

**Coastal Management in Small Islands: recommendations for the process in Cape Verde**

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**ABSTRACT**

Globally we are witnessing a phenomenon of coastal anthropization. This being the place where dwells the majority of the world population (Nelson, 2010; Borges et al., 2009), thus representing a significant fraction of the territory in terms of socio-economic and cultural issues. At the same time the coast represents a valuable biophysical support (Gomes, 2007) and it is subject to physical processes (eg storms, wave action, sea level rise due to global warming), which could endanger the population, infrastructure, as well as habitats and natural resources (eg soil). Therefore the challenge is focused in seeking a balance between human activities and natural processes, considering the hazards that could arise. Specifically on the small islands, the challenge gains more emphasis since the islands are isolated spaces and totally exposed around their perimeter, and can be considered as coastal territory in its entirety.

Cape Verde is an archipelago of about 1,000 kilometers of coastline (more than Portugal), and regarding to coastal management there is little or almost no experience. Therefore the moment seems opportune to reflect on this issue, since the regulatory process of the coastal areas through the elaboration of the Coastal Plan (*POOC*) is about to start in short-medium term.

Thus, this work aims to propose recommendations as a basis for a coastal management model adjusted to Cape Verde, based on two aspects: 1) the current challenges facing the coast in this country; 2) the long experience in Portugal (almost two decades) with the *POOC*.

**Keywords:** Coastal management, *POOC*, Small islands, Cape Verde.

## 1. INTRODUCTION

Currently the majority of the world population lives in coastal areas (Nelson, 2010; Borges et al., 2009), especially in urban centers (UN-Habitat, 2010), thus representing a significant fraction of the territory in terms of socio-economic and cultural issues. It is usually a privileged and expensive region due to the continued interest of the population and the limited physical space (Davis, 2005). It turns out that in environmental terms the coast represents a valuable biophysical support (Gomes, 2007) and has been under enormous pressure by anthropogenic activities (alongside growing urbanization, coastal tourism has fostered a steady demand, resulting in some negative impacts at environmental and social level, especially in developing countries [UNEP, 2009]). Moreover, coastal areas are territories that are subject to physical processes (eg storms, wave action, sea level rise due to global warming), which could endanger the population, infrastructure, as well as habitats and natural resources (eg soil). Therefore the challenge is focused in seeking a balance between anthropogenic activities and natural processes, taking into account the hazards.

Specifically on archipelagos, the coastal challenges earn a greater emphasis since the islands are isolated and relatively small spaces. Although there are some perspectives that define the concept of *small island* not by the area or population but by the challenges and vulnerabilities that present (Maul, 2005), most of the islands will be small enough to be affected directly and indirectly by the proximity of the sea and be regarded as a coastal area in their entirety. The hazard issue associated with coastal processes is fundamental for the islands since they are involved by the sea and exposed around their perimeter. The limited space makes the competition for coastal space more evident and as suggested by Cambers et al (2011) the land tenure patterns can differ from the most traditional (land adjacent to the coastline is owned exclusively by the government and can only be leased, not sold, to private individuals) to more eccentric (the floor of the sea is privately leased). As a tourist destination islands represent, according to Lohmann (2011), the archetype associated with white sandy beaches, sun, relaxation, sense of distance and break from daily routines and these aspects have been promoted in many island states such as a growth strategy which increases demand and therefore anthropogenic pressure.

Cape Verde as a small archipelago faces many coastal challenges and in terms of coastal management little has been done. As the elaboration of the coastal plan is expected in a short-medium term, this work aims to propose some recommendations as a basis for a coastal management model adjusted to Cape Verde Islands, based on both, the analysis of the current state of the coast (identifying the main challenges) and the analysis of Portuguese coastal context (considering the similarity of territorial management system and almost two decades of experience with POOC) in order to realize any contributions to the process in Cape Verde.

## 1.1. Coastal areas: conceptual and geographic framework

Coastal areas represent the interface between the marine and terrestrial realm, characterized by a constant mutation that derives from the dynamic interaction between the ocean and land surface, where waves, currents, tides and wind emerge as key factors in a continuum process of erosion and sediment deposition (Nelson, 2010). However, how this interaction occurs may vary according to the site, depending on the intensity of coastal processes (ie astronomical, meteorological, hydraulic, transport of sediment and human activity), the type of coastline and continental shelf. This condition leads to a variety of situations with different dominant parameters. Thus, given the diversity and complexity that characterize these territories, it is important to define spatial concepts that facilitate, for example, the legal framework and operational policies. However, it should be noted that the coastline is associated with several spatial concepts and designations, not always agreed, as there is not a standardization of the terminology. Authors found that, for the same reality, different terms are used, or else, same terms are used with different physical limits (USACE, 2002a).

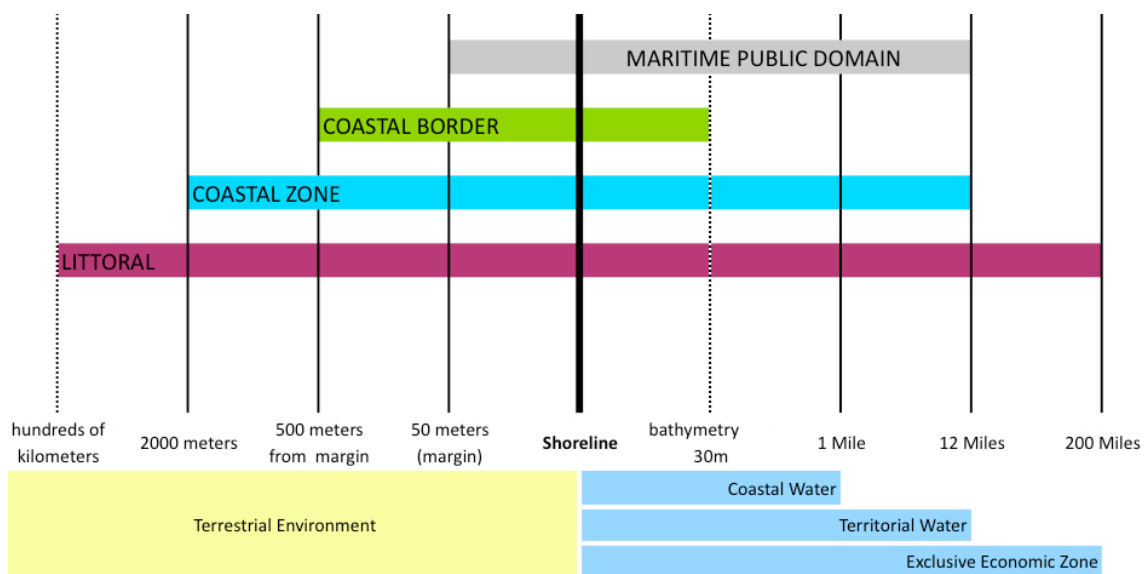


Figure 1 Spatial definition of key concepts inherent to the coastal territory in Portugal

Considering the concepts represented above (Figure 1), it can be stated that although the size of the islands can be diverse, many are sufficiently small to be considered in its entirety as "Littoral" or even "Coastal Zone" (e.g. Santa Luzia island in Cape Verde).

## 2. COASTAL PLANS IN PORTUGAL

The Portuguese coastal plan (POOC), regulated by Decree-Law nº 309/93 of 2 September (repealed by Decree 159/2012 of 24 July) is defined, as well as few others, as a special plan (PEOT). It has as its object the coastal and inland waters as well as the bed and its margins. It has two protection zones (terrestrial and maritime): from the land side it goes to the limit of 500 meters and from the sea side until the

bathymetric of 30 meters. The POOC arose mainly as a response to the pressure observed on the beaches, in a context where regulation was almost nonexistent. Over the years POOC's content went through some updates, which shifted its focus, from the regime of soil use to preservation issues (focused more on hazards). Most POOC on the mainland have reached the limit of validity and based on assessments made to these plans it was concluded that the main problems or constraints fall into the following areas: hazards, protection limits, vision, methodologies, articulation with the Municipal Plans (PMOT). If the POOC emerged mainly as a response to the enormous pressure that was felt on the beaches on the mainland, where there was no regulation, this issue was not relevant in the Azores Islands (Autonomous Region belonging to Portugal) considering its geomorphologic characteristics: instead of sandy beaches what prevails are cliffs. For this archipelago, the main issue was related to the natural hazards, since it is common to find in its coastal zones, areas threatened by natural processes (e.g. instability of cliffs).

Regarding territorial management instruments it was necessary to find solutions for two problems in Azores: 1) articulation between POOC and PMOT and 2) articulation between all the PEOT (which include the POOC as said before). Such solutions are presented below:

1) Despite the fact that legislation distinguishes three zones in the intervention area of each POOC (1- maritime zone protection and bed [between the bathymetry of 30 meters and the high-tide line (HTL)]; 2- margin of the sea [from HTL up to 50 meters], and 3- land zone protection [500 meters from the margin]), in Azores most of POOC references two key zones:

- Zone A – the ones that are essential for sustainable use of the coastal zone, comprising the maritime protection zone, beds and margin of the sea, protected areas and buildings in areas at risk. It encompasses therefore a land zone and a sea zone where uses are set preferred (bathing, natural and cultural [environmental interest, landscape], Urban in hazardous areas).
- Zone B – the ones for the defense and coastal protection, comprising the remaining areas of the land zone protection. It defines occupation principles and conditioning in certain activities and leaves the management regime to be defined and regulated by the PMOT. The Zone B is subdivided into uses such as urban, industrial, agricultural and forestry.

2) The new legal regime of the territorial management instruments, recently approved in Azores (Regional Legislative Decree nº. 35/2012/A, 16 August), presented a new way of dealing with the PEOT: its no longer a category that encompasses several planes, passing to be a plan that develops various thematic areas: coastal management; planning and management of protected areas; management of watershed ponds or streams; protection and management of groundwater; prevention and mitigation of natural hazards (geological, marine, climate and hydrological). In other words, it merges into one plan - called the "Island Plan" (IP) - all the previous PEOT along with two new issues: natural hazards and groundwater. The goal is to develop the thematic areas deemed of interest for each site, which may be all of them or just a few.

### 3. COASTAL ZONES IN CAPE VERDE

Cape Verde has a coastal perimeter of nearly 1.000 km observing different types of coast: rocky cliffs, beaches (white sand, black sand, gravel and pebbles), lowlands (rocky, sandy), and dunes. The rocky cliffs reign in half of the islands (S. Antão, S.Vicente, Santiago, Fogo and Brava), and the other half is divided among the white sand beaches (Boavista and Maio) and low rocky areas (São Nicolau and fire) and rocky (Sal).



Figure 2 Cape Verde Islands: Area (A) and Coastline perimeter (C). Source (data): Hidroprojecto (1997<sup>a</sup>) e Censos 2010.

Since the nineties that coastal areas in Cape Verde have been the subject of increasing concern, although little has been done in practical terms. Currently, the coastal management has been done mainly by the tourist sector through the regulation of Integrated Tourism Development Zones (ZDTI), which are all enclosed in coastal areas. Although they represent a small fraction of the entire coastal territory, it seems to encompass a good part of the most relevant zones in morphological terms, accessibility and relationship with the sea. With the definition of territorial management system in 2006 (an adoption of the Portuguese system), were created the conditions for a coordinated approach to the territory and consequently to the coast.

#### 3.1. Main coastal challenges

The difficulty of managing the coastal zone results not only from a deficient legal and regulatory framework (with many gaps and shortcomings) but also from an administration problem, which is related to a lack of information and technical maturity of the responsible institutions (DGOTDU CV, 2010), and that combined with the lack of information and awareness of the population and scarce

resources have led to a weak law enforcement (DGT and WWF, 2010). It also seems to be a problem related either with the overlapping powers between the central and local governments in areas of concurrent jurisdiction, or with the institutional disarticulation on the intermediate level (general directorates and institutes). Regarding the anthropogenic activities stands out above all the intensive extraction of aggregates for the construction industry, culminating in beach erosion, loss of habitat and saline intrusion. Besides this activity, improper urban development and coastal tourism have exerted some pressure on the coast. Anyhow the tourist pressure is a phenomenon observed mainly in Sal (Southern) and more recently in Boavista (West zone) and are not nationally widespread. In terms of natural hazards, floods derived from occasional storms seem to be the main problem for coastal areas. However this occurrence is related with the drainage basins and not with some phenomena associated to the coast (e.g.: Storm Surge).

#### **4. RECOMMENDATIONS AS A BASIS FOR A COASTAL MANAGEMENT MODEL ADJUSTED TO CAPE VERDE ISLANDS**

##### **4.1.1. Spatial concepts and criteria for delimitation**

The spatial concepts must be tailored to each territory and it is a relevant aspect for coastal planning because it facilitates the legal framework and the implementation of policies, measures and actions. Based on the concepts defined in the Portuguese legal context (Littoral [LT], Coastal Zone [CZ] and Coastal Border [CB]), and the experience in the Azores, it seems reasonable to assume, for the insular context, the use of only two spatial concepts: one for defining the land surface that is directly and indirectly influenced by the proximity of the sea, (which will be the entire island in this case), and one that will aim to delimit the more dynamic interface between sea and land surface, on which it will be necessary to ensure through management a balance between environmental, socio-economic and cultural factors, looking for the safety of persons and goods. It will be on the latter that there will be addressed the coastal management plans.

Setting a regular width has been the criterion used for the demarcation of the land zone protection in Portugal. It started as a range of 500 meters but the new legislation, based on evaluations of the POOC's 1st generation, has opened the possibility of extension up to 1.000 meters for having come to the conclusion that the 500 meters was insufficient. In the Azores, for example, the ideal width to cover the areas of highest pressure in terms of usage and occupancy appears to be 1.500 meters measured from the high-tide level. The advantage of this virtual line or regular distance appears to be linked more to the administrative process because the limits associated with physical events in the territory may be easier to identify and communicate to the population. Therefore, it may be appropriate the use of flexible criteria as *the proper width to prevent coastal flooding, based on topographic, meteorological and oceanographic information*" (REN legal regime, Decree-Law nº 239/2012, November 2), or else, a

width that takes into account the geological, geomorphological and resources inventoried. In both cases the result is a strip of variable width that depends on the characteristics of each coastal portion.

For the demarcation of the maritime zone protection, the use of bathymetric criterion may not be sufficient in island environments whereas the continental shelf may vary from island to island with situations where it is relatively extensive and others where it is very short (almost nonexistent). In the latter case it may result in a very narrow range, with less potential for the protection and preservation of resources that may exist. Thus, it is believed to be most suitable the use of a distance (regular or otherwise) measured in nautical miles, which can vary between islands depending on what is intended to protect in each case.

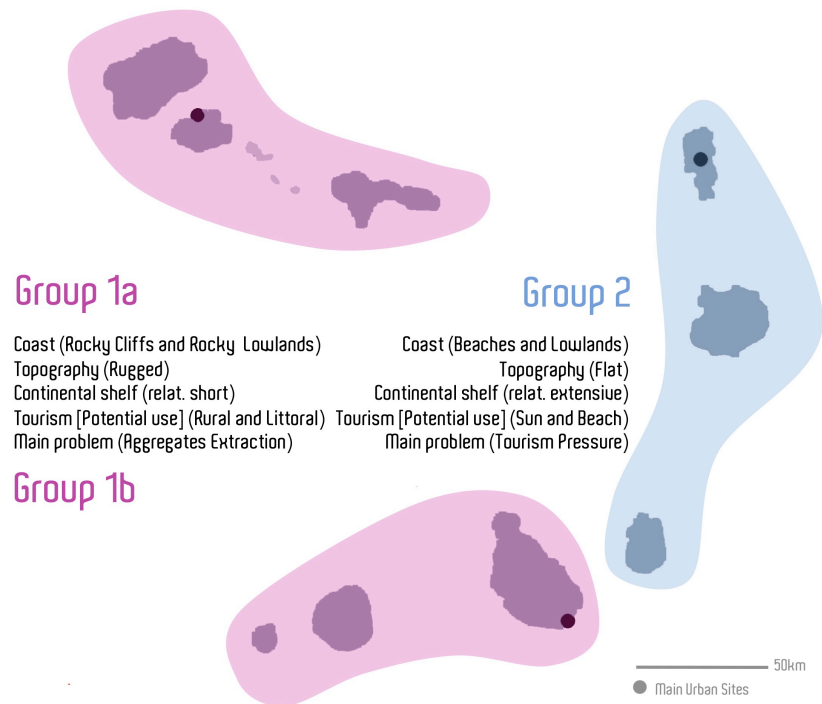
#### **4.1.2. Management and Governance**

Defining a vision is a fundamental aspect in the context of management and governance, especially in vulnerable areas such as islands. It establishes *a strategic framework for the global, integrated and participatory management to ensure sustainability conditions to its development converging different policies according to a framework that facilitates the balancing of interests and the coordination of all interventions that are responsible and are involved in the use, management, planning and development of these areas* (INAG, 2009).

The definition of a management and governance model is a relevant issue because it determines the framework for the central government, local government and the private, and can influence the role of local communities. In this sense, in order to have favorable conditions for all stakeholders to contribute positively to sustainability of the shoreline, it is crucial to have a decentralized management.

Administrative decentralization is a principle that is present in the capverdian law of planning in order to strengthen the local government. Regarding this, local communities can also play a crucial role especially as *vigilants for sustainability* (MRP Consulting, 2009:29) of coastline, promoting conservation and responsible use. To do that its important to convey to the people the knowledge and information necessary to enable them to become more aware of issues affecting the coast so they can act accordingly.

Finally, in this decentralization context, it is thought to be relevant to define a territorial model that promotes a more focused stakeholder involvement and resources distribution. It is therefore proposed a schematic model (Figure 3), supported on criteria that try to cover the main issues related to coastal areas in Cape Verde. The purpose is to recognize groups of islands where we observe the same type of issues relevant to coastal planning, deducing what may be the target of similar policies, measures and actions.



**Figura 3** Schematic territorial model for a decentralized coast management

At the same time it should encouraged the articulation of institutions (co-promoting institutional responsibility around a coordinating body at national level), and public-private cooperation (converging interests around partnerships for coastal management, assuming a co -responsibility in risk-sharing) (MRP Consultants, 2009).

#### 4.1.3. The role of coastal plans and the articulation with other plans

Coastal plans should involve civil society in its elaboration and objectives as well as in the implementation process and committing their representative organizations to become active in the process of preservation and valorization of territorial resources, strengthening social cohesion and local dimension of national interests (Campos, 2010). Consequently coastal plans may become an important means of raising awareness among the population on the problems affecting coastal areas, especially with regard to environmental degradation and hazards, as these are key issues for coastal plans.

Regarding the issue of overlap and coordination between POOC and other plans, the solutions adopted in the Azores seems to be a credible alternative: 1) POOC vs. PMOT – the POOC establishes a Zone A where is defined the critical areas for a sustainable use (maritime zone protection, beds, banks, protected areas and urban areas at risk), and a Zone B where is just defined the occupation principles leaving the regulation to the municipal plans (PMOT); 2) POOC vs. others PEOT – the solution to merge all special plans (PEOT) into a single plan called the "Island Plan" is an opportunity to the practice in



Cape Verde allowing, since the beginning, a more integrated management of the issues inherent to the PEOT. Therefore, subjects that are relevant to the coast management but are beyond the scope of POOC become integrated into a wider management perspective. One example is the issue of flooding along the coast, which derives from drainage basins, whose solution will inevitably be managed beyond the POOC intervention area.

## **5. CONCLUSION**

Achieving a balance between man and natural environment becomes particularly necessary in coastal areas, as territories are under severe and constant dynamic in terms of natural processes and human activities. Therefore the coastal zones are more complex to manage than other territories mainly because of having to consider issues related to two distinct environments: land and sea. Given this framework, the role of planning becomes crucial because we need to adjust activities and uses to the physical environment, manage natural and anthropogenic hazards, and preserve resources and environmental values.

An effective planning also depends on policies, strategies and a well-achieved implementation. In this regard we need to combine forces between the many stakeholders (from central government to local communities) to acquire a concerted knowledge (on a scientific and empirical level) and thus increase the chance of successful planning. An appropriate management and governance model becomes crucial since it conditions the relationship between stakeholders and consequently the exchange of knowledge.

The implementation of policies must be preceded by spatial concepts that specify areas affected by the proximity of the sea and the interface where occurs the large interaction between the land and sea. The delimitation of the latter must carry out flexible criteria in order to consider the specific aspects of each site.

To conclude, it should be noted that the approach to marine environment should be more objective and consistent, considering that the oceans are critical to the overall balance of the planet, which can affect the fate of terrestrial systems. In archipelagos like Cape Verde this issue becomes even more worrying since the islands are small isolated spaces, and therefore more vulnerable to any impact. Thus the conservation of the marine environment must be addressed by coastal planning in a serious and explicit way to better understand the effects of the interaction between marine and terrestrial system and take the necessary measures to prevent the collapse of both. As suggested by Timothy Beatley on his essay *Blue Urbanism: The City and the Ocean* the horizons must be broaden in order to realize that although the plans ending roughly at the shoreline, activities that support the urban systems stretch much beyond this limit and we need to aggregate them in the planning process.

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