

Ngoran, Suinyuy Derrick; Xue, XiongZhi

Article

Addressing urban sprawl in Douala, Cameroon: Lessons from Xiamen integrated coastal management

Journal of Urban Management

Provided in Cooperation with:

Chinese Association of Urban Management (CAUM), Taipei

Suggested Citation: Ngoran, Suinyuy Derrick; Xue, XiongZhi (2015) : Addressing urban sprawl in Douala, Cameroon: Lessons from Xiamen integrated coastal management, Journal of Urban Management, ISSN 2226-5856, Elsevier, Amsterdam, Vol. 4, Iss. 1, pp. 53-72, <https://doi.org/10.1016/j.jum.2015.05.001>

This Version is available at:

<https://hdl.handle.net/10419/194415>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

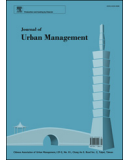
Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by-nc-nd/4.0/>



Research Article

Addressing urban sprawl in Douala, Cameroon: Lessons from Xiamen integrated coastal management

Suinyuy Derrick Ngoran^a, XiongZhi Xue^{b,*}

^aDepartment of Environmental Sciences and Environmental Engineering, College of the Environment and Ecology, Xiamen University, 361102 Xiamen, Fujian Province, China

^bCollege of the Environment and Ecology, Coastal and Ocean Management Institute (COMI), Xiamen University, 361102 Xiamen, Fujian Province, China

Received 29 March 2015; received in revised form 27 May 2015; accepted 29 May 2015

Available online 12 June 2015

Abstract

This paper addresses the dynamics surrounding urban sprawl on the coastline of Douala, Cameroon. Douala is the economic capital, main seaport and the industrial nerve of Cameroon. Also, Douala harbours about 80% of the Cameroon's industries. Due to the centralized nature of economic activities in Douala by the State, urban development is more noticeable here than any other city in Cameroon. The fast developing nature of the city coupled with limited human/physical capital and poor management policies have resulted to intense anthropogenic pressure on coastal resources.

This article examines the key actors shaping the urban planning process in Douala and expatiates on the gaps constraining sustainable urban planning in Cameroon. Moreover, Xiamen's socio-economic and environmental outlook before and after the implementation of integrated coastal management (ICM) is discussed. It is showcased that, the delegation of additional powers to local governments to implement new environmental laws and accepting of bilateral and multilateral assistance by the Chinese Central Government served as a crunch since the introduction of ICM. Moreover, the political will bestowed by the Xiamen municipal authorities, the participation and inculcation of relevant participants/stakeholders, the establishment of a multi-agency council and the acquisition of sea-use zoning scheme are all key points that symbols Xiamen's ICM accomplishment. Today, with the successful implementation of ICM, Xiamen has built dual status of a vibrant economy and comprehensive ecological environment.

The conclusions of this effort portray that sprawl in Cameroon is caused by inadequate policy implementation, outdated master plan, insufficient information, disparity in resources distribution among the different regions of the State and the gaps expounded by the traditional management. Grounded in the knowledge drawn from Xiamen ICM, the paper recommends the creation of an autonomous coastal interagency in Douala to address the gaps disrupted by sectoral management, and thus, improve coastal management in Cameroon.

© 2015 Zhejiang University and Chinese Association of Urban Management. Production and Hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Keywords: Integrated coastal management; Urban sprawl; Urban planning; Douala; Cameroon

*Corresponding author.

E-mail addresses: derrick_ngoran@yahoo.co.uk (S.D. Ngoran), xzxue@xmu.edu.cn (X. Xue).

Peer review under responsibility of Zhejiang University and Chinese Association of Urban Management.

1. Introduction

Globally, coastal areas are convergence zone for human settlements. On a universal scale, coastal areas cover about 20 percent of the Earth's surface, yet they harbour almost 50 percent of human population living within 200 km of the coast (Derrick Ngoran & XiongZhi, 2013). The continuous occupancy of the coastal environment with limited resources and increasing economic hardship has resulted in an uncoordinated spatial layout of urban settlement, labelled urban sprawl. Urban sprawl, though not a new phenomenon, remains a daunting challenge for most policy makers in the world. Cameroon, a country located in central Africa is not an exception to sprawl. The challenge is further compounded by the fact that urban sprawl is not well circumscribed as there is no universally accepted definition for it.

This study, therefore, addresses the gaps in Cameroon's urban planning with Douala City being the case in point. Douala is the economic capital, main seaport of Cameroon and the industrial nerve of Cameroon. Douala city harbours about 80% of the Cameroon's industries (Ngoran, 2014). Due to the centralized nature of economic activities in Douala by the State, the city has witnessed a tremendous growth more than any other city in Cameroon. The fast developing nature of the city coupled with limited human and physical capital and poor management policies have resulted to intense anthropogenic pressure on limited coastal resources.

Integrated coastal management (ICM), a successful urban planning approach as exemplified in Xiamen City is also x-rayed and valuable lessons from this approach are recommended to urban planners in Cameroon.

The rest of the article is structured as follows: Section 2 gives an overview of key terminologies and typifies the urban outlook in Douala. Section 3 looks at the stakeholders involved in the urban planning process in Cameroon. Section 4 presents the gaps in urban planning while Section 5 showcases the strength of ICM in urban planning and draws a logical conclusion.

2. Overview

2.1. Roots of urban sprawl

According to Wassmer (2002), the term, "urban sprawl", was first used in 1937 by Earle Draper of the Tennessee Valley Authority (TVA), USA, in a national conference of planners. At this conference, Earle Draper considered urban sprawl to be both an unaesthetic and uneconomic manner of settlement. The first time urban sprawl was used in an opening paragraph of an article was by the sociologist, William Whyte, in Fortune magazine in 1958 (Wassmer, 2002). The Real Estate Research Corporation inaugurated in 1974 in USA, presented a contentious debate on positive and negative effects of sprawl (Real Estate Research Corporation, 1974). Franz, Maier, and Schröck (2006) argues that the public and policymakers often use the term as a medical analogy where urban sprawl is seen as a disease with undesirable symptoms. Many cures are offered for this disease, but there is no solid understanding of the underlying causes and mechanisms.

Today, urban sprawl, though not a new phenomenon, continues to be a serious challenge to most governments around the world and more specifically to lesser developed nations as well as countries witnessing rapid economic growth.

2.2. Definition of urban sprawl

The term "urban sprawl" is difficult to define precisely due to the amount of ambiguity, misunderstanding and confusion associated with the term in different fields of studies. According to Lechner and Maier (2009), the term urban sprawl is so abused that it lacks a precise meaning and defining "sprawl" has become a methodological quagmire. Maier, Franz, and Schrock (2006) advanced six reasons to substantiate while urban sprawl is so difficult to define.

- Causes, characteristics, and consequences of sprawl are ill-defined.
- It is hard to distinguish sprawl from related terms, such as suburbanization, urban growth, or suburban development.
- The term is used in a scientific context as well as in public and political discussions. Also, it is used by the various scientific disciplines in different manners and from different perspectives.
- The term is so broad, that it leaves plenty of room for interpretations/misinterpretations.

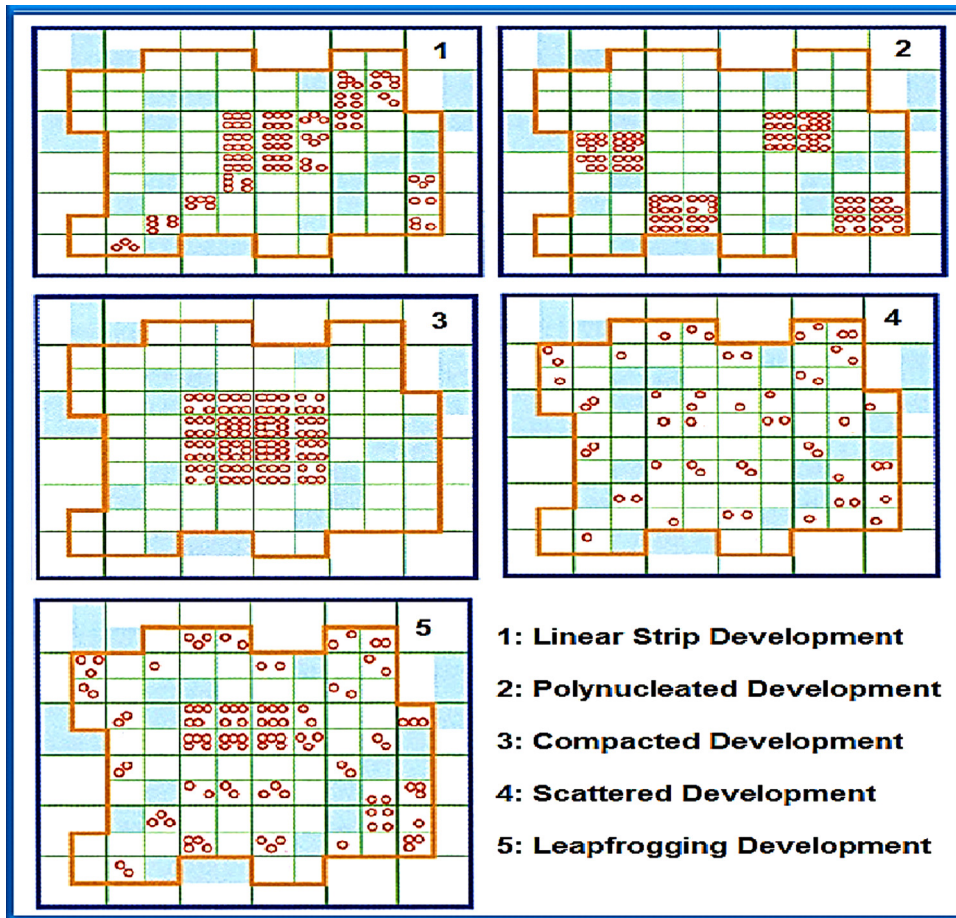


Fig. 1. Physical patterns defining sprawl (Derrick Ngoran and XiongZhi, 2013).

- There is no agreed upon way of measuring sprawl, due partly to the lack of a generally accepted definition in the first place, creating a vicious ideological circle.
- The term is used for characterizing a situation as well as a process, which invites further confusion.

Wolman et al. (2005) make a classification of the different forms of physical settlements that are connected to what can be termed urban sprawl (Fig. 1). This classification of sprawl depicts eight components: density, continuity, nuclearity, clustering, concentration, centrality, land use mix, and proximity. These components can all be detected in a clear demonstration of the patterns of urban sprawl. Wolman et al. (2005) point out that at a more compact end of the city, of suburban¹ growth can be seen as sprawl. Scattered, or “leapfrog”, development is another piece of terminology that helps elucidate sprawl (Ngoran, 2014). This “leapfrog form” is characterized by a discontinuous urban development from the central core of an urban area, with the intervening areas interspersed with vacant land. Other forms that are classified as sprawl include compact growth around a number of smaller centres (polynucleated development), and linear urban forms, such as strip development, along major transport routes (Besussi, Chin, Batty, & Longley, 2010).

Olujimi (Dagger, 2003) circumscribes urban sprawl as the external spread of built-up areas caused by their expansion. The expansion of the urban area is towards its country-side that surrounds it. The urban sprawl is believed to be one of the by-products of urbanization. As for environmentalist organizations, the focus is on aspects such as the destruction of the natural ecosystem and climate change. For instance, the Federation of Ontario Naturalists (2002) cited in Osolen and Lister (2004) defines sprawl as the loss of natural areas and productive farmland to urban

¹Suburban growth is defined as the contiguous expansion of existing development from a central core.

development rather than using land and re-using buildings within existing towns, cities and villages to meet growth needs. Conversely, the Urban Development Institute (2003) puts forth that, it is not just sprawl but growth catalysed by a vibrant economy, reasonable interest rates and immigration. We should not apologize for growth, but should manage its growth responsibly (Osolen & Lister, 2004). Hence, the circumscription of sprawl outside the sphere of academia are highly coloured by the memos of the organizations making the delineation.

Various interest groups define² sprawl according to their agendas whether it be a natural, although unguided, extension of economic growth or a wholly un-natural assault on the ecological systems that support human populations. Whatever the case, it is obvious that many players are involved, which is what makes Dagger's (2003) argument interesting. He argues that sprawl is actually a collective action problem.

In this article, sprawl or urban sprawl is that form of uncoordinated urban development along the coastal esplanade that runs counter-productive to the stipulated goals set forth by decision makers, technocrats and more especially, town planners.

2.3. History of integrated coastal management

The history of coastal management approach called integrated coastal management (ICM) is difficult to trace due to the variation in its appellation by different scholars, decision makers, researchers/scientists, educators, etc. Some authors and organizations prefer the appellation Integrated Coastal Zone Management (ICZM) (Fabbri, 1998; Forst, 2009; Gibson, McField, & Wells, 1998; Linton & Warner, 2003; Shi, Hutchinson, Yu, & Xu, 2001; Sarda, Avila, & Mora, 2005). Some scholars term it Integrated Coastal Area Management (ICAM) (Henocque & Denis, 2001; Jetic, 1996; Scialabba, 1998; Wang, Zou, & Zhu, 2000) whereas others simply prefer the appellation integrated coastal management (ICM) (Christie, 2005; Christie et al., 2005; Cicin-Sain & Belfiore, 2005; Cicin-Sain, Knecht, & Fisk, 1995; Olsen, 2003; Pollnac, & Pomeroy, 2005; Westmacott, 2001; Xue, Hong, & Charles, 2004; Zeidler, 1997). Whatever the dichotomy in the appellation of the coastal management approaches, the goals, objectives or aims, principles, and concepts remain the same. Therefore, ICM has been used in this paper in the same sense as ICZM and ICAM.

Govan (1997), Pomeroy and Berkes (1997) and Brown and Pomeroy (1999) point out that traditional form of local coastal resource management goes back centuries. During the fourteenth century, the native people of Hawaii practiced a sustainable form of planning and management through an ancient integrated land-use system called Ahupua'a17. Ahupua'a17 was applied to local territory, following the natural boundaries of the watersheds, from the mountain ridges to several miles offshore; no distinction was made between land and sea for resource management. This local coastal resource management included some of the principles which resembled ICM in some ways, though obviously the management approach was not called ICM.

When and where the concept of ICM evolved is highly controversial. Derrick Ngoran and XiongZhi (2013) support the assertion that ICM started in Australia and Sweden in the early 1970s, whereas Olsen (2003) and Ngoran (2014) trace the roots of ICM in the United States in 1969 and the early 1970s. Despite the controversies in the origination of ICM, it is, however, accepted that the management option called ICM made its first formal appearance through the American legislation known as the Coastal Zone Management Act (CZMA) 1972 (Nasuchon, 2009).

The birth of ICM was the consequence of the many failures or gaps presented by previous management approaches which were based on a single approach, the separation of man from the ecosystem, much attention paid to economic development and little regard given to environment, and strong centralized system with impeccable flow of information (Cullinan, 2006). Some observers, like MacDonald and Rudel (2005) and Hildebrand (2009) suggested that the most effective means of addressing these gaps in coastal management is to follow a top-down model that would invest in and build the capacity of existing statutory authorities by establishing in-house ICM groups. Others, like Wiber, Charles, Kearney, and Berkes (2009) and Gaden, Mkumbo, Lawrence, & Goddard (2012), advocate a highly decentralized approach in which coastal stakeholders play a major role.

However, the concept of ICM gained world recognition in 1992 when it entered the international political scene during the Rio Earth Summit. Moreover, the specificities regarding ICM were stipulated in Agenda 21, Chapter 17 of

²See for e.g., Brueckner, J. K. (2000). Urban sprawl: diagnosis and remedies. *International Regional Science Review*, 23(2), 160–171; Burchell, R. W., Shad, N. A., Listokin, D., Phillips, H., Downs, A., Seskin, S.,... & Gall, M. (1998). *The costs of sprawl-revisited* (No. Project H-10 FY'95) and Frumkin, H., Frank, L., & Jackson, R. J. (2004). *Urban sprawl and public health: Designing, planning, and building for healthy communities*. Island Press; Ourng, C., & Rodrigues, D. S. (2012). Urban growth pattern identification: a case study in Siem Reap, Cambodia. For more information on the definition of sprawl or urban sprawl.

the Summit. Since that period, there has been a multiplicity of ICMs in the world, among which is the famous Xiamen ICM in Southeast Asia.

2.4. Delineation of integrated coastal management

The European Commission defines ICM as a dynamic, multidisciplinary, and iterative process to promote sustainable management of coastal zones. It covers the full cycle of information collection, planning, decision making, management, and monitoring of implementation (Nurhidayah, 2010). ICM uses the informed participation and cooperation of all stakeholders to assess the societal goals in a given coastal area, and to take actions towards meeting these objectives. ICM seeks, over the long-term, to balance environmental, economic, social, cultural, and recreational objectives, all within the limits set by natural dynamics. ‘Integrated’ in ICM refers to the integration of objectives and also to the integration of the many instruments needed to meet these objectives. It means integration of all relevant policy areas, sectors, and levels of administration. It means integration of the terrestrial and marine components of the target territory, in both time and space (Long, 2010).

Another comprehensive definition for integrated coastal management is the one provided by Harwitasari and Van Ast (2011). They define ICM as a “dynamic and continuous process of administering the use, development, and protection of the coastal zone and its resources towards common objectives of national and local authorities and the aspiration of different resource user groups”.

Sorensen (1997) gives a definition of ICM as: “Integrated management provides policy direction and a process for defining objectives and priorities and planning development beyond sectional activities. It adopts a systems perspective and multi – sectional approach which takes into account all sectional interests and stakeholder interests, and deals with economic and social issues as well as environmental and economic issues”.

The main principals of ICM as identified by the EU include the following:

- Adopting a wide ranging view of interrelated problems.
- Decision making based on good data and information.
- Working with natural forces.
- Involving all stakeholders and all relevant parts of the administration.
- Using a range of instruments (laws, plans, economic instruments, information campaigns).

2.5. Urban sprawl in Douala–Cameroon

The expansion of urban areas is a common and historical phenomenon in African cities. Nowadays, poorly planned urban expansion has led to lesser actions on environmental protection. This situation is further compounded by the difficult economic environment with tolls of urban poverty and the short-sightedness of decision makers to address the preponderant issue adequately. The myopic nature to address housing-related problems in Cameroon has yielded the emergence of different types of human habitats, some of which are very awful. In the case of Douala city, there are varying types of buildings, but this can be grouped into two main categories with reference to building materials. That is, temporary and final or definite buildings (standard and luxury).



Fig. 2. Temporary structure erected with wood (Carabotte).

2.5.1. The temporary buildings

The temporary buildings consist of buildings with walls or boards locally called “carabottes” with corrugated iron roof, floor screed, and no ceiling (Fig. 2). Most temporary buildings, especially at the periphery of the city are considered informal. However, when such structures are erected within the planned and centre section of the city, the city government consider them illegal; the reason such illegal occupant are constantly evicted and their temporary structures demolished.

2.5.2. Definite buildings (the standard way)

The standard way buildings consist of block walls, corrugated iron or aluminium tray, floor tiles, and ceiling of plywood or wood panelling (Fig. 3).

2.5.3. Definite Buildings (the luxury)

These buildings consist of block walls, roof sheet tray or aluminium tiles, floor tiles or marble, ceilings, panelling or staff (Fig. 4).

2.5.4. Forms of sprawl in Douala

Harvey and Clark (1971) classified sprawl into three basic spatial forms. That is, low density-continuous sprawl, ribbon sprawl, and leapfrog development sprawl. The coastal city of Douala depicts all forms of sprawling development ranging from scattered to nucleated forms.



Fig. 3. Standard structure erected with blocks.



Fig. 4. Buildings categorized as luxury in Douala.



Fig. 5. Low density sprawl in Makepe–Douala.

2.5.4.1. Low density sprawl. Low density sprawl (Fig. 5) is a phenomenon caused by outward spreading of low-density suburban land uses as currently being experienced in Douala. Low density development is common in the quarters of Douala, such as Makepe, Bepanda, Cite de Palmier, Akwa Nord, and Bonaberi, just to name a few.

2.5.4.2. Leapfrog development. Leapfrogging development occurs when developers jump from one built-up area to another, leaving a large, undeveloped space of land or forest in between. Leapfrogging development in Douala is mostly orchestrated by natural factors rather than anthropogenic factors; for example, the extensive swamps along the Wouri and Dibanba Rivers (Fig. 6).

2.5.4.3. Ribbon sprawl. Ribbon sprawl is the development that follows major transportation corridors outward from urban cores. Land adjacent to corridor is developed, but those without direct access remain in rural uses (Fig. 7). Over time, these nearby rural lands may be converted to urban uses as land value increases and infrastructure extends perpendicularly from the major roads and lines. Ribbon form of sprawl is characteristic of the Douala–Yaounde highway.

Fig. 7 Generally speaking, urban sprawl and ICM almost operate on parallel lanes. In a more localized or specific context, sprawl and ICM converge only when the unplanned form of urban extension converge in a coastal area. Therefore, the question that emanates is; why is ICM a suitable approach in addressing the concomitant effects of sprawl on the coastal esplanade? The latter, can be supported is the tenets are properly looked into.

- ICM adopts an integrative, holistic decision-making framework to address competing and conflicting uses of the coastal areas including those severely affecting sustainable development, i.e., poverty, equity, environment, and governance.
- It uses interactive, process-oriented approach to integrate cross-cutting issues; linking science and policy and emphasize local-level actions.
- It is incremental, programmatic and strategic, people-focused, involves stakeholders and creates ownership.
- It improves coastal governance through strategic planning, policy and management integration and interagency coordination.



Fig. 6. Leapfrogging Sprawl, Latitude 4°02'10E and 4°1'52N and Longitude 9°49'13E and 9°49'21, Douala. Source: Ngoran Derrick Ngoran and XiongZhi (2013).



Fig. 7. Ribbon Sprawl, P 14-Douala. Source: Derrick Ngoran and XiongZhi (2013).

- It places focus to quantify ecosystem services so as to enable policy considerations of trade-offs and puts the basic coastal policy and management fundamentals in place so as to cope with economic and environmental challenges.

The coastal milieu in Cameroon has been a podium of interagency conflict as concerns urban planning; conflict between the numerous ministries, the ministries and the urban council, the ministries, the urban council and the general population. The conflict engendered by sectoral management has left a lot undone both socioeconomically and environmentally. ICM, as defined by the above tenets appears to be the best management approach to bridge sectoral divergence and attenuate the on-going littoral degradation affirming

3. Stakeholders involved in urban planning in Cameroon

3.1. At the institutional level

Urban management, including administrative, and investment functions, has been shared by the ministries and para-statal central offices; their provincial offices; the municipalities.

3.1.1. Ministerial level

The Ministry of Property and Land Affairs (Ministère des Domaines et des Affaires Fanciers, MINDAF), which is also referred to as the Ministry of State Property and Land Tenure, is the primary public actor in the land sector. MINDAF has authority over all land, but many of its objectives are largely focused on state land. MINDAF has overall responsibility for land allocations, land development, and land surveys. MINDAF divisions include: the Department of Land, Department of Land Tenure, Department of State Land, and Department of Surveys.

The Ministry of Urban Development and Housing (Ministère de l'Urbanisme et de l'Habitat) is responsible for:

- Implementation of the government's general policy on urban planning and housing in urban areas with no more than 100,000 inhabitants.
- Land registry and land management functions of state-owned land.
- Oversight of the Special Agency for Sites and Services Development like MEATUR (World Bank, 2002).

The Ministry of Territorial Administration and Decentralization (Ministère de l'Administration Territoriale et de la Décentralisation) (MINATD) is in charge of the development, implementation and the evaluation of government policy regarding administration of the territory and decentralization. This ministry has responsibility for helping design regional and local government bodies, including those governing land, and determining their scope of authority.

The Ministry of Economy, Planning, and Regional Development (MINEPAT) is responsible for the development and implementation of the country's economic policy. MINEPAT is the titular Ministry for a World-Bank funded Community Development Program Support Project (PNDP), which is designed to promote sustainable urban and rural development by improving the legal, regulatory, and governance frameworks and building the required capacities for local development (Derrick Ngoran & XiongZhi, 2013; Ako, Eyong, & Nkeng, 2010; African Development Bank, 2009).

The Ministry of Energy and Water Resources (MINEE) has primary responsibility for the sector with tasks, such as developing, implementing, and evaluating policies concerning water resources and exploitation of water resources. Within MINEE, the Department of Water Resources and Hydrology (DHH) is responsible for rural drinking water. As rural water supply networks develop, they will be managed by water point management committees or contracted out to private entities depending upon growth of networks. The Ministry of Agriculture oversees irrigation and drainage, and the Ministry of Scientific Research and Technology runs the Center on Hydrologic Research (Food and Agricultural Organization, 2006).

The Ministry of Towns (MINVILLE, Ministère de la Ville), was created in 1998, with urban responsibilities in the provincial capitals and all towns with at least 100,000 inhabitants. This occurred two years after new regulations to improve the decentralization process. MINVILLE is responsible for:

- Development and restructuring of large towns.
- Sanitation and drainage.
- Social development of neighborhoods.
- Public health and welfare, and supervision of waste collection and processing.
- Professional and social integration of young people in difficulty.
- Administration of roads in towns with at least 100,000 inhabitants.

3.1.2. MAETUR

The Mission d'Aménagement des Terrains Urbains et Ruraux (MAETUR; Mission for the Planning of Urban and Rural Territories) is a public company with industrial and commercial purposes that was established in 1977. MAETUR's main objective is to achieve operations of planning and equipment of areas, and to promote housing and real estate across the country.

Its voluntary strategy of massive intervention, backed up by the state, enabled it to improve conditions of living for hundreds of thousands of Cameroonians. It also contributed to developing urban areas in a harmonious way in specific extension zones, such as the southwest of Yaoundé and north of Douala. MAETUR is in charge of the planning of 100 ha per year. Douala and Yaoundé have been the main beneficiaries of the MAETUR since its creation. Presently, other cities: Kribi, Soa, Garoua, Maroua, Bafoussam, Limbe, and Buea are also benefiting.

MAETUR has three operational cells: the bureau of studies, the bureau of control, and the land operator. The company's expertise exists in several fields, such as accountancy, civil engineering, architecture and land. The personnel are given strong logistical, technical and IT support, in order to help structure the best solution to their clients' and partners' needs.

3.1.3. S.I.C.

The Société Immobilière du Cameroun (S.I.C.; Real Estate Company of Cameroon) is one of the principal structures of promotion of the social habitat by the construction of housing. This organization has undergone many changes since its creation in 1952, the reform of 1978 in particular, which made it become a mixed investment company (capital held by the Cameroonian state and by private shareholders). It is today the tool of the government policy as regards housing in Cameroon and is always referred to when a housing crisis needs to be solved.

Since its creation, the S.I.C. has built more than 13,000 houses, mainly in Douala and Yaoundé but also in seven other cities of the country. The 300 collaborators working for the company, serve the Cameroonians to bring them social housing depending on their financial means.

Today, S.I.C. faces a housing shortage as a result of the strong demographic growth of the large cities. A great programme of housing was therefore launched to try to face this phenomenon and to fight poverty that could result from this. Private investors also have to take part in this great project.

3.2. At the municipal level

3.2.1. Douala Urban Council (CUD)

The Douala Urban Council was created by the law no. 87/015 of July 15, 1987. The Urban Council of Douala has competence in the following environmental fields:

- Town planning and urban development.
- Public lighting and the provision of drinking water.
- Circulation and transport.
- Hygiene and sanitation.
- Parks and gardens.
- Installation and rehabilitation of primary roadway systems.

In order to achieve the above task in a large city like Douala, a sufficient number of personnel are required. However, the functions of the Douala Urban Council have been stifled by the consistency of insufficient funding, poor managerial skills, and inadequate work force.

3.2.2. HYSACAM (*Hygiène et Salubrité du Cameroun*)

The activities of this organization can be regrouped into four categories: sensitization in a move to create awareness and provoke a change of the mentality of the population; collection and removal of household wastes which calls for the creation of waste collection points and routine emptying of waste containers around homes and quarters; sweeping of streets and markets; and the transportation and processing of wastes at discharge sites. In order to carry out this work effectively, HYSACAM has employed a workforce of about 1500 workers and about 100 trucks transporting household waste. This enables HYSACAM to remove and transport approximately 1500 t of waste daily, both in Douala (800 t) and Yaoundé (700 t) (Derrick Ngoran & XiongZhi, 2013).

The removal of wastes and the cleanliness of the two major cities (Douala and Yaounde), is the affair and responsibility of three partners, including the State (City Councils), the public and HYSACAM (*Hygiène et Salubrité du Cameroun*), the service provider.

HYSACAM's mission is limited to the removal, transportation, and processing of household wastes from homes, streets, and markets only. Cleaning of industrial wastes, scrap iron, etc., is not its duty. This is same for gutters, drains, and streams. Hence the inhabitants are advised to have garbage cans/bins in their homes and not throw waste materials at the roadsides or in gutters. Any garbage that is not from household is the concern of the City Councils.

A European Union survey on habitat in Cameroon revealed that there is an average of seven persons per home in Douala and that most homes are without waste or garbage cans and that each person produced at least 600 g of waste daily. Inferring that with an estimated population of about 2 million inhabitants of the City of Douala, nearly 1200 t of waste are produced daily. HYSACAM succeeds in transporting about 800 t daily in Douala, meaning that about 400 t is stockpiled daily, mostly as a result of the population's behaviour towards the respect of hygiene and sanitation norms. The law provides for sanctions, but HYSACAM's mission is limited to the provision of services not to sanction defaulters.

3.3. *Para-statals*

AE-SONEL (*Société Nationale d'Electricité*) and SENEK (*Société Nationale des Eaux de Cameroun*) are responsible for urban services. Cameroon National Water Corporation (*la Société Nationale des Eaux du Cameroun*, SNEC), were reassigned to the state-owned company, Camwater. Camwater has a concession with the government for service delivery in urban and peri-urban zones, which it delegates to a consortium led by the Moroccan public utility, the Office National de l' Eau Potable (ONEP). In 2008, the ONEP/Delta Holding Ingema Consortium began production, transportation, and supply of drinking water through the newly established local private company, Camerounaise des Eaux (CdE). Camwater is responsible for infrastructure development and for financing investment in the water sector (Marin, Loening, & Drozd, 2010).

Pertinent functions governing urban function in Cameroon are defined on sectorial lines and thus give more room for mismanagement within the realms of urban planning.

4. Gaps in Cameroon's urban planning policy

Urban planning in Douala and Cameroon in general is enshrined with good laws and regulations. The challenge lies on inadequate implementation of these Town Planning Laws and insufficient competence of personnel. Urban planning in Douala is practiced under the Town Planning Law No 2004/003 of April 2004. This law stipulates that the main document guiding development is the master plan and the land use plan. These two documents are not adequately put to use in Douala.

4.1. *Obsolete master plan*

The master plan is a document which lays down the basic guidelines for developing a given urban area, the general use assigned to land and the schedule for the provision of amenities. The August 1982 master plan, though outdated, is the only document available, even though it was never implemented. Unfortunately, nothing has been done till date to update and make it a working tool in town planning practice.

4.2. Insufficient implementation of land use plan

The land use plan, which is a document drawn up to define the allocation of land and the rules governing such allocation in the medium term defines the area of each of the allocated land and spells out the rules and special land use restrictions. Field studies indicate that this document is poorly put in use in Douala. The poor implementation of this significant document makes it problematic for satisfactory urban planning to be accomplished in Douala. The result, therefore, is the haphazard allocation of land uses without taking into account their compatibility with the environment and other land uses, and the safety of the Doualas. For instance, the residential land uses of Bonnassama, Venice, New Deido, Mabanda, Ndobu, Bonaberi, Bonambape, and Akwa Nord expose the settlers to sea intrusion and flood hazards

The only document that is put to function to a certain degree by urban planners in Douala is the sector plan. The sector plan, just like the name, deals only with sections of the town. It gives detailed specifications for the organization, technical terms and conditions of land use equipment, reserved areas and the technical and financial characteristics of the various infrastructure works. The Douala City Council admitted to the fact that it has implemented some sector and layout plans. Examples of such plans are the built up areas of Bonamoussadi, Makepe, and Logpom which are about 50 km away from the Atlantic Ocean. Unfortunately the master plan which is supposed to determine the compatibility of this sector plans with other land uses and to ensure uniformity of the town is outdated and was never respected in the first place. The noncompliance to these vital documents makes it difficult for proper town planning to be practiced. Henceforth, land uses have favoured sprawl forms, without considering their compatibility with the ecosystem.

4.3. Misuse of urban planning tools

Urban planning tools are processes put in place to realize the provisions of the different planning guidelines. In order to ensure adequate implementation of urban planning guideline, tools, such as building permits, town planning certificate, and development control are used.

The town planning certificate is a document which provides information on the rules governing town planning and administrative rights applicable to a piece of land. This certificate is awarded by the mayor of the relevant council upon technical recommendation of the local urban planning service. For this certificate to be awarded, field inspection is usually carried out by the technical team to determine whether the land use of that area differs from what the developer intends to build. After confirming this, the developer further applies and obtains a building permit, which is an administrative instrument authorizing a building to be put up after ensuring that it complies with building standards and the town planning regulations. Technical and field studies are carried out by the Regional Delegations of Land tenure and state property, Surveys, Urban Development, Health and finally the City Council who may or may not issue the building permit. The problem here lies in the fact that adequate studies by the technical staff before issuing these permits are not carried out. As a result, town planning certificates and building permits are issued to developers in risk-prone areas. Field studies indicate that some developers in Douala-Village, Venice, which are vulnerable to landslides and floods, have been granted building permits.

4.4. Inadequate qualified staff

Another puncture resides with inadequate qualified staff in the city council. The Douala City Council cannot effectively carry out development because of inadequate and mismanagement of funds. As a result, they cannot employ enough qualified staff in the town planning section of the City Council. The technical office that is in charge of urban planning is manned by few surveyors, assisted by untrained field workers. This has led to the poor implementation of town planning rules and regulations. For example, development control, which is a tool to regulate and control development, has various stages of applications and the final of them all is demolition. If the City Council had carried this out properly, they would have demolished all the houses constructed in risk-prone zones. This, however, would invoke a social problem. Under the circumstances, it is better to prohibit the springing up of settlements at such risk-prone sites as the social factor will come into play once the houses have been built.

4.5. *Insufficient exertion of functions*

The Delegation of Urban Development and Housing is not doing much in coordinating and advising the City Council. The only activity in which they are very active is the studying of application files for the issuing of planning certificates and building permits. Therefore, the main function of the Delegation of Urban Development and Housing is more about signing and approval of documents. Field visits, for instance, are aimed mostly at identifying the owner of the plot and the boundaries. These field visits are equally aimed at issuing town planning certificates and building permits. Very little is being done in the domain of environmental studies in order to determine which site is suitable for a particular land use. This can be seen in the non-respect of the outdated Douala master plan.

4.6. *Conflicting functions*

There is conflict in most of the functions performed by the various stakeholders. An interview with the delegate for Land Tenure and State Property indicates that they issue land titles to landowners in areas earmarked by the City Council as risk-prone areas. There is, therefore, conflict in function between the City Council on the other hand which does not encourage human settlement in these areas and the Department of Land Tenure and State Property.

At the ministerial level, the responsibilities of the ministries and the decentralized local authorities overlap and are not plainly defined. The State continues to exercise tutelage over local authorities and financial autonomy is far from being reached. The principle of centralized finances compounded by the continuous financial problems of the State has had negative impacts on municipal functions. In 1987, the urban local authorities of Yaoundé and Douala were created. Yaoundé and Douala have elected municipal councilors, but executive commands are exercised by central government representatives who preside over the council (Delegates du Gouvernement).

4.7. *Land ownership problems*

Like other African countries, Cameroon suffers a profound right-to-land dualism between traditional and modern rights. There is an overlap between land use rights, customary rights and modern rights established by State law. With regards to tradition, the notion of individual land ownership does not exist. Instead, the traditional “owners” are considered managers of the land, and the land itself is considered communal or to a particular ethnic group. Nevertheless, traditional land rights and land occupation are not even throughout the nation. In fact, there are many different traditional land practices as a consequence of earlier intermingling of people from different areas of the country. The notion of allogène (immigrant or outsider in the community) is very strong in land matters and the ceding of traditional land to an allogène is a very long and challenging process. For example, New-Bell in Douala is occupied by allogènes (the Bamiléké, who migrated from the western region of the country). Since 1938, the Bamiléké have claimed the right to this land, but they are still unable to sell or rent the land.

According to the Law, land without formal property titles belongs to the State even though the traditional occupants claim it for themselves because of their traditional rights. This condition validates the complexities involved in land use and land ownership conflicts; these complexities continue to be the main problems in land legalization since upgrading.

In 1974, Cameroon adopted laws which provided a framework for the transformation of traditional into modern tenure rights, along with state management of the undeveloped lands. Based on these regulations, land is divided into three categories as below:

- Registered land belonging to the State.
- Registered private land (with a title deed³).
- “Domaine National” (former traditional lands which are neither private nor belong to the State).

However, the limited implementation capacities of the Ministry of Urban Affairs and Housing (MINUH) have not allowed for effective enforcement of these laws. Only a small number of urban properties have ever been registered. Thus, the official

³A deed is any legal instrument in writing which passes, or affirms or confirms something which passes, an interest, right, or property and that is signed, attested, delivered, and in some jurisdictions sealed.

plot production by the State is very limited, and the new unplanned urban developments have spread to the peri-urban area without rules and without official rights. In 1993 in Douala, between 40 and 60 of households owned the houses in which they lived, but fewer than 20 of the residents held registered title to the land. There is an active market in untitled or illegally titled plots; this also is in part because of the absence of an updated cadastral.

5. Lessons from Xiamen integrated coastal management

Integrated coastal management, though not a panacea in resolving coastal related problems, has been used in some coastal nations, such as the United State of America, Canada, China, the Philippines, Australia, and others. This management approach has been clamoured with remarkable achievements. It is in this perspective that the pathways of Xiamen ICM, China, is examined and proffer recommendation to a coastal country like Cameroon with its coastal area rapidly succumbing to intense anthropogenic pressure.

Xiamen, prior to 1994, was heading towards a calamity (increasing environmental degradation with much attention paid at boosting the economy), but thanks to her great minds, there was a paradigm shift when Xiamen embraced ICM in 1994. The pathway to ICM before then had been staggering in short term, but due to the concerted efforts of the local government and the accompanying stakeholders (partnerships in Environmental Management for the Seas of East Asia-PEMSEA; United Nations Development Programme-UNDP, Global Environmental Facility-GEF, etc.) that Xiamen was able to attenuate the on-going degradation and create a propitious environment worth emulating (Thia-Eng, Yu, & Guoqiang, 1997; Xu & Yuan, 1999).

This section, therefore, precludes Xiamen's environmental atmosphere prior to the implementation of ICM, and then makes recommendations to coastal managers of Cameroon.

5.1. Xiamen before the ICM implementation

Economy of Xiamen⁴ before the implementation of ICM was heavily dependent upon agriculture and mariculture (Xu & Yuan, 1999). The industrial sector was highly inefficient as it was still in its infancy. Despite this infancy stage, the industrial sector was fast changing. With the designation of Xiamen as a special economic zone in the late 1980s, the city witnessed a rapid economic growth. This rapid economic growth influenced migration trends as many rural dwellers soon fluxed into the city to seek employment opportunities. The augmentation in Xiamen's population resulted in increased utilization of coastal space and marine resources which, in turn, resulted in space competition, resource-use conflicts⁵ and pollution (Table 1).

The desire of Xiamen's economic promoters to achieve economic development significantly altered the coastal environment. In the previous years, monitoring data and analysis of the concentration of chemical oxygen demand, faecal coliform count, total inorganic nitrogen, inorganic phosphorus, oil in the seawater, and sulphide and organic matter in sediments, indicated serious environmental pollution in areas, such as the Yuandang Lagoon and Maluan Bay (Chua, & Gorre, 2000; Klumpp, Humphrey, Huasheng, & Tao, 2002). Without remedial and timely actions taken, the on-going coastal degradation of Douala–Cameroon is likely to attend the case of Yundang lagoon decades ago.

The adverse consequences of unregulated economic growth and population increase in Xiamen led to the reduction and deterioration of natural habitats and living resources, siltation and erosion, shoreline retreat, and blocking of navigation channels (Figs. 8–10).

Before the adoption of ICM in Xiamen, sectoral management within the marine sector was highly pronounced. There were twelve marine-related departments from the central, provincial, and local governments that worked independently. This resulted to gaps in policymaking and sometimes, even provoked coastal-use conflicts.

⁴Agricultural runoff laced with fertilizers and pesticides finds its way to rivers and streams that run into the sea. Other non-point source pollution from residential and commercial development, mining, forest cutting, and land clearing added to the impact.

⁵Prior to ICM, there was no integrated marine management department in Xiamen, and there was no government department to supervise, settle and record disputes and cases. Some cases related to use conflicts caused serious problems, but these were not settled and recorded due to lack of legal basis. For example, the use of marine resources was virtually free for all and no sector had priority over the others. The limited resources and absence of a clear governing body to handle the cases discouraged most complainants from filing.

Table 1

Measures taken to address environmental problems in Xiamen.

Source: <http://beta.pemsea.org/sites/default/files/casestudy-v1n4-xiamen.pdf> (accessed 28/02/2015).

Area (timeframe)	Issues	Actions	Results
Yuandang Bay (1988–1996)	Causeway construction. Reclamation for agriculture. Decreased water flow. Silt accumulation	Interception of waste. Sewage treatment plant. Improving water exchange. Dredging sludge. Cleansing wastes with the help of mangroves and seaweeds	Water quality has improved considerably. Egrets have returned. Area surrounding Yuandang is pleasant. Real estate values have risen
Xinglin Bay (1995–2005)	Yintan–Xiamen railway cutoff. Xinglin Bay from the sea. Aquaculture developed inside	Aquaculture removed, Dredging. Landscaping and park. Development	Flood and drainage were controlled. Xiamen Garden Expo Park was developed
West Sea, including Maluan Bay (2002–present)	Excessive aquaculture. Causeway decreased water flow. Degradation of wetlands	Aquaculture removed. Reclamation restricted. Opening of causeway. Dredging out sediments. Construction of shore protection and wetlands	Dolphins are now more common. Water flow is expected to increase (30 million m ³), as well as increase coastline (14 km) and sea areas (8 km ²)
Wuyuan Bay (2005–present)	Seawall construction. Reclamation for farmland. Decreased water flow and silt accumulation	Opening of seawall. Dredging. Keeping water level in dams low	Reclaimed land of 0.013 km ² was returned to sea. High-tech park and business centre were developed.
Uninhabited islands (2005–present)		Re-vegetation and landscaping	Beautiful landscapes appeared on Monkey and Lantau Islands.
East Coast, including Tong'an Bay (2006–2013)	Gaoji causeway and Jixing seawall	Opening and rebuilding of causeway and seawall; dredging; reclamation between Dadeng and Xiaodeng	Reclaimed land of 4.5 km ² was returned to sea. Rehabilitation is on-going.
Xiangshan–Chanwei, Guanyinshan, and Eastern beach (2007–2009)	Mining sand from the beach	Beach rehabilitation with artificial sand. Removing stones, replenishing sand, and stabilizing slope	Beach is now protected from sand extraction and is used for public recreation and tourism

Cities

Attribute	Xiamen, China	Douala, Cameroon
Location	118°04'04" east longitude and 24° 26' 46" north latitude	Latitude 03°40'–04°11'N, longitude 09°16'–09°52'E
Population	4.255 million in 2014 (Xiamen Municipal Government)	> 2 million inhabitants (National Institute of Statistics, 2005)
Governance	The Mayor or the Party Secretary is at the helm decision making in the city	The Governor is at the top of the hierarchy
City lay-out	Well planned (modern)	Poorly planned
ICM status	Complete phase	Still in discussion
Economy	According to the 4th session of the 14th Xiamen Municipal People's Congress, Xiamen's Gross Domestic Product (GDP) totalled RMB 327.3 billion in 2014	Douala, the economic powerhouse of Cameroon, contributed 32% to national GDP with just 12% of the country's employed population in 2012.
Maritime status	It is ranked the 8th largest container port in the PRC, and ranks 17th among the world's top 100. It is the 4th port in the PRC with the capacity to handle the sixth-generation large container vessels	Douala is the largest city in Cameroon, the capital of Cameroon's Littoral Region and the richest city in the whole CEMAC region of six countries.
Communication network	Sea transport, air (international airport), railways (state-of-the-art) tarmac surfaces (well maintained), BRT, cable ways (few), Subway (under construction)	Sea transport, air (international airport), railways (archaic) tarmac surfaces (poorly maintained, characterized by potholes and irregular gulleys)

5.2. Xiamen after ICM implementation

In the 1980s, the Chinese government adopted two key strategies to address the country's environmental degradation entrusting more powers to local governments to implement new environmental laws and welcoming multilateral and bilateral assistance (Chen & Uitto, 2003). This opening by the central government paved the way for



Fig. 8. Eastern sea area before ICM implementation.

Source: Ngoran (2014).



Fig. 9. Yundang Lake before 1994.

Source: Ngoran (2014).



Fig. 10. Douala coast 2012.

Source: Ngoran (2014).

international environmental organizations in China. It is in this perspective that Xiamen in the later years happened to be an ICM demonstration site.

The Xiamen Demonstration Project was launched in 1993 under the Global Environment Facility (GEF), the United Nations Development Programme (UNDP) and International Maritime Organization (IMO) Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS) (Peng, Hong, Xue, & Jin, 2006). When the Programme moved to its follow-on phase, the GEF/UNDP/IMO Regional Programme on Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), the Demonstration Project was likewise continued.

With the desire to succeed, the municipal government with its collaborators identified hot environmental issues and strategic actions to address them. The overall result was satisfactory with the implementation of ICM.

Another aspect worth mentioning was the move at curbing gaps in management with the implementation of the sea-use zoning. The implementation of the sea-use zoning scheme as part of the ICM programme facilitated the resolution of multiple-use conflicts and impose order in previously unregulated marine resource utilization. This function was harnessed by the creation of a multi-agency council to oversee the coastal and marine resource management. The Xiamen municipal government being at the helm organized interagency coordinating mechanism⁶ into 22 government agencies⁷ led by the executive vice-mayor, supported by a Marine Management Office and advised by a Marine Experts Group. A multidisciplinary group composed of environmental, economic, and legal experts, as well as key government planners and managers developed an integrated coastal profile (McCleave et al., 2003). The profile identified a number of related issues:

- Natural factors and cross-sectoral conflicts that are hampering further development and which in turn are also affected by development.
- Inadequate government capability (human, organizational, information, legal, financial, technical, enforcement) to manage cross-sectoral issues and pollution in an integrated and effective manner.
- Inadequate environmental awareness among policymakers and the public.
- Lack of a master plan for the coastal area.
- Inadequate pollution management.

Problem identification is vital for the realization of a project in that it directs future activities and the rational allocation of resources. Thus, the key issues identified by the integrated coastal profile were a stepping stone for addressing the problems.

With the implementation of integrated coastal management, the Yuandang Lagoon area became a centre for international and domestic investment, tourism, and residential development in Xiamen.⁸ More investments came in as investors chose Yuandang Lagoon as the site of their business and for aesthetic reasons (Fig. 11). A survey under the Xiamen ICM Demonstration Project discovered that over 53 percent of 173 investors located in the area listed “beautiful environment” as a major reason for their choice of investment location. Such investment decisions have resulted in an estimated US \$1.23 billion in current value to Xiamen's economy (Hong & Peng, 2002).

Despite the fact that the total cost for the cleaning up the Yuandang Lagoon was colossal (around US \$43.75 million for the two phases), enormous economic benefits were realized upon completion of the project. The total cost of the project since the first phase was initiated in 1998 is estimated at US \$135.5 million and the benefits varied between US \$12 million to US \$1.23 billion (Hao & Peng, 1998).

What is even more intriguing is the overall improvement of the physical environment coupled with a sustained economic growth (Xiamen's GDP rose from 156 billion Yuan in 2008 to over 205.374 billion Yuan in 2010).⁹ A clean environment will obviously reduce the multiplication of disease vectors and thereby curbing the health expenditure of the population. The finality here is dwindling poverty.

In summary, Xiamen, once a fishing village with down warping environmental quality, has emerged to be a beautiful and picturesque city that does not only attract the curiosity of tourists but also potential investors. Also, a strong political will is exhibited by the governing class, portrayed in management and effective enforcement mechanism within the government through legislation, broad public support fostered by high public awareness, and sound scientific basis for overall societal benefits.

Today, Xiamen is a clean city with various appellations, such as; National Sanctuary City, National Garden City, China's Outstanding Tourist City, and one of the Top 10 Liveable Cities in China (Chua, 1998).

In a nutshell, with the full swing of ICM implementation, Xiamen has built herself a reputable triangle of success stories worthy of emulation in long term; a viable economy with its status of Special Economic Zone,¹⁰ sound environment with pollution tolls curtailed, and an ever increasing job creation to improve the wellbeing of its society (Fig. 12).

⁶Through the ICM program, an interagency body, the Marine Management Coordination Committee (MMCC), was formed to synchronize all related environmental management efforts in the coastal and marine areas to avoid duplication of efforts, functions and overlapping jurisdictions, and share resources (McCleave, Xiongzi, & Huasheng 2003).

⁷https://www.jointokyo.org/files/cms/news/pdf/Case_study_Xiamen.pdf (accessed 04/04/2013).

⁸<http://oceanweek.org/old/english/refershow.asp?id=206> (accessed 04/04/2014).

⁹http://news.xmnn.cn/xmxw/201101/t20110122_1688049.htm (accessed 04/04/2014)

¹⁰Xiamen Special Economic Zone (Chinese: 厦门经济特区; pinyin: Xiàmén Jīngjì Tèqū), established in October 1980, is one of the five special economic zones in the People's Republic of China.



Fig.11. Beautiful Array of Yuandan Lake.

Source: <http://tv.campusdomar.es/en/video/450.html> (retrieved 22/02/2015).

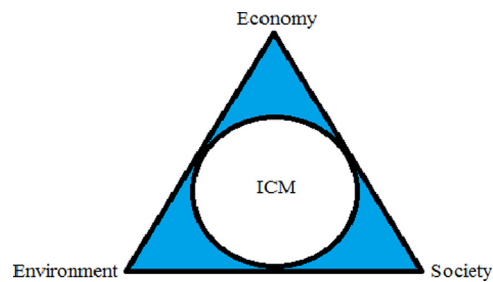


Fig. 12. Functional relation of ICM within the coastal Esplanade.

To clearly draw a demarcation between the urban outlook/peculiar features of Xiamen and Douala, certain attributes are summarized in Table 2.

5.3. Recommendations

In order to bridge the conflicting gap perpetuated by sectoral management in Cameroon, the following key points need to be taken into consideration while drawing up urban management plans in an effort to attenuate the environmental consequences of urban sprawl in a city like Douala:

- Create an autonomous coastal interagency¹¹ that focuses on addressing coastal related problems. Such an institution should have a mutual relationship with the ministries, the urban council traditional ruler and the general population (Fig. 13). The goal here is to harmonize all projects conceived by the various stakeholders, and therefore, bridge up the gaps in management. Such an interagency should have a similar role like the Marine Management Coordination Committee in Xiamen.
- Bearing in mind that ICM does not only focus on upgrading the environmental quality, but also promulgates the economy, there is no doubt that carefully conceived goals bestowed on a suitable political atmosphere will yield long lasting results everything being equal. In order to curtail poverty in Douala, ICM is direly needed.

¹¹The autonomous coastal interagency should play a leading role in the integration of sectoral policies and interagency functions to reduce policy conflicts and overlapping responsibilities.

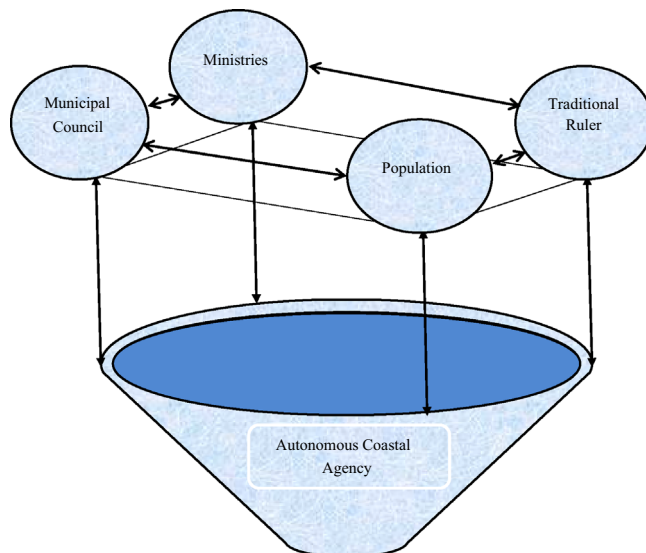


Fig. 13. Toward the reduction in sectoral conflict by the establishment of an autonomous coastal agency.

Interdisciplinary management in Cameroon has long been relegated to the background. It is time to blend hard science with management in order to better comprehend anthropic action.

5.4. Conclusion

The article has examined the typology of the settlements, the key actors shaping the urban planning process in Douala, and the gaps constraining sustainable urban planning in Cameroon. Moreover, Xiamen's socio-economic and environmental outlook before and after the implementation of integrated coastal management (ICM) has been discussed. It is showcased that, the delegation of additional powers to local governments to implement new environmental laws and accepting of bilateral and multilateral assistance by the Chinese Central Government served as a crunch since the introduction of ICM in Xiamen. Furthermore, the political will bestowed by the Xiamen municipal authorities, the participation and inculcation of relevant participants/stakeholders, the establishment of a multi-agency council and the acquisition of sea-use zoning scheme are all key points that symbols Xiamen's ICM accomplishment. Today, with the successful implementation of ICM, Xiamen has built herself a dual status of a vibrant economy and a comprehensive ecological environment.

The conclusions of the effort portray that urban sprawl in Cameroon is caused by inadequate policy implementation, outdated master plan, insufficient information dissemination to the population, disparity in resources distribution among the different regions of the State and above all, the gaps expounded by the traditional form of management. Grounded in the knowledge drawn from Xiamen ICM, the paper recommends the creation of an autonomous coastal interagency in Douala to address the gaps disrupted by sectoral management, and thus, improve coastal management in Cameroon as a whole.

Acknowledgements

Our appreciation goes to Bongajum Simplicite Ngoran (Department of Geography, Faculty of Arts, Letters and Social Sciences, University of Yaoundé I) who despite of his tied schedule, created adequate time for data collection and discussion. We also thank Mr. Hirwa Maurice for valuable comments on the earlier version of the manuscript and the laudable effort of the two anonymous blind reviewers.

References

- African Development Bank (2009). Cameroon: Diagnostic study for modernization of the lands and survey sector. (http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Cameroon_Etude%20sur%20le) (accessed 15/02/2014).
- Ako, A. A., Eyong, G. E.T., & Nkeng, G. E. (2010). Water resources management and integrated water resources management (IWRM) in Cameroon. *Water Resources Management*, 24(5), 871–888.
- Besussi, E., Chin, N., Batty, M., & Longley, P. (2010). The structure and form of urban settlements. In *Remote sensing of urban and suburban areas* (pp. 13–31). Netherlands: Springer.
- Brown, D. N., & Pomeroy, R. S. (1999). Co-management of Caribbean Community (CARICOM) fisheries. *Marine Policy*, 23(6), 549–570.
- Chen, S., & Uitto, J. I. (2003). Governing marine and coastal environment in China: Building local government capacity through international cooperation. *China Environment Series*, 6, 67–80.
- Christie, P. (2005). Is integrated coastal management sustainable? *Ocean & Coastal Management*, 48(3), 208–232.
- Christie, P., Lowry, K., White, A. T., Oracion, E. G., Sievanen, L. Pomeroy, R. S. Key findings from a multidisciplinary examination of integrated coastal management process sustainability. *Ocean & Coastal Management*, 48(3), 468–483.
- Chua, T. E. (1998). Lessons learned from practising integrated coastal management in Southeast Asia. *Ambio*, 27, 599–610.
- Chua, T. E., & Gorre, I. R. (2000). Xiamen region, China. In: C. Sheppard (Ed.), *Seas at the millennium: An environmental evaluation* (pp. 513–533). Amsterdam: Elsevier Science Ltd.
- Cicin-Sain, B., & Belfiore, S. (2005). Linking marine protected areas to integrated coastal and ocean management: A review of theory and practice. *Ocean & Coastal Management*, 48(11), 847–868.
- Cicin-Sain, B., Knecht, R. W., & Fisk, G. W. (1995). Growth in capacity for integrated coastal management since UNCED: An international perspective. *Ocean & Coastal Management*, 29(1), 93–123.
- Cullinan, C. (2006). *Integrated coastal management law: Establishing and strengthening national legal frameworks for integrated coastal management*. Food & Agriculture Org..
- Dagger, Richard (2003). Stopping sprawl for the good of all: The case for civic environmentalism. *Journal of Social Philosophy*, 34(1), 28–43.
- Derrick Ngoran, S., & XiongZhi, X. (2013). *The socioeconomic and environmental implications of urban sprawl on the coastline of Douala-Cameroon*. Options for Integrated Coastal Management.
- Fabbri, K. P. (1998). A methodology for supporting decision making in integrated coastal zone management. *Ocean & Coastal Management*, 39(1), 51–62.
- Food and Agricultural Organization, 2006. Integrated coastal management law establishing and strengthening national legal frameworks for integrated coastal management. Available at: (<http://www.fao.org/docrep/012/a0863e/a0863e00.pdf>).
- Forst, M. F. (2009). The convergence of integrated coastal zone management and the ecosystems approach. *Ocean & Coastal Management*, 52(6), 294–306.
- Franz, G., Maier, G., & Schröck, P. (2006). Urban sprawl: How useful is this concept. In *Proceedings of ERSa conference papers from European Regional Science Association*.
- Gaden, M., Mkumbo, O. C., Lawrence, T., & Goddard, C. (2012). Top-down and bottom-up approaches in the management of the Laurentian great lakes and Lake Victoria fisheries: A comparison of two shared water bodies. *Great Lakes: Lessons in Participatory Governance*, 1001, 364.
- Gibson, J., McField, M., & Wells, S. (1998). Coral reef management in Belize: An approach through integrated coastal zone management. *Ocean & Coastal Management*, 39(3), 229–244.
- Govan, H. (1997). Building on local culture for development in the Pacific: Community participation in natural resource management. *Environment and Development in the Pacific*
- Hao, S., & Peng, B (1998). *The social economic benefits analysis of integrated treatment of Yuandang Lake. Xiamen Demonstration Implementation Office of GEF/UNDP/IMO Regional Programme for Marine Pollution Prevention in East Asian Seas*. Beijing, China: Marine Publishing Company.
- Harwitasari, D., & Van Ast, J. A. (2011). Climate change adaptation in practice: People's responses to tidal flooding in Semarang, Indonesia. *Journal of Flood Risk Management*, 4(3), 216–233.
- Harvey, R. O., & Clark, W. A.V. (1971). The nature and economics of urban sprawl. In: L. S. Bourne (Ed.), *In Internal Structure of the City* (pp. 475–482). New York: Oxford University Press.
- Henocque, Y., Denis, J. (2001). A methodological guide: steps and tools towards integrated coastal area management. IOC Manuals and Guides No. 42.
- Hildebrand, L. P. (2009). *Power sharing in the coastal zone: Shifting roles of government in community-based coastal management* (Doctoral dissertation). Cardiff University.
- Hong, H., & Peng, B. (2002). Harmonizing economic development and environmental management: The Xiamen experience. *Tropical Coasts*, 9(1), 44–47.
- Jeftic, L. (1996). Integrated coastal and marine areas management (ICAM) in the Mediterranean Action Plan of UNEP. *Ocean & Coastal Management*, 30(2), 89–113.
- Klumpp, D. W., Humphrey, C., Huasheng, H., & Tao, F. (2002). Toxic contaminants and their biological effects in coastal waters of Xiamen, China: II. Biomarkers and embryo malformation rates as indicators of pollution stress in fish. *Marine Pollution Bulletin*, 44(8), 761–769.
- Lechner, J., & Maier, G. (2009). Sprawl or no sprawl. A quantitative analysis for the city of Vienna. SRE - Discussion Papers, 2009/03. Institut für Regional- und Umweltwirtschaft, WU Vienna University of Economics and Business, Vienna.
- Linton, D. M., & Warner, G. F. (2003). Biological indicators in the Caribbean coastal zone and their role in integrated coastal management. *Ocean & Coastal Management*, 46(3), 261–276.

- Long, R. (2010). Approach to integrated management: Are there lessons for the China Seas region? (p. 7).
- MacDonald, K., & Rudel, T. K. (2005). Sprawl and forest cover: What is the relationship? *Applied Geography*, 25(1), 67–79.
- Maier, G., Franz, G., & Schrock, P. (2006, August). Urban sprawl. How useful is this concept? In *Proceedings of ERSA conference papers (No. ersa06p105)*. European Regional Science Association.
- Marin, P., Loening, E., & Drozd, J. (2010). Subsidizing Water Connections in Cameroon: How to Apply Output-Based Aid to an Affermage. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/10921> License: CC BY 3.0 Unported.”.
- McCleave, J., Xiongzi, X., & Huasheng, H. (2003). Lessons learned from ‘decentralized’ ICM: An analysis of Canada's Atlantic Coastal Action Program and China's Xiamen ICM Program. *Ocean & Coastal Management*, 46(1), 59–76.
- Nasuchon, N. (2009). *Coastal management and community management in Malaysia, Vietnam, Cambodia and Thailand, with a case study of Thai fisheries management*. New York: Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, the United Nations.
- Ngoran, S. D. (2014). *Socio-environmental impacts of sprawl on the coastline of Douala: Options for integrated coastal management*. Anchor Academic Publishing.
- Nurhidayah, L. (2010). *Integrated coastal zone management in Indonesia: Framework assessment and comparative analysis*. New York: Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, the United Nations.
- Olsen, S. B. (2003). Frameworks and indicators for assessing progress in integrated coastal management initiatives. *Ocean & Coastal Management*, 46(3), 347–361.
- Osolen, R. & Lister N. (August 2004). Social capital, urban sprawl, and smart growth: A preliminary investigation into sustainable communities in Canada. (http://www.crcresearch.org/files/File/Discussion_Paper-3_SoCap&SD_Mar19-09.pdf) (retrieved 27.05.15).
- 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.
- Pollnac, R. B., & Pomeroy, R. S. (2005). Factors influencing the sustainability of integrated coastal management projects in the Philippines and Indonesia. *Ocean & Coastal Management*, 48(3), 233–251.
- Pomeroy, R. S., & Berkes, F. (1997). Two to tango: The role of government in fisheries co-management. *Marine Policy*, 21(5), 465–480.
- Sarda, R., Avila, C., & Mora, J. (2005). A methodological approach to be used in integrated coastal zone management processes: The case of the Catalan Coast (Catalonia, Spain). *Estuarine, Coastal and Shelf Science*, 62(3), 427–439.
- Scialabba, N. (Ed.). (1998). *Integrated coastal area management and agriculture, forestry and fisheries*. Food & Agriculture Org.
- 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.
- Sorensen, J. (1997). National and international efforts at integrated coastal management: Definitions, achievements, and lessons. *Coastal Management*, 25(1), 3–41.
- Thia-Eng, C., Yu, H., & Guoqiang, C. (1997). From sectoral to integrated coastal management: A case in Xiamen, China. *Ocean & Coastal Management*, 37(2), 233–251.
- Wang, Y., Zou, X., & Zhu, D. (2000). The utilization of coastal tidal flats: A case study on integrated coastal area management from China. *Proceedings in Marine Science*, 2, 287–294.
- Wassmer, R. W. (2002). Fiscalisation of land use, urban growth boundaries and non-central retail sprawl in the western United States. *Urban Studies*, 39(8), 1307–1327.
- Westmacott, S. (2001). Developing decision support systems for integrated coastal management in the tropics: Is the ICM decision-making environment too complex for the development of a useable and useful DSS? *Journal of Environmental Management*, 62(1), 55–74.
- Wiber, M., Charles, A., Kearney, J., & Berkes, F. (2009). Enhancing community empowerment through participatory fisheries research. *Marine Policy*, 33(1), 172–179.
- Wolman, H., Galster, G., Hanson, R., Ratcliffe, M., Furdell, K., & Sarzynski, A. (2005). The fundamental challenge in measuring sprawl: Which land should be considered? *The Professional Geographer*, 57(1), 94–105.
- Xu, K., & Yuan, D. (1999). An assessment of the integrated marine pollution monitoring program of Xiamen. In *Challenges and opportunities in managing pollution in the East Asian Seas. MPP-EAS conference proceedings 12/PEMSEA conference proceedings* (Vol. 1, No. 567, p. 88).
- 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.
- Zeidler, R. B. (1997). Continental shorelines: Climate change and integrated coastal management. *Ocean & Coastal Management*, 37(1), 41–62.