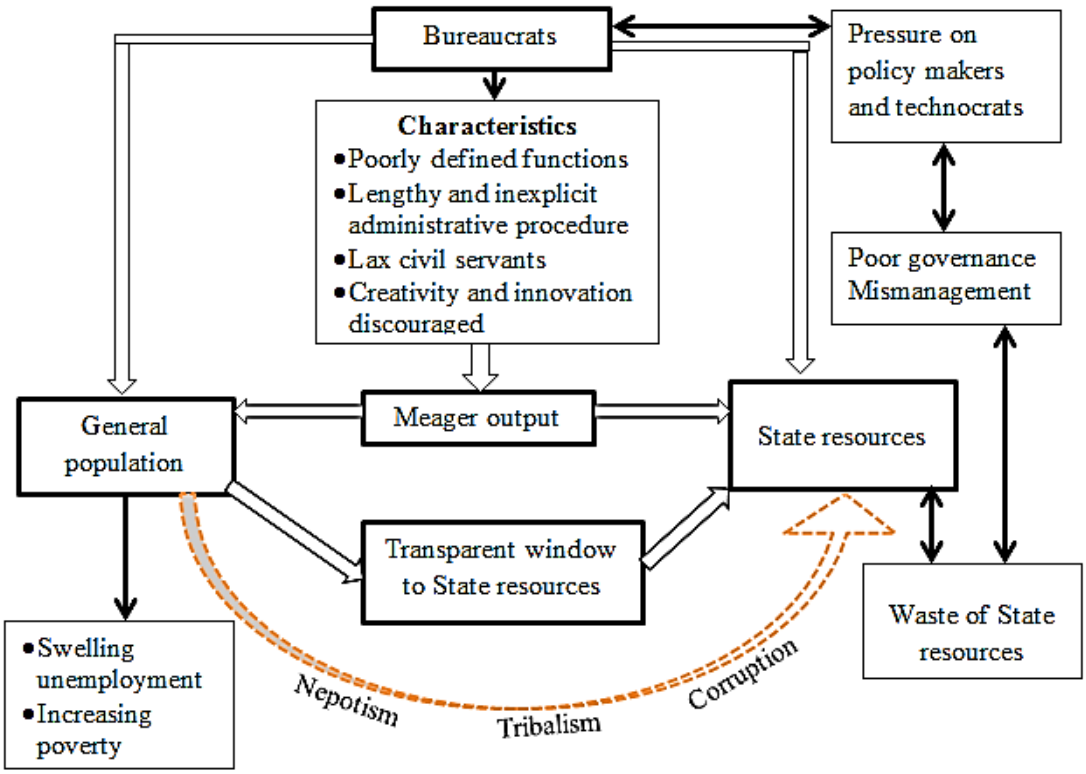

Figure 6 - Adverse effects of bureaucracy.

Figura 6 – Efeitos adversos da burocracia.

Moreover, there is a huge difficulty in hiring and retaining competent program-managers and staff in Cameroon due of low pay and poor working conditions. Cameroonian with needed skills and education go abroad for education and experience and usually stay abroad (brain drain). Also, the over-reliance of Cameroonian on the skills and inputs of foreign consultants though many foreign assistance programs have not been able to instill capacity building that can sustain the ICM process. Additionally, implementation of ICM is often viewed as too expensive by the State of Cameroon.

3.2.2. Paper decentralization

The State embarks on the decentralization process because she wants to bring the government closer to the local population so that they can participate actively in orienting developmental issues of the country (Cheka, 2007). According to Article 55 *et seq* of the Constitution, that lays down the general guidelines in matters of decentralization in Cameroon, the State will devolve upon regional and local authorities, under conditions laid down by law, powers over matters essential to their economic, social, health, educational, cultural and sports development.

In reality, devolution of power still remains a nightmare. The exertion of power by the local authorities is still subject to rigid supervision by the hierarchy. Today, there is still a linear trickling down of power from the presidential level, ministerial level, regional level (governors) to the prefectural level and then, the local authorities (traditional rulers). Though the modalities of implementing effective decentralization are well circumscribed in the constitution, they remain largely on paper. Paper decentralization presents predicaments to the development of the entire country and more especially the densely populated coastal stretch (Figure 7).

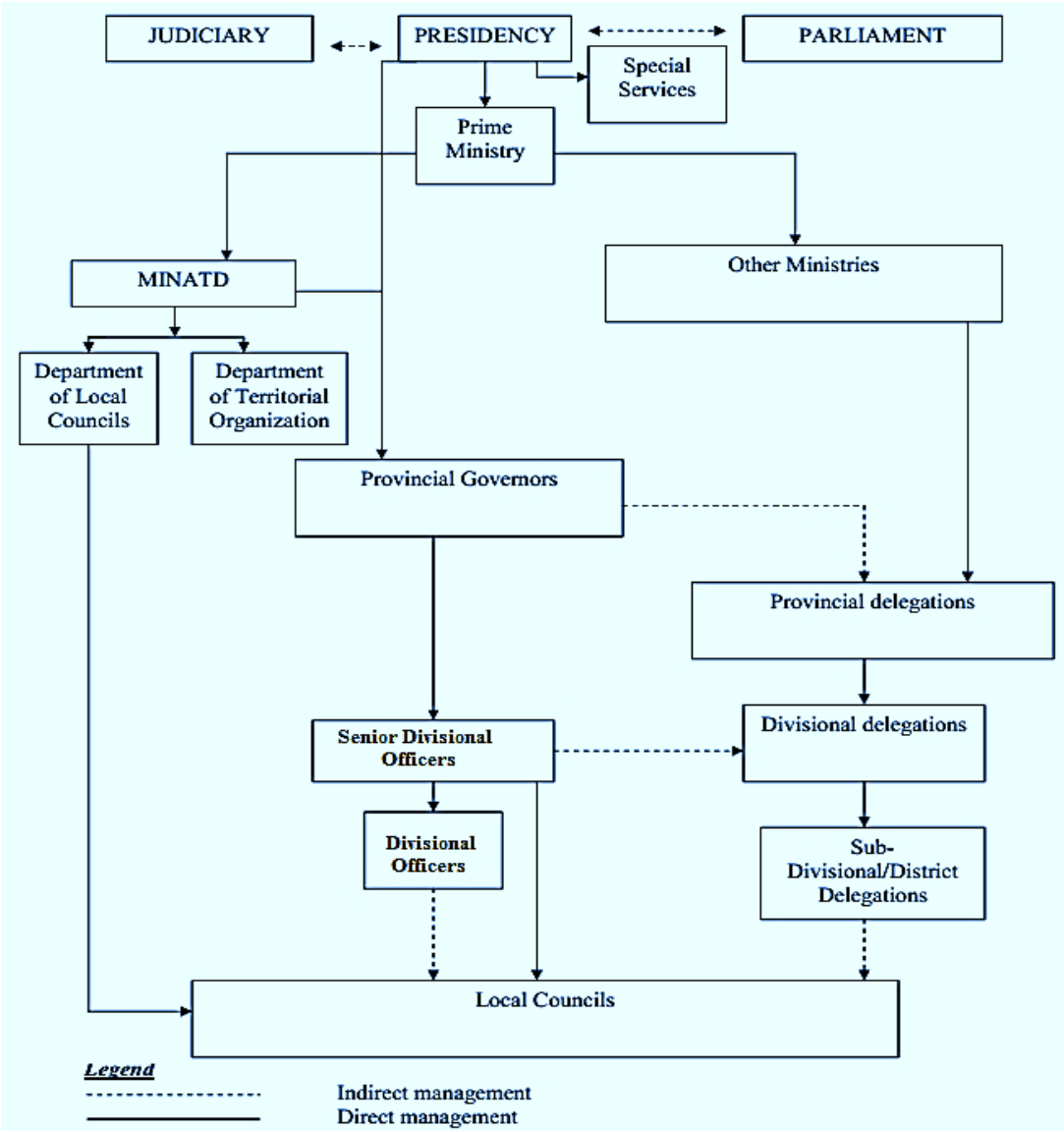

Figure 7 - Administrative setup in Cameroon

Figura 7 - Configuração administrativa dos Camarões.

In other words, the sectoral fragmentation of the environment and resources therein, decision-making is the centred at the national level, with little or no ability actors at the decentralized administrative units to act without authorization from the central government. Thus, because each area has its local characteristics and problems known only by those living and/or working there, management of the Cameroon coast needs to be area-specific, and will be more efficient if decisions are taken at the local level, rather than being decided at the national level.

3.3. Geophysical challenges

3.3.1. Coastal erosion

The coast of Cameroon with increasing population concentration is witnessing rapid coastal habitats, sand and gravel mining, hotel and other infrastructure construction, human settlements, mangrove trees cutting and destruction of vegetal cover and also as a consequence of global warming (coastal erosion-accelerated sea level rise). There is poor planning and control of settlements along the sea front which lead to the loss of beach and landscape aesthetics and therefore reduction of tourism activities (Ajonina, 2008). .

3.3.2. Siltation and sedimentation

Sedimentation and siltation are both naturally occurring erosive processes. However, anthropogenic activities have accentuated these processes resulting to excess accumulation of sediments (artificial sedimentation) that adversely affects coastal/marine organisms on the coastal esplanade of Cameroon. Artificial sedimentation is generally triggered by improper waste disposal from either domestic households or industrial wastes, uncontrolled logging and mining operations, and poorly built and maintained roads (Todd *et al.*, 2010).

According to Otero *et al.,* (2006); Ngoran *et al.* (2015) mangrove forests worldwide retain a natural level of sedimentation at a rate of 0.5 to 1 cm per year on an average and anything above this threshold is considered to be an unnatural rate of sedimentation. Sedimentation becomes harmful to mangroves when portions of their roots become submerged. When this happens, there is less gaseous exchange between the roots and the water that surrounds them, thereby reducing the ability of the aquatic vegetation to respire and thus preventing an important physiological process. In addition, excess sediment inhibits adequate light from reaching the mangrove roots (Todd *et al.,* 2010). Sedimentation above the accepted threshold on the coast significantly disrupts the life cycle of aquatic organisms and more especially those that survive in brackish medium. Besides the biophysical impairment orchestrated by excess sediment deposition, heavy financial losses are also incurred annually by the Douala port authority in dredging the port area in order to easy anchoring by ships. Due to the bad geomorphological and hydrological situation of the Douala sea port, proponents of ICM will need to surmount the challenge of convincing decision makers that the Douala sea port should be relocated to Limbe with a natural deep habours and calm waves.

4. Discussion

4.1. ICM and economic growth

Integrated coastal management is as recognized a management approach that addresses the problems plaguing the coastal and marine environmental in order to achieve sustainable use of coastal resources. Many works support the fact the ICM frame encompasses indicator of economic growth (Otero *et al.,* 2006). According to a study that seeks to evaluated the socioeconomic benefits without and with ICM implementation in Xiamen, China by Peng *et al.,* 2006, their study indicated that, implementation of the ICM program in Xiamen yielded significant increase of about 40 percent in annual socioeconomic benefit from the marine sectors. Additionally, Ngoran (2014) pointed out that the present value of ICM net benefits in Xiamen from 1995 to 2001 was more than RMB 27 billion. Likewise, Cullinan (2006) indicated that the European Union (EU) most valuable habitats were located in coastal zones, and that the total ecosystem benefits generated by EU coastal zones are worth more in economic terms than the national GDP of many of the smaller EU countries. The study also found out that the estimated gross annual socioeconomic benefits of implementing an integrated approach to coastal management were worth approximately to €4.2 billion

Viewed the economic benefits made with the successful implementation of ICM, it is therefore recommended that the government of Cameroon with other intervening stakeholders should draw valuable lessons from successful ICM cases like the Philippine and China

4.2. ICM and policy enhancement

According to Shi *et al.* (2001) ICM is an approach that provides strong legal and institutional framework to effectively address hot environmental issues such as pollution control, biodiversity protection and the management of multiple agencies' conflicts. Xue *et al.* (2011) points out that the implementation of ICM underscores the establishment of a unified mechanism that better coordinates government responsibility, re-orient the responsibilities of various government departments and gives them purposeful and sustainable vision in addressing coastal/marine problems, establishes a better licensing, charging and penalty systems to keep the activities of coastal users in checked. Chua & Scura

Table 1 - Summary of coastal challenges in Cameroon

Tabela 1 – Síntese dos desafios costeiras em Camarões

Attributes	Category	Events and Impacts
Socioeconomic Setbacks	Urbanization and industrialization challenges	- Habours 70 percent of the country's industry - Industries and fertile soils attract people from the hinterland and neighbouring countries. - Inadequate infrastructure and employ opportunities has resulted to trending pressure on coastal resources
	Over fishing	- Sectoral and centralized system of governance, little or no collaboration between the management sectors, gaps in the fisheries legislation, scientific research and insufficient expertise in the fisheries - Dwindling fish stocks exacerbate poverty among the fishing communities
	Ethnic setbacks	- The population in Cameroon is highly heterogeneous - ethnic diversity can potentially breakdown the economy of a country when different fractions of country feel relegated to the background or largely

		dominated by a particular tribe - Attitude and behaviour are key pillars of ethnicity that might act as a fridge to development (see main text)
	Stakeholder participation	- Bringing together and harmonizing sectoral government agencies and different disciplines is the most daunting characteristic for a successful ICM in Cameroon
Political challenges	Lengthy bureaucracy and corruption	- Fragmented institutions are setbacks to governance and management - The reluctance of civil servants in accessing their duty further complicates and slows down coastal development
	Paper decentralization	- Decision-making is the centred at the national level with little or no ability actors at the decentralized administrative units to act without authorization from the central government
Geophysical challenges	Coastal erosion	- Poor planning and control of settlements along the sea front has led to the loss of beach and landscape aesthetics - Increase Sand and gravel mining, hotel and other infrastructure construction, human settlements, mangrove trees cutting due to increasing population
	Siltation and sedimentation	- Sedimentation is harmful to mangroves when portions of their roots become submerged. Submerge roots reduces the ability of the aquatic vegetation to respire and thus prevent important physiological process.

(1992) supports Xue's idea by stating that ICM implementation leads to improvement in coastal governance via strategic planning, policy and management integration and interagency coordination.

Contrary to the above authors, the successes in implementing integrated coastal management tallies on government's effort. For instance in China, the entrusting of more powers by the central government to local governments to address environmental degradation, implement new environmental laws in the late 80s, paved the way for the Xiamen ICM program (Ngoran, 2014). Moreover, the opening up of the Chinese government to key stakeholders (Global Environment Facility (GEF), the United Nations Development Programme (UNDP), International Maritime Organization (IMO), Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS) and Programme on Partnerships in Envi-

ronmental Management for the Seas of East Asia (PEMSEA) can't be left out. Likewise, the devolution of power by the Philippine government to local governments fostered increased stakeholders involvement in the management of coastal resources and hence, the success stories behind the Batangas Province ICM (Ngoran, 2014).

Lessons from the aforementioned examples could be adapter in order to bolster the uncoordinated and fragmented administrative system in Cameroon, especially along the coastal milieu.

4.3. ICM and environmental protection

The burgeoning world's population is exerting increasing pressure on coastal areas and there is need of a suitable management approach to arrest the ongoing situation. The integrated coastal management framework

therefore stands as one of the best management approaches to curtail nefarious human activity in coastal areas. What makes ICM an outstanding management program is the fact that it encompasses issues dealing with environmental protection, economic and pressing societal needs (Ngoran, 2014). For instance, Xiamen Island before the implementation of ICM was vicinity characterized with trending sewage disposal, the fecal coliform count exceeded maximum accepted standards in the Yuandang Lagoon and Maluan Bay; summarily, Xiamen Island was experiencing a severe environmental crisis (Peng *et al.*, 2011). Fortunately, there was a paradigm shift in Xiamen's environmental situation when it finally assimilated ICM implementation in 1994. Nowadays, Xiamen due to its environmental quality is a pivotal place not only for tourist from within China, but from other parts world (Ngoran & Xue, 2015). Due to the environmental standard in Xiamen, it has been designated by governmental officials and some renowned scholars as; National Sanctuary City, National Garden City, China's Outstanding Tourist City, and one of the Top 10 Liveable Cities in China.

The achievements emblem in Xiamen ICM should serve as an eye opener to decisions makers and politicians in Cameroon to quickly embrace the ICM approach. With such a gear, the fast degrading coastal stretch of Cameroon stands a chance of recovering.

4.4. The need to strengthen municipal participation in environmental and resource management

The Douala city council and all subsidiary councils within the coastal stretch (Buea, Limbe, Tiko etc.) should be key players in integrated management of the Cameroon estuary, whose role is not only limited to improving the urban space and develop road networks. Thus, they must put environmental considerations at the fore, and integrate the principles of sustainable development into their planning process, which is done in concertation with other stakeholders, including communities and governmental and non-governmental agencies. Therefore, by balancing social, economic and environmental activities, the Douala municipality will pave the way to achieving environmentally sustainable urban development and a sustainable community.

4.5. The need to realize the full potential of the coastal ecosystem

From the foregone discussions, it is evident that the full potential of the Cameroon coastline is currently not realized, and has been compromised by poor management and the quest for short term financial benefits. Coastal ecosystems and their associated wetlands are important centres for ecotourism due to their attractive landforms and species diversity. Therefore, effective management of the Cameroon coast through ICM has the potential to boost the tourism industry which is an important source of Government revenue and an important employer of the numerous unemployed or under-employed in Douala. However, despite the fact that Douala has the tourism potential, presently, the city is not on the list of cities local and international tourists consider visiting. Therefore, the Cameroonian authorities should evaluate what they are currently losing, and consider what they stand to gain by adopting integrated management.

Moreover, around the world, coastal areas have been identified as some of the most agriculturally productive systems. Much of the rice consumed around the World is cultivated in the estuaries in Southeast Asia, for example, in Vietnam, Cambodia, Thailand, Laos, China, etc. These estuaries have similar climatic and environmental characteristics as the Cameroon estuary, and in most cases, more than twice as much people. Therefore, rather than letting the uncontrolled colonization of wetlands for residential purposes go unabated, the municipal authorities and policy makers in Cameroon should consider utilizing some of these wetlands for rice cultivation by drawing from the experience of Asian nations. The adverse environmental impacts of agriculture in the fragile wetlands should however be taken into cognizance, and effective measures out in place to minimize such impacts while maximizing the benefits derived from the activity. In order to do this, numerous people must be displaced from what they currently consider their homes, in the wetlands. Therefore, in order not to create a social unrest, these wetland settlers should be resettled in further from the coast where there is abundant high ground covered with forest. In this sense, coastal managers should consider steering the growth and development of the city further inland in order to reduce anthropogenic pressures on the estuarine environment.

It should be noted that rice is the most consumed staple food and fish is the most consumed source of protein in Cameroon. Therefore, the importation of these are a major drain to the state treasury, further plunging Cameroon into poverty, with the already over-stretched citizens suffering from increasing costs of living. It is therefore not surprising that the February 2008 general unrest in the Country resulted from the skyrocketing costs of these basic products, notably rice and fish. Rice and fish rank high on the country's list of imports.

4.6. The need for capacity building integrated coastal management

"Capacity building" is a central concept in Agenda 21 and in other United Nations Conference on Environment and Development (UNCED) agreements. As defined by the UN Development Programme (UNDP) and the UN Division of Law of the Sea (UNDOALOS) in 1994, "capacity-building encompasses human resource development, the development of organizations and endorsing the emergence of an overall policy environment favorable to the generation of suitable responses to emerging needs" (UNDP/UNDOALOS, 1993). A less formal delineation of capacity building in the context of integrated coastal management might be; the design and conduct of the range of activities essential to enhance the capacity of institutions and the individuals that comprise them to accept effective ICM programs. It could be argued that the objective of capacity building effort should be to create an environment wherein outside or external assistance is no longer needed, that is, to have educational and training facilities in place that will meet the needs for skilled ICM professionals in a specific nation.

Perceived in this way, the goal would be to create the capacity in-country (or on a regional basis) in universities and in training centers to produce people with the necessary skills. The challenge, then, is to select the range of skills required and to assist the in-country educational facility in gearing up to meet these newly identified needs. This usually means the design and design of new courses, the production of training materials (texts, notes, cases, etc.), and working with the faculty and/or instructors that will be involved in conducting the fresh programs (Cicin-Sain *et al.*, 1998).

Such capacity building however should be organized in such a way as to include already established policy-makers, scientists, and scholars, as well as young students, who should be trained at the very base on multi-disciplinary skills and the art of working successfully with multiple stakeholders a common sustainable development objective.

Cameroon can also draw inspiration from the major implementation actions inherent to ICM and their achievements, based on specific examples in South East Asia.

5. Conclusion

In this research article, we have expatiated on the factors constraining the implementation of ICM and hence the attainment of sustainable development in Cameroon. Moreover, relevant points have been advanced to buttress the gaps in coastal management as punctuated by sectoral management. There is a need for Cameroon to change from the current development approach. That is, a paradigm shift from the sectoral GDP-centred to an environmental/society-focused approach, while adopting integrated management for the sustainable management of coastal resources. In order to attend a desirable degree of sustainability within Cameroon's coastline, real implementation of ICM can only be achieved if sectoral lines are effectively minimized through the enforcement of the decentralization process as stipulated in to Article 55 *et seq* of the Constitution.

References

Abbot, J.I.; Thomas, D.H.; Gardner, A.A.; Neba, S.E.; Khen, M.W. (2001) - Understanding the links between conservation and development in the Bamenda Highlands, Cameroon. *World Development*, 29(7):1115-1136. DOI: 10.1016/S0305-750X(01)00033-X

Ajonina, G.N. (2008) - *Inventory and Modelling Mangrove Forest Stand Dynamics Following Different Levels of Wood Exploitation Pressures in the Douala-Edea Atlantic Coast of Cameroon, Central Africa*. Doctoral dissertation, Faculty of Forest and Environmental Sciences, Albert-Ludwigs-Universität Freiburg.

Ayissi, I.; Ajonina, G.N.; Angoni, H. (2014) - Status of Large Marine Flagship Faunal Diversity Within Cameroon Estuaries of Central African Coast. *In:* Salif Diop, Jean-Paul Barusseau, Cyr Descamps (eds.), *The Land/Ocean Interactions in the Coastal Zone of West and Central Africa*, pp.97-107, Springer International Publishing. ISBN: 978-3319063874. DOI: 10.1007/978-3-319-06388-1_9

Baird, R. (2005) - On sustainability, estuaries, and ecosystem restoration: the art of the practical. *Restoration ecology*, 13(1):154-158. DOI: 10.1111/j.1526-100X.2005.00019.x

Boesch, D.F. (2006) - Scientific requirements for ecosystem-based management in the restoration of Chesapeake Bay and Coastal Louisiana. *Ecological Engineering*, 26(1):6-26. DOI: 10.1016/j.ecoleng.2005.09.004

Calado, H.; Ng, K.; Johnson, D.; Sousa, L.; Phillips, M.; Alves, F. (2010) - Marine spatial planning: lessons learned from the Portuguese debate. *Marine Policy*, 34(6):1341-1349. DOI: 10.1016/j.marpol.2010.06.007

Carlton, J.T.; Geller, J.B. (1993) - Ecological roulette: the global transport of non indigenous marine organisms. *Science*, 261(5117)78-82. DOI: 10.1126/science.261.5117.78

Cheka, C. (2007) - The state of the process of decentralisation in Cameroon. *Africa Development*, 32(2):181-196. DOI: 10.4314/ad.v32i2.57187.

Christie, P.; Pollnac, R.B.; Oracion, E.G.; Sabonsolin, A.; Diaz, R.; Pietri, D. (2009) - Back to basics: An empirical study demonstrating the importance of local-level dynamics for the success of tropical marine ecosystem-based management. *Coastal Management*, 37(3-4):349-373. DOI: 10.1080/08920750902851740

Chua, T.E.; Scura, L.F. (eds.) (1992*)* - *Integrative Framework and Methods for Coastal Area Management.* Proceedings of the Regional Workshop on Coastal Zone Planning and Management in ASEAN: Lessons Learned, 169p., Bandar Seri Begawan, Brunei Darussalam, WorldFish. ISBN: 978-9718709320.

Cicin-Sain, B.; Knecht, R.W.; Jang, D.; Fisk, G.W. (1998*)* - *Integrated coastal and ocean management: concepts and practices*. 517p., Island Press. ISBN: 978-1559636049.

Cullinan, C. (2006) - *Integrated coastal management law: establishing and strengthening national legal frameworks for integrated coastal management*. Food and Agriculture Organization of the United Nations, Rome, Italy. Avaible on-line at http://www.fao.org/docrep/012/a0863e/a0863e00.pdf.

Curtin, R.; Prellezo, R. (2010) - Understanding marine ecosystem based management: A literature review. *Marine Policy*, 34(5):821-830. DOI: 10.1016/j.marpol.2010.01.003

Douvere, F. (2008) - The importance of marine spatial planning in advancing ecosystem-based sea use management. *Marine Policy*, 32(5):762-771. DOI: 10.1016/j.marpol.2008.03.021

Easterly, W.; Levine, R. (1997) - Africa's growth tragedy: policies and ethnic divisions. *The Quarterly Journal of Economics*, 112(4):1203-1250. DOI: 10.1162/003355300555466

Eyebe, A.; Simeon, A.E.; Angu, K.A.; Endamana, D. (2012) - *Integrating Biodiversity Conservation into National Development Policy: A case study of Cameroon*. IIED Poverty and conservation learning group Discussion Paper, (09). Avaible on-line at http://pubs.iied.org/pdfs/G03722.pdf.

Finegold, C. (2009) - The importance of fisheries and aquaculture to development. *In:* Wramner, P. ; Cullberg, M. ; Ackefors, H. (eds.), *Fisheries, sustainability and development*, pp.353-364, The Royal Swedish Academy of Agriculture and Forestry, Stockholm, Sweden. Available on-line at http://pubs.iclarm.net/resource_centre/WF_2546.pdf.

Hildebrand, L. (2002) – *Integrated Coastal Management: Lessons Learned and Challenges Ahead*. Discussion document for Managing Shared Water/Coastal Zone Canada 2002. International Conference, Hamilton, Ontario, Canada.

Leslie, H.M.; McLeod, K.L. (2007) - Confronting the challenges of implementing marine ecosystem-based management. *Frontiers in Ecology and the Environment*, 5(10):540-548. DOI: 10.1890/060093

Liu, Z. (2003) - Sustainable tourism development: A critique. *Journal of sustainable tourism*, 11(6):459-475. DOI: 10.1080/09669580308667216

Manga, V.E.; Agyingi, C.M.; Djieto-Lordon, A.E. (2013) - In-channel Sand Extraction in River Mungo, Cameroon: Nature Effects and Concerns. In: Water & Environmental Dynamics, 6th International Conference on Water Resources and

Environment Research Proceedings, pp.11-28, Koblenz, Germany. DOI: 10.5675/ ICWRER_2013.

McClanahan, T.R.; Marnane, M.J.; Cinner, J.E.; Kiene, W.E. (2006) - A comparison of marine protected areas and alternative approaches to coral-reef management. *Current Biology*, 16(14):1408-1413. DOI: 10.1016/j.cub.2006.05.062

McKenna, J.; Cooper, A.; O'Hagan, A.M. (2008) - Managing by principle: A critical analysis of the European principles of Integrated Coastal Zone Management (ICZM*). Marine Policy*, 32(6):941-955. DOI: 10.1016/j.marpol.2008.02.005

Mebratu, D. (1998) - Sustainability and sustainable development: historical and conceptual review. *Environmental impact assessment review*, 18(6):493-520. DOI: 10.1016/S0195-9255(98)00019-5

Ndah, A. B. (2011) - *Sustainable Development Challenges in Cameroon Estuarine complex and Opportunities for Integrated Management: Focus on the fisheries sector*. Masters Thesis, Xiamen University, China. *Unpublished*.

Ndjama, J.; Kamgang, K.B.V.; Sigha, N.L.; Ekodeck, G.; Tita, M.A. (2008) - Water supply, sanitation and health risks in Douala, Cameroon. *African Journal of Environmental Science and Technology*, 2(12):422-429.

Ngoran, S.D. (2014) - *Socio-environmental Impacts of Sprawl on the Coastline of Douala: Options for Integrated Coastal Management*. 172p., Anchor Academic Publishing. ISBN: 978-3954892464

Ngoran, S.D.; Xue, X. (2015) - Addressing urban sprawl in Douala, Cameroon: Lessons from Xiamen integrated coastal management. *Journal of Urban Management*, 4(1):53-72. DOI: 10.1016/j.jum.2015.05.001

Ngoran, S.D.; Xue, X.; Ngoran, B.S. (2015) - The Dynamism between Urbanization, Coastal Water Resources and Human Health: A Case Study of Douala, Cameroon. *Journal of Economics and Sustainable Development*, 6(3):167-181.

Otero, X.L.; Ferreira, T.O.; Vidal-Torrado, P.; Macías, F. (2006) - Spatial variation in pore water geochemistry in a mangrove system (Pai Matos island, Cananeia-Brazil). *Applied Geochemistry*, 21(12):2171-2186. DOI: 10.1016/j.apgeochem.2006.07.012

Peng, B., Chen, W.; Hong, H. (2011) - Integrating ecological damages into the user charge for land reclamation: a case study of Xiamen, China. *Stochastic Environmental Research and Risk Assessment*, 25(3):341-351. DOI: 10.1007/s00477-010-0372-5

Peng, B.; Hong, H.; Xue, X.; Jin, D. (2006) - On the measurement of socioeconomic benefits of integrated coastal management (ICM): Application to Xiamen, China. *Ocean & coastal management*, 49(3), 93-109. DOI: 10.1016/j.ocecoaman.2006.02.002

Platteau, J.P. (2009) - Institutional obstacles to African economic development: State, ethnicity, and custom. *Journal of Economic Behavior & Organization*, 71(3):669-689. DOI: 10.1016/j.jebo.2009.03.006

Pollnac, R.B.; Crawford, B.R.; Gorospe, M.L. (2001) - Discovering factors that influence the success of community-based marine protected areas in the Visayas, Philippines. *Ocean & Coastal Management*, 44(11):683-710. DOI: 10.1016/S0964-5691(01)00075-8

Pomeroy, R.; Douvere, F. (2008) - The engagement of stakeholders in the marine spatial planning process. *Marine Policy*, 32(5):816-822. DOI: 10.1016/j.marpol.2008.03.017

Shi, C.; Hutchinson, S.M.; Yu, L.; Xu, S. (2001) - Towards a sustainable coast: an integrated coastal zone management framework for Shanghai, People's Republic of China. *Ocean & coastal management*, 44(5):411-427. DOI: 10.1016/S0964-5691(01)00058-8

Xue, X.; Hong, H.; Charles, A.T. (2004) - Cumulative environmental impacts and integrated coastal management: the case of Xiamen, China. Journal of Environmental Management, 71(3):271-283.