



A COMPARATIVE ASSESSMENT OF THE IMPLEMENTATION OF INTEGRATED COASTAL ZONE MANAGEMENT POLICIES IN DEVELOPING COUNTRIES.

BY

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ABSTRACT

This research focussed on a comparison of the Integrated Coastal Zone Management (ICZM) policies of two developing countries (Xiamen in China and Bangladesh). The research was designed to examine these policies in both study areas in order to identify their strengths and weaknesses. To achieve this, the key requirements of ICZM were examined, the ICZM policies of both countries were evaluated against define mechanisms and then recommendations were made. In selecting the case studies, this research considered locations with the highest proportional increase in human population around coastal areas in 2070s. For the purpose of analysis, the research adopted five mechanisms based on an eight country study targeted at improving integration for ICZM. These five mechanisms include Environmental Impact Assessment, Planning Hierarchy, Setback Lines, Marine Spatial Planning and Regulatory Commissions.

The nature of the coastal zones in each of the study areas were examined to understand the underlying issues relating to ICZM, followed by an assessment of their ICZM policies. It was discovered that both countries possess extensive policies relating to ICZM but the level of implementation varied. Xiamen's coastal issues mainly revolved around conflicts from the multi-use of the coastal zone with most of such conflicts manifesting within the marine environment. Bangladesh's coastal issues on the other hand are both natural and man-made. The country's coastline had been devastated by tsunamis, cyclones and erosion in the past. There is also the problem of land use conflicts which saw shrimp farming take-up land designated for other coastal uses.

Recommendations were made both generally and specifically to the study areas.

KEYWORDS

Integrated Coastal Zone Management (ICZM), Environmental Impact Assessment (EIA), Marine Spatial Planning, Coastlines, Ecology **and** Sustainability

1.0 INTRODUCTION

Integrated Coastal Zone Management (ICZM) offers an approach to aid the conservation of natural resources while simultaneously pursuing economic development. This approach

eliminates the sectoral way to managing the coastal zone by providing a holistic view which presents a framework for addressing social and political conflicts that may arise (Lau 2005). This approach basically seeks to integrate economic and ecological needs with the aim of achieving sustainability.

Coastal zones are regarded as being very productive areas around the world which possess a broad variety of significant habitats and ecosystems services that continually attract humans and their activities (European Commission 2015). The sustainable use of these areas is however significantly affected by economic, social and environmental factors such as climate change, demand for coastal resources, industrialisation and increased population (National Resource Management Ministerial Council 2006).

The dynamism and complex nature of problems associated with coastal zones require urgent and adequate attention. Institutional weaknesses can be linked to the cause or exacerbation of problems in coastal areas and this brings about the need to develop a formula directed at achieving sustainability in these strategically significant areas (European Commission 1999).

Bangladesh's 710km coastline (Samwar 2005) is composed of many ecosystems which possess significant conservation values. These ecosystems are situated in a zone that is prone to natural hazards such as flooding and cyclones, while also providing opportunities which are of economic value thereby making them susceptible to overexploitation. Sectoral coastal management programs in Bangladesh have been active in the country since the 1960s and have been dauntingly challenged with the task of enhancing livelihoods while at the same time conserving ecosystems (Islam, Xhe and Rahman 2009).

Chen and Pearson (2015) examined the management of China's coast from a legal and regulatory perspective. They identified that more than 70% of large Chinese cities are situated within coastal zones and that development in these areas contributes more than 55% of the nation's Gross Domestic Product (GDP). It was also identified that issues such as accelerated population growth, urbanisation, increased economic growth and infrastructural development have worsened the problem of ecosystem degradation within coastal zones thereby posing a threat to coastal development in the country.

In the 1990s, the European Commission initiated a programme to demonstrate the application of an integrated approach to managing coastal areas by carrying out 35 projects across Europe with a bid to understanding the pressures and issues faced by coasts (Department of the Environment in Northern Ireland [DOENI] 2006). The process identified a variety of social and environmental problems linked to a lack of vision regarding coastal management due to poor understanding of coastal areas; insufficient stakeholder involvement, lack of synchronisation in policies and legislation in the short and long term; lack of coordination among relevant administrative bodies and inadequate support from higher administrative levels.

Rupprecht Consult (2006) regards ICZM as a complex process composed of various stakeholders, policies and issues which are broadly linked. A comparative study of the manner in which ICZM is being implemented from country to country will reveal a wide variety of programs and degrees of implementation which can be connected to the various histories and methods countries adopt in managing their coastal zones. According to Portman et al. (2012), previous research on the implementation of ICZM advocate for practical and comparative analysis in order to provide guidance on how best to apply certain mechanisms within specific institutional and organisational frameworks.

The importance of a comparative study in ICZM is that it exposes the dynamics of coastal areas in different countries allowing for lessons to be transferred or replicated where possible. In such a study conducted by Rupprecht Consult (2006) on the implementation of ICZM in Europe as a follow-up to the European Union (EU) ICZM recommendations of 2002, it was established that generally, most of the countries lacked a proper fusion of horizontal (cooperation between private and government stakeholders) and vertical (coordination among all government agencies) structures and are expected to handle complex problems in coastal zones. It also stressed the rise of constraints as a result of overlapping responsibilities, competition, limited authorities and gaps in vertical and horizontal communication, as well as poor stakeholder involvement leading to local ICZM clamouring for increased participation, policy creation and execution.

1.1 Research questions

1. What is the policy framework of the ICZM policies in Bangladesh and Xiamen (China)?
2. How has the implementation of these policies impacted on coastal area in these two countries?
3. Have gaps been identified in the implementation of these policies?
4. What steps have been taken to identify gaps with a view to correct them in the overall plan?

2.0 Nature of Bangladesh's coastal zone

2.1 Geography

Bangladesh is located above the Bay of Bengal and has a coastline of about 710km (Chowdhury 2007). It is situated in the tropical climate zone and its coastal area spans an area of 47,201km² which is about 32% of the country's total population as well as having 19 districts (see Figure 2.1) (Islam, Xue and Rahman 2009). About 35 million of Bangladesh's population (29% of the entire population) live in its coastal zone (MoWR 2005). The entire coastal zone covers an area of between 37km and 195km but the exposed parts of the coast (see Figure 2.3) are between 37km and 57km in distance (Islam et al., 2006). Bangladesh's coastal zone is divided into three geographically diverse regions namely, the Western, Central and Eastern regions. The regions in the Western and Central parts are very low and flat and the lands in these areas have many intersecting rivers and channels and are composed of many islands.

The Western region of Bagerhat, Sattkhira, Perojpur and Khulna is home to Bangladesh's popular mangrove forest, The Sundarbans (Ahmed 2010). A steep-sided valley which diagonally cuts into the sea floor the continental shelf, runs from the north-east to south west, up to around 24km. The Central region, composed of Noakhali, Bhola, Feni, Lakshmpur and Barisal, is very active geomorphologically thereby influencing land formation processes which are transforming land features. These areas experience a significant amount of natural hazards such as tidal surges, cyclones, floods and salinity intrusion almost annually (Ahmed 2010).

The eastern region, which quite narrow in shape, begins from Bodormokarm, located at the mainland's southern tip and terminates at the estuary of River Feni (See Figure 2.1). Running parallel to the eastern zone is a chain of hills (Sarwar 2005). Mudflats and submerged sands are the predominant soils in this region (Islam 2001) and the submerged sand has transformed into a sandy beach which stretches a distance of 145km. There are two important beaches in this region which are the Cox's Bazar and Patenga which attract lots of tourists. The main source of livelihood for the population in the Eastern zone include bay fishing, fish farming, tourism and production of salt (Sarwar 2005).

A demographic issue affecting Bangladesh is its rapid population rise. The urban poor which include small scale farmers and labourers amount for about 71% of the 6.85 million households (Ahmad 2004). Large scale farmers are 2% of landowners; medium scale farmers own 18% of coastal lands, while 80% of land owners are small scale farmers (Program Development Office for Integrated Coastal Management Plan [PDO-ICZMP] 2004). These issues have the tendency pf affecting the use of the coastal zone resources in Bangladesh.

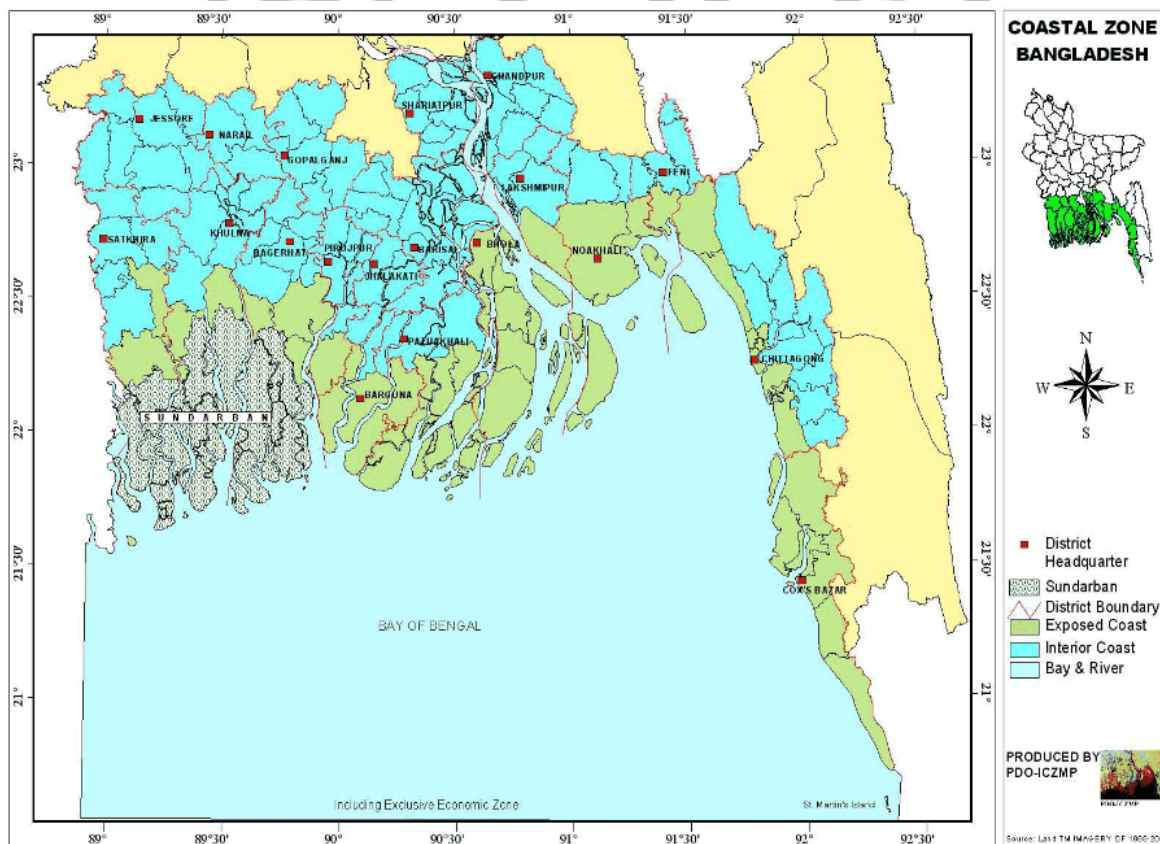


Figure 2.1 Coastal zone map of Bangladesh. Source: (Islam, Xue and Rahman 2009).

2.2 Socio-economic development

Bangladesh's Gross National Product (GNP) per capita was fourth to the last in 1990 and at that time, its population growth annually was at 2% (Ericksen, Ahmad and Chowdhury 1996). PDO-ICZMP (2005) estimated Bangladesh's coastal zone population to increase from 36.8 million in 2001 to 43.9 million in 2015, with the population reaching over 60 million by 2050. Climate is the single most significant factor for the determination of its agricultural performance and as such, it is not unusual to see severe fluctuations in GNP or GDP (Ericksen, Ahmad and Chowdhury 1996). Bangladesh's GDP also relies on other sectors besides agriculture (which employs 57% of its population, mainly women and contributes 37% of the GDP), but also, sectors such as manufacturing (9% of the GDP) and energy and construction (8% of GDP). 47% of the GDP is attributed to Bangladesh's services sector which is fast growing (Ericksen, Ahmad and Chowdhury 1996). The ripple effect of economic development has diversified employment opportunities but has not kept pace with rapid population increase mainly in the rural areas. In 1991, the nation's potential workforce was about 36.5 million and gradually increased at the rate of one million per year due to the influx of migrants. During this period, around one-third of the entire labour force was unemployed which is about 12 million people (Ahmad, 1993). In the 1980s, investment as a part of the GDP reduced from 15.9% to 11.7% which undermines the economic base for growth in the future. This, coupled with low savings domestically, reliance on foreign aid, tentative foreign remittances and unpredictable prospects, present a big hurdle in terms of economic growth (Ahmad and Mirza 1992).

2.3 Multi-use of coastal resources in Bangladesh

Due to the regional differences characterised by Bangladesh's coastal areas (i.e. the Western, Central and Eastern zones) sources of livelihood range from agriculture to fishing, salt farming, shrimp farming, tourism, forestry and other sources.

2.4 Agriculture

Bangladesh as a nation is highly dependent on agricultural production to support its population and rice cultivation represents the main agricultural produce. Agriculture also represents the largest aspect of the coastal economy of the coastal areas (see areas in green in Figure 2.4). The country has a net cultivatable land of 1.95 million hectares which reduces as a result of high soil salinity during the dry season as the rainy season starts (Ahmed 2010). The coastal areas are characterised by varying landforms with medium-highland being dominant. This is followed by highland, then medium-to lowland, and then lowland. Coastal zones contribute around 16% of the entire rice production in Bangladesh (Ahmed 2010).

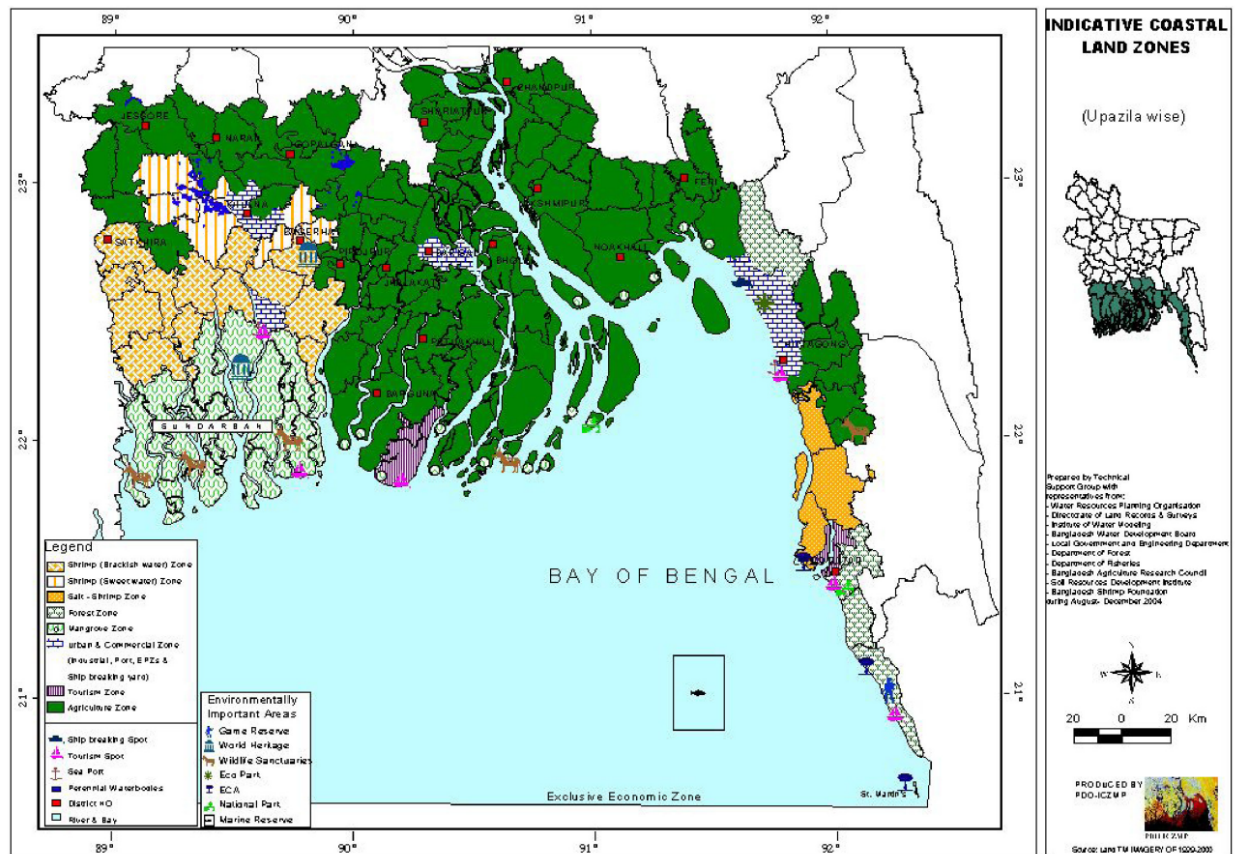


Fig 2.2 Bangladesh's delineated coastal land zones. Source: (Islam et al., 2006).

2.5 Fisheries

Aquaculture remains one of the major economic activities within the country's coastal areas (Islam and Koudstaal, 2003). Fisheries as a sub-sector, contributed 5.23% of Bangladesh's GDP in 2002 and 2003. Fish farming is made possible as a result of a large network of river systems, dead river sections, natural depressions, low-lying marshes and land and ponds (Ahmed 2010). Shrimp cultivation and pond aquaculture represent the dominant land uses in fisheries within the coastal areas (see areas in yellow in the western part of Figure 2.3). Shrimp farming has become very significant over the last three decades due to its rapid growth (Alam and Phillips 2004). Its expansion rose from 51,812 hectares in 1982 to 137,996 hectares in 1994 and 218,649 hectares in 2004 (DoF 2005).

2.6 Forestry

Bangladesh's coastal zone is the habitat for 7,869,000 hectares of the country's forests (around 50% of the nation's total forests). This value includes natural forests such as the Sunderbans and artificial forests (Ahmed 2010). Among the forests found in the natural areas are mangrove forests, a mixture of deciduous and evergreen forests and mixed thickets (see both patternised green areas in the west and east of Figure 2.4).

2.7 Salt production

Salt production in Bangladesh can be found on 2,742 hectares in the districts of Chittagong and Cox's Bazar located in the south-east of the country (see the area in yellow with white dots on the east of Figure 2.4). Salt concentration is continual in these areas and had been exploited since 1960 (Ahmed 2010). This has caused the demand for land for salt production to increase due to a continuously growing demand for the product. Since then, land use under salt production had been gradually increasing to meet the ever-growing demand. There are 41,000 listed salt producers. In 2003/2004, 900,000 tonnes of salt from was produced on 24,900 hectares of land during the period of 2003 and 2004 alone (Ahmed 2010).

2.8 Other coastal uses

Due to the natural sceneries available along the coastal areas of Bangladesh, tourists are attracted to spots around them (see areas in purple lines in Figure 2.4). As mentioned in the geography of Bangladesh in 2.3.1 above, Cox's Bazar beach and Patenga beach attract a lot of tourists. Cox's bazar beach is the most visited due to its natural and cultural diversity (Ahmed 2010). There are also some developed urban areas within the coastal areas such as Chittagong. 74 municipalities and areas considered as urban are situated along the coastal zone of Bangladesh (see areas in patternised blue lines in Figure 2.4). Some other minor uses include ship breaking and sea ports.

2.9 Coastal problems in Bangladesh

The coastal zone in Bangladesh provides livelihood for the inhabitants of the area and contributes significantly to the country's GDP. However, this area is also vulnerable to natural catastrophes and man-made problems which are discussed below.

2.10 Vulnerability to natural hazards

According to World Bank (2011), Bangladesh will be the most affected country in South, East and South-East Asia by rise in sea level (1m by 2100). The effects of this rise include the loss of about 1,000km² of agricultural land and the loss of areas for aquaculture which will become salt marsh. The organisation also identified four primary physical impacts of the sea level rise namely: drainage congestion, saline water intrusion, extreme events and morphological changes in the country's coasts. Bangladesh's popular mangrove forest (Sandarbans) will most likely suffer severely from the effects of climate change. High evapotranspiration and low flow in winter will cause soil salinity to soar and in turn, forest productivity will decline (World Bank 2001).

2.11 Land use issues

A major problem identified in the land use structure of Bangladesh is that most lands within the coastal zone can be applied for multiple uses and as such, land use conflicts arise (Islam 2006).

One major of such conflicts as identified by several studies is shrimp farming and other uses (Nuruzzaman, 1979; Karim and Stellwagen, 1998). Haque (2004) described how the development of shrimp farming has altered the land-use structure of farmlands, changing agriculture and also converting mangrove areas for shrimp production purposes. There have also been studies which indicated trees were dying and other vegetation types were being lost (Alauddin and Tisdell, 1998). Maniruzzaman (1998) examined some studies stating a decline in the land used for cattle grazing. Shrimp farming contributed to the reduction in the amount of drinking water available and increased soil and water salinity (Islam 2006).

2.12 Summary

In this chapter, the characteristics of the coastal zones in Xiamen and Bangladesh were examined. Firstly, the geography of each study area was examined in order to give an understanding of the natural and artificial environments. Secondly, the socio-economic situations were identified as these play a critical role in the manner in which coastal resources are exploited. Thirdly, the main coastal resources present in each coastal zone was looked into in order to find out the exact resources resource type, nature and their effects. Lastly, the main issues facing the coastal zones in both study areas were examined.

It was discovered that Xiamen has some islands which provide a variety of fisheries and mariculture which are of economic significance. It is also a very important port city and a lot of cargo travel through it via shipping. The fishing industry conflicts with the shipping industry in some parts and there are issues of pollution which were identified.

Bangladesh on the other hand is composed of three geographically unique regions which possess varying resources such vast mangrove forests, aquaculture and salt production. The problems Bangladesh's coasts faces are both natural and man-made. The natural hazard which poses significant threat country is sea level rise. Land use conflicts constitute the man-made problems.

3.0 Methodology

3.1 Sources of data

For the purpose of this research, data was derived from secondary sources. Below is a list of the types of secondary data identified to meet the objectives of this research.

1. The Integrated Coastal Zone management policy documents of each country. These outline and explain the framework for the way in which the ICZM policy is to be implemented as well as identifies the scope of such an ICZM policy.
2. Documents providing a criteria and guideline for the execution of an ICZM policy. These were gotten from similar research and also from guidelines set by International Organisations.
3. Journal articles. Scholars have written extensively on issues around coastal zones which provided an insight into the actual situation around this research.
4. Past research projects. A look at studies on a similar scale provided a guide in structuring this research project.
5. Books were utilised in understanding the underlying concepts of coastal zones and coastal zone management. They were also essential for a review of the literature.
6. Other secondary sources deemed suitable for the purpose of this research were also consulted.

3.2 Case study selection

Two countries were selected for this research. In selecting the case studies, priority was given to locations with the highest proportional increase in human population around coastal areas in 2070s. An increased population will mean competition for resources, stress on resources, vulnerability of the population to natural and man-made disasters and the need for a good management plan in place.

Figure 3.1 shows that Dhaka ranks number one position on the chart followed by Chittagong. In order to give a perspective in the comparison, Chittagong (being second position on the list) was not selected as it is in the same country as Dhaka, Bangladesh. Ningbo, being third on the list was then selected as it is in a different country (China).

Both countries were also selected because parts of their coastal areas have been faced with natural or man-made disasters and both of them each developed an Integrated Coastal Management policy which have been implemented or may still be in the process of implementation.

Bangladesh's ICZM was implemented on a national scale so its entire coastal zone was considered based on the varying characteristics within these areas. China implemented its first ICZM project in Xiamen hence, this location was selected for analysis.

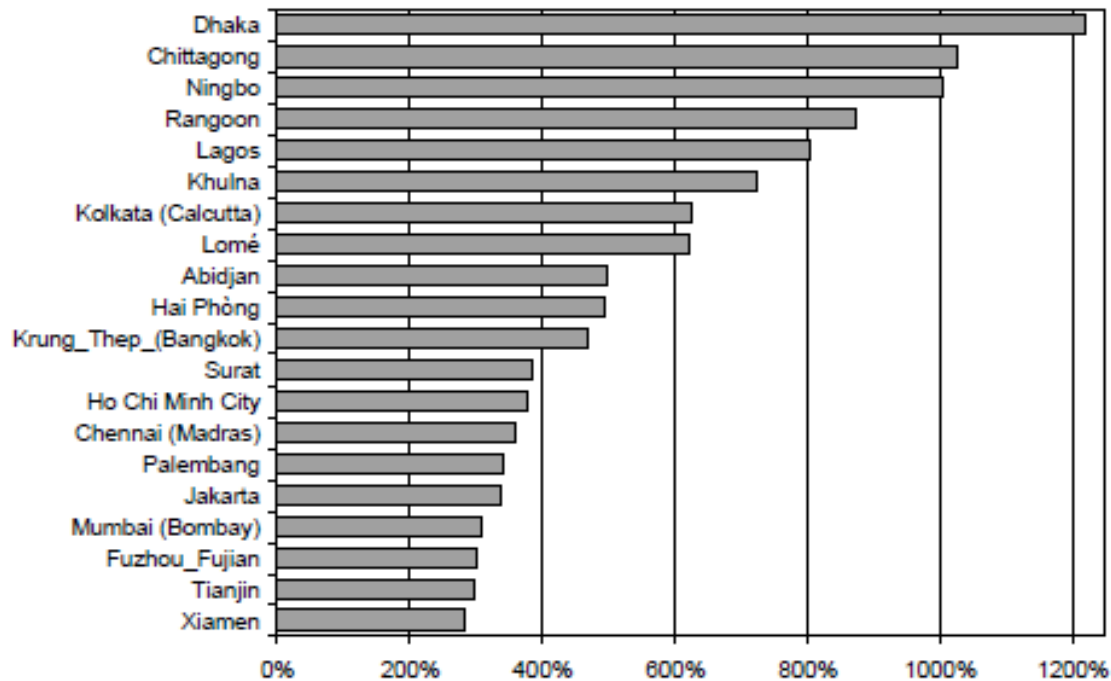


Figure 3.1: Top 20 cities with the highest proportional increase in exposed populations by 2070s as a result of climate change, natural subsidence and human-induced subsidence. Source: Nicholls *et al.* (2008).

3.3 Data presentation analysis

This research seeks to identify the strengths and weaknesses of the ICZM policies of Bangladesh and China. This required an assessment of the framework of these policies and how they have been implemented, monitored and where available, reviewed. It studied the role and achievement of ICZM policies in both countries and analysed the performance of specific mechanisms used to support ICZM based on a qualitative comparative analysis. These mechanisms include:

- Environmental Impact Assessment (EIA);
- Planning Hierarchy;
- Setback Lines;
- Marine Spatial Planning and
- Regulatory Commission.

Portman *et al.* (2012) developed the above analytical technique using these five mechanisms based on an eight country study targeted at improving integration for ICZM. They highlighted a gap in the study of the implementation of ICZM successes and identified that comparative analysis have not been carried out widely in the past and that there is a need to carry out such researches so as to transfer knowledge. These mechanisms are commonly used in the management of resources and various uses to which terrestrial-marine habitats (i.e. the coastal zone) are being applied and the objective is to identify which of these mechanisms have been

adopted by each of these countries and to determine if they best suit them Portman et al. (2012).

The five mechanisms are explained below.

3.4 Environmental Impact Assessment (EIA)

Usually in the form of a statement (Environmental Impact Statement), EIA is concerned with the Identification and appraisal of the potential impacts that may arise as a result of a proposed project on its surrounding areas. These impacts range from those which affect environmental quality to those which can affect the state of ecosystems. In some capacities, EIA provides a platform with which systems of government integrate environmental sciences into the decision making process (Dimento and Ingram 2005)

3.5 Planning hierarchy

This refers to a governmental system at various levels for planning at a regional scale as well as management of resources using a top-down approach. Master plans (statutory or non-statutory) at the top level will coordinate the route of development to be taken at lower levels. In most cases at the top level, national plans are created and the dissected in details at lower levels with the aim of addressing regional and local areas particularly.

3.6 Setback lines

It is important to set a recommended boundary from a physical or landscape feature which could be a shoreline or line of permanent vegetation, within which restrictions have been placed on all or some types of development or coastal zone uses. The boundaries indicated by setback lines are set on the land areas in coastal zones (Cambers 1997).

3.7 Marine spatial planning (MSP)

MSP involves a process in which the spatial and temporal distribution of human activities within marine areas are analysed and allocated in a bid to achieve economic, ecological and social goals which would have been via a political process (Ehler and Douvere 2009).

3.8 Regulatory commission

A regulatory commission is a forum established and mandated by law or regulation comprising of government agencies at various levels and other experts working together within a collaborative and participatory process with the aim of regulatory decision making on issues concerning development or those that relate to the management of activities in coastal areas.

Data was presented using tables. The five mechanisms for analysis were tabulated against the ICZM policies of China and Bangladesh. Analysis was then carried out based on how much the policies in both countries conformed to the five mechanisms.

4.0 RESULTS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

4.1 Results and discussion

The methodology applied for this research is a qualitative comparative one in which the following mechanisms are used to compare the ICZM policies in Xiamen and Bangladesh.

1. Environmental Impact Assessment (EIA)
2. Planning Hierarchy
3. Setback Lines
4. Marine Spatial Planning
5. Regulatory Commission

4.2 EIA

Table 4.1 EIA Legal Instruments and policies in the study areas (see Appendix A and B)

Mechanism description	Xiamen	Bangladesh
EIA is concerned with the Identification and appraisal of the potential impacts that may arise as a result of a proposed project on its surrounding areas.	<ol style="list-style-type: none"> 1. Zoning of Various Sea Uses 2. Regulations for the Uses of Sea Areas 3. Regulation for the Protection of Chinese White Dolphin 4. Regulations for the Management of Tourism 5. Government Notice on Implementation of Xiamen Functional Zoning Scheme 	<ol style="list-style-type: none"> 1. EIA guidelines for Industries 1997 2. Environmental Conservation Act 1995. 3. Marine Pollution Ordinance 1977 4. Inland Shipping Ordinance 1976 5. Environmental Conservation Rules 1997 6. National Fisheries Policy 1998 7. National Agriculture Policy 1999 8. Pesticides Law 1985 9. National Forest Policy

As shown in the table above, both study areas have legal instruments to regulate development within the coastal zone. As described in 4.1 above, Xiamen struggled with managing most of its waste by treating them. Particularly is the issue of waste from non-point sources such as effluents from upstream and agricultural wastes which is usually a challenge to trace. The Chinese white dolphins were given major consideration in the West Sea. Through an analysis of the most suitable location to situate them, it was realised that they could not be relocated. The shipping industry gained the priority position in the West Sea but ships are required to reduce speeds to eight knots so as not to cause harm to dolphins. Bangladesh identified a number of problems relating to its coastal and marine areas and one of such problems is industrial waste (refer to 4.3.2). The EIA guidelines for Industries, 1997 is an applicable law to address this issue.

4.2 Planning Hierarchy

Table 4.2 Planning Hierarchy in the study areas.

Mechanism description	Xiamen	Bangladesh
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<p>This refers to a governmental system at various levels for planning at a regional scale as well as management of resources using a top-down approach. In most cases at the top level, national plans are created and the dissected in details at lower levels with the aim of addressing regional and local areas particularly.</p>	<ol style="list-style-type: none"> 1. Xiamen’s ICM Plan 2. Xiamen structured an interagency coordinating mechanism which comprised of 22 government agencies led by Xiamen’s executive vice-mayor who was supported by the Marine Management Office (MMO) and advised by a group of marine experts. 3. A mass media education program was setup which included television and radio, articles in newspapers, integration of pertinent information in school curricula, quiz shows, seminars, ocean and environmental day celebrations and an environmental hotline 	<ol style="list-style-type: none"> 1. Bangladesh’s Integrated Coastal Zone Management Plan (ICZMP). 2. The Coastal Zone Policy 3. The Coastal Development Strategy. 4. The priority Investment Program 5. The institutional structure recognises line agencies as the best implementers at an agreed planning an implementation framework at the national level, but coordination will be done and supervised at the local level 6. Multi-purpose infrastructure for communities.
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ICZM in Xiamen did not emanate from any existing Federal structures. The coastal zone was selected as a pilot project for ICM in China by the Global Environment Facility/United Nations Development Program/International Maritime Organization’s (GEF/UNDP/IMO) Prevention and Management of Marine Pollution in the East Asian Sea (MPP-EAS). As such, the ICM plan was formulated at the municipal level which increases the possibility of the project being successful. The ICM structure was composed of 22 government agencies and headed by the vice-mayor. The project also relied a lot on public awareness via various media. This public awareness strategy through the mass media helped spread information about ICM and its importance around the coastal zone. In Bangladesh, ICZM was drawn-up at the national level through the ICZMP. There was also the CZP, CDS and Priority Investment Program. The institutional structure proposed that line agencies be the executors of the national level while coordination should be done at the local level.

4.3 Setback Lines

Table 4.3 Setback lines from the coastline

Mechanism description	Xiamen	Bangladesh
<p>This is a boundary from a physical or landscape feature which could be a shoreline or line of permanent</p>	<ol style="list-style-type: none"> 1. No setback lines set based on definition. 2. See table 4.3 for delineated coastal uses 	<ol style="list-style-type: none"> 1. Setback distance restricts the construction of residential blocks and hotels within a specified distance along the coastline.

<p>vegetation, within which restrictions have been placed on all or some types of development or coastal zone uses.</p>		<p>2. The setback distance for this purpose is generally 50m. However, a set-back distance of 100m is set for non-polluting industries and 200m for polluting industries</p>
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Based on the definition given for setback lines, Xiamen cannot be said to have put any of such in place. This however, can be traced to the reason that most of Xiamen’s coastal problems manifest at sea. This make reduces the need for such instruments. Setback lines are still needed to protect the coastal zone from natural hazards such frequent typhoons and earthquake. On the other hand, Xiamen has been able to delineate its coastal uses and placed restructure on the mixing of certain uses. This was done to ensure that conflicts within the coastal areas were reduced as much as possible (see table 4.3). Bangladesh placed a setback distance of 50m from the coastline for the construction of hotels and residential blocks. It then further set a distance of 100m which marked the minimum distance where only non-polluting industries could be situated. A distance of 200m was also set for polluting industries in a bid to reduce the possibility of pollution along the coastline.

4.4 Marine Spatial Planning (MSP)

Table 4.4 Marine Spatial Planning within the coastal zone

Mechanism description	Xiamen	Bangladesh
<p>MSP involves a process in which the spatial and temporal distribution of human activities within marine areas are analysed and allocated in a bid to achieve economic, ecological and social goals which would have been via a political process</p>	<p>1. Xiamen has a good example of Marine Spatial Planning. It recognised the conflicts in the West Sea and relocated the aquaculture activities (including the structures) which hitherto caused obstructions for ship navigation, to Tong’an Bay. It also recognised that tourism did not pose a risk to shipping and retained certain tourism activities in the West Sea. In order to protect the Chinese white dolphins, ships had to reduce their speeds to 8 knots while approaching the harbour areas where these dolphins inhabited.</p>	<p>1. Although Bangladesh relies on fisheries from its marine areas to sustain its economy, there are no evidences of actual marine spatial planning. This can be linked to the reason that most of the coastal issues given priority here are mitigation against environmental hazards and improvement of the livelihoods of coastal inhabitants.</p>

4.5 Regulatory Commission

Table 4.5 Regulatory Commission

Mechanism		
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description	Xiamen	Bangladesh
<p>A forum established and mandated by law or regulation comprising of government agencies at various levels and other experts working together within a collaborative and participatory process with the aim of regulatory decision making on issues concerning development or those that relate to the management of activities in coastal areas.</p>	<ol style="list-style-type: none"> 1. Xiamen used consultations, meetings of experts and public hearings while considering its zoning system (see 4.1.1.1 above). 2. These helped in settling the grievances of some sea farmers in the coastal zone that initially rejected the idea of relocating their activities from the West Sea to Tong'an Bay. 3. The forums paved way for alternatives to be considered where sea farmers were given a three-year grace period to relocate from the West Sea and compensations being paid to them by the ports and shipping industry. 	<ol style="list-style-type: none"> 1. There are no records of Regulatory commissions in Bangladesh. This can be attributed to the issues raised concerning the level of implementation of Bangladesh's ICZMP (see 4.3.4 above).

4.6 Further discussions

Xiamen showed considerable levels of conformity with the defined mechanisms used to analyse aspects of ICZM in both study areas. The areas where it had not-so-well defined conformities are in Planning Hierarchy and Setback Lines. These issues were however addressed based on the nature of coastal areas and how it varies from country to country and region to region (see introductory chapter). Nonetheless, Xiamen instituted an ICM structure which showed Planning Hierarchy at the local level and based on the post ICZM implementation, recorded a significant amount of successes in tackling its coastal issues. In the area of Setback Lines as mentioned earlier, Xiamen's main coastal issues were at sea which made Marine Spatial Planning more relevant to it.

Bangladesh showed conformity to all the mechanisms except Marine Spatial Planning and Regulatory Commission. Following the report on its ICZM performance in figure 4.3, it can be seen that there exist some problems within the framework for its ICZMP. The adoption of the CZP and CDS recorded successes but these policies have been largely unimplemented. Poor financial commitment was raised as a major issue in executing ICZM plans especially in developing countries and Bangladesh had issues with funds to continue with the project. The country's ICZM was implemented from 2002-2005 (3 years) which is an issue (i.e. short timelines of ICZM programs in developing countries) that has been studied by numerous researchers.

4.7 Conclusion

ICZM is an effective tool in the holistic management of coastal zones but only if well applied. During the course to designing an ICZM plan, it is very important for all potential affected

sectors to be considered as this leaves little margin for error. This also requires that all stakeholders to be involved in the process have a clear understanding of their roles and responsibilities in order to reduce the possibility of conflicts arising. The lead agency needs to create an enabling environment for cohesion amongst all relevant government agencies and departments involved in the ICZM process as well as put in place a mechanism for the balance-of-power which tends to create friction.

This research set-out to carry-out a comparison of the implementation of ICZM in developing countries based on five mechanisms identified as being widely used. The initial objective was to identify the key requirements of an ICZM policy. This identified the roles of all stakeholders within ICZM and elaborated on the responsibilities of each player within the ICZM framework. The research then looked at the issues affecting ICZM in developing countries to provide a context for the main requirements of ICZM. The second objective required an evaluation of the ICZM policies of both countries and it was discovered that where Xiamen had recorded significant improvements in the management of its coastal zones, Bangladesh was still faced with implementing a substantial part of its programs due to setback as a result of funding and some institutional issues. The third objective will be to recommend possible courses of actions for both countries based on the areas where issues have been identified.

4.8 Recommendations

The following recommendations are suggested based on the findings.

Continuity in ICZM

ICZM needs to be seen and addressed as a continuous process which can span several years. The need for evaluation and review after the implementation of any plan means there may be a need to revisit certain issues which may not have been adequately captured during the data collection stages or the cumulative impacts of some actions provided in the plan. Due to the changing nature of the geography of coastal areas, ICZM needs to be handled sustainably by putting mechanisms in place to check for problems as they arise. This also stresses the need for all stakeholders to be fully and actively involved in the process as this will save time and cost on the long run.

Fusion of ICZM with existing spatial planning frameworks

ICZM need a holistic approach in order to record success. This makes it necessary to fuse a proposed ICZM plan with existing spatial planning frameworks. In Bangladesh, ICZM was carried out from 2002-2005 which signifies that the country may have returned to its sectoral coastal management methods or a partially integrated way of managing coastal issues. This poses a big problem in that it has the capability of potentially causing harm to the success of future calls for ICZM in Bangladesh. The process of ICZM is exhaustive in itself and stakeholders have a lot to bear with during the process and as such, make truncation a big problem. To this end, it is suggested that ICZM form the basis for spatial planning in coastal zones.

Full Participation

It is very important that all relevant players at all levels including stakeholders and coastal communities are allowed to participate in the ICZM process. In Bangladesh, the Government mentions plans to improve the livelihood of the inhabitants of coastal areas but makes no mention of areas where citizens have been involved in the ICZM process. Just as it was done in

Xiamen, it is necessary for coastal dwellers to be aware and well informed about the importance and benefits of ICZM via various media. This then needs to translate into results as the ICZM plan is being executed as it will serve as a convincing tool for the coastal populace.

Effective monitoring and communication

Xiamen's ICZM recorded a lot of successes. It then becomes imperative to increase the role of monitoring, collection of data and proper management of such data, as well as information dissemination and appraisal. Effective monitoring and communication have the capacities to improve knowledge base which in turn can reduce the amount of response time when issues arise, provide a proper platform for integrated planning, provide guides for monitoring strategies, and ensure overall sustainability. This also paves way for ease of communication between decision makers and coastal people. The coastal people experience problems first-hand as they begin to manifest while experts have the capacity to tackle such problems. Effective channels for communication can ensure the perceived problems are solved at their infancy stages before they are exacerbated.

Increase International participation

Developing countries are plagued with the problem of committing financial resources to manage their coastal problems. It then lies on the international community to step-up their approach towards funding and assisting developing countries in managing their coastal areas. Coastal nations need to be encouraged to contribute more towards the protection of their coastal zones from natural and man-made hazards. There can also be transfer of experiences and success stories from coastal zones which have recorded significant improvement in coastal management.

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