CHAPTER 9

Planning for a Dynamic and Resilient Land-Sea Interface

Michelle Borg

Introduction

It has been claimed that a country's economic performance is influenced by its physical geography and particularly in having a coastline which provides more opportunities through sea-trade (Sachs, 2005). Coastal economies have been noted to have higher income than the landlocked economies (Gallup and Sachs, 1998). For small island states isolated from the mainland economies on continents, the land and sea interface assumes an even more important role that in many instances is either taken for granted or overlooked. Over the islands' history the Maltese coast has accommodated uses that supported human life. Ports offer an economic life link through maritime trade, critical infrastructure provides energy and water, while reprieve from the hot weather and urban areas is obtained through clean seas and scenic landscapes respectively. The decisions to locate uses along the coast were largely based on operational and economic criteria, which for many years were the key factors that shaped government policy.

In a global scenario that has endorsed sustainable development, it is now evident that human quality of life depends on the natural environment. Therefore the quality of the coastal environment affects the quality of the ecosystem services it provides, such as clean waters that support fisheries and recreation, upon which we depend. In addition the healthier the coastal environment the stronger its resilience to the predicted impacts of climate change, particularly if supported through measures that reduce stressors on ecosystems (IPCC, 2007). Spatial planning is one such measure as it determines the long term status of the land-sea interface and its resources through the allocation of space for different uses. This paper presents a historical overview of how the national planning system in the Maltese Islands addressed the coast. It is argued that through adaptive management together with the application of coastal zone management principles Malta's land use planning system has transformed from the original instrument focused mainly on traditional urban planning to cater for the needs of a small island state, where the relatively larger maritime space has gained a much higher spatial significance (Government of Malta, 2015), and formally introduced the concept of maritime spatial planning.

Managing the Coast Sustainably

The coast brings together two very distinct environments to create a constant state of dynamic interaction that distinguishes this geographical area from any other areas on dry land or in the open sea. Coastal areas are among the most fragile ecosystems on the globe where traditional management approaches particularly applied to commercial fisheries and coastal conservation failed (Portman, Dalton and Wiggin, 2015). Given the diverse habitats and human activities taking place, conflicts amongst users either through competition for space or resource degradation, abound particularly where human settlements and populations are concentrated. The management approach recommended for coastal areas was one where all characteristics, uses and issues needed to be addressed holistically.

Integrated Coastal Zone Management (ICZM)

The chapter on ocean and coastal management in Agenda 21 called for new approaches to marine and coastal area management and development that are integrated (Adler et al, 1999). Such an approach is necessary for an area that encompasses a mosaic of natural processes and human activities. The terminology used for the coastal area to be managed is the 'coastal zone' and over time many definitions were proposed to identify where it is and what it is composed of. The concept of Integrated Coastal Zone Management (ICZM) as a tool saw its early beginning approximately four decades ago (Portman et al, 2015). Table 1 includes some of the definitions that have been put forward over time highlighting the basic common elements centred mainly on the physical environment and the interactions with human activities.

Experience in coastal management around the world has developed a series of common principles that constitute effective management. The European and Mediterranean regional experience which are of significant relevance to the Maltese Islands have also contributed to the development of this approach. The European Recommendation on Integrated Coastal Zone Management (2002/413/EC) lists a series of principles that European Member States are to follow in developing coastal strategies. Similar principles are included in the Protocol on Integrated Coastal Zone Management in the Mediterranean adopted through the United Nations Environment Program-Mediterranean Action Plan (UNEP-MAP).

Table 2 allows for a comparison to be made on the set of principles included in these two policy documents. ICZM as an approach benefits from the application of instruments such as urban planning and declaration of public domain; complementary approaches such as the ecosystems based approach; and the prioritisation of space allocation for certain uses. The concept of adaptive management referred to in the EU ICZM Recommendation

is a means of linking learning with policy and implementation, when uncertainty exists (Stankey, Clark and Bormann, 2005). This approach still enables decisions on coastal use to be taken, on the basis of available knowledge to design policies and measures that once implemented will also enable knowledge to be gained. Ultimately the overarching framework embedded in both these policy instruments is sustainable development. This confirms the claim that sustainability emerged as the dominant paradigm for coastal management in the late twentieth century (Kay and Adler, 1999).

Table 1. Coastal zone definitions

Year	*Definition*	*Source*
1969	That part of land affected by the proximity to the sea and that part of the oceans affected by its proximity to the land	US Commission on Marine Science, Engineering and Resources (in Sorensen and McCreary, 1990)
1972	The band of dry land and adjacent ocean space (water and submerged land) in which terrestrial processes and land uses directly affect oceanic processes and uses, and vice versa.	Ketchum (in Kay and Adler, 1999)
1990	The interface or transition space between two environmental domains, the land and the sea.	Sorensen and McCreary, 1990
1995	Coasts are dynamic interface zones involving the meeting of the atmosphere, land and sea. It is taken to include the area between the tidal limits as well as the continental shelf and coastal plain	Viles and Spencer, 1995
1999	Contains both land and ocean components; has land and ocean boundaries that are determined by the degree of influence of the land on the ocean and the ocean on the land; and are not of uniform width, depth or height	Kay and Adler, 1999
2002	The coast is a narrow zone where the land and the sea overlap and directly interact. Its development is affected by terrestrial, atmospheric, marine and human processes and their interrelationships. The coast is the most varied and rapidly changing of all landforms and ecosystems.	Waugh, 2002

Table 2. ICZM Principles in EU and Mediterranean policy

EU ICZM Recommendation	*UNEP-MAP ICZM Protocol*
- A broad perspective that takes into account the interdependence of natural systems and human activities - A long term perspective taking into account the precautionary principle and needs of present and future generations - Adaptive management to facilitate adjustment implying need for sound scientific knowledge - Local specificity and the great diversity of European coasts - Working with natural processes and respecting the carrying capacities of ecosystems - Involving all partners concerned in the management process - Support and involvement of relevant administrative bodies at all levels - Use combination of instruments to facilitate coherence between sectoral policy objectives and between planning and management: - Developing contractual or voluntary agreements with coastal zone users, - Harnessing economic and fiscal incentives - Working through regional development mechanisms	- The natural dynamics and the interdependent nature of the land and marine parts shall be taken into account - All elements relating to hydrological, geomorphological, climatic, ecological, socio-economic and cultural systems shall be taken into account in an integrated manner, not to exceed the carrying capacity of the coastal zone and prevent the negative effects of natural disasters and of development - The ecosystems approach shall be applied - Adequate and timely participation in a transparent decision-making process by civil society - Cross-sectorally organised institutional co-ordination of administrative services - Formulation of land use strategies, plans and programmes covering urban development and socio-economic activities - Priority shall be given to public services and activities requiring in terms of use and location, immediate proximity of the sea - Allocation of uses throughout the entire coastal zone should be balanced, and unnecessary concentration and urban sprawl avoided - Preliminary assessments shall be made of the risks associated with human activities and infrastructure to prevent and reduce negative impacts - Damage to the coastal environment shall be prevented and appropriate restoration affected

Source: adapted from O.J. (2002) and UNEP/MAP/PAP (2008)

Adapting to Climate Change

The vulnerability of a country to climate change depends not only on natural factors such as geographical location, but also on the degree of preparedness being taken to increase resilience of natural and human systems in order to adapt. Coastal zones are considered vulnerable due to sea level changes and inundation from increased storm surge events that affect both natural coasts and human infrastructure present whilst increased sea temperatures are expected to modify marine ecosystems (EEA, 2012). For small islands, the expected climate impacts on coastal zones increase the risk to livelihoods of their inhabitants and economic stability more significantly in view of the limited land space available, particularly if no adaptation efforts are made (IPCC, 2007). In Malta, these risks are further compounded as the IPPC Fifth Assessment Report in 2007 also identified the Mediterranean region as being at high risk in terms of water scarcity and extreme heat events.

Malta's second Communication to the United Nations Framework Convention on Climate Change (MRRA, 2010) highlights the vulnerability of human activities and natural resources particularly in low lying coastal areas. However detailed evaluation of climate impacts on the Maltese Islands was hampered by the lack of relevant data available at the local scale. This is still the case as evaluations are limited to extrapolating assumptions from global and regional predictions linked primarily to weather patterns and long term sea level changes. Nonetheless planning efforts for adaptation need not be put off in the absence of all the required information: knowledge on the existing physical characteristics and climate change phenomena of the coastal area coupled with an insight of the expected related impacts can still assist in guiding adequate adaptation measures (NOAA, 2010).

In a similar manner where ICZM principles recognise spatial planning as a useful tool for coastal sustainability, evidence from academic literature and policy sources point towards the significant role that the planning system can also play in climate change policy agenda (Davoudi, 2009). Thus, adopting spatial planning as a leading instrument to guide sustainable use of the coastal zone can also pave the way to mainstream climate adaptation measures in the process.

Integrating ICZM into the National Planning System

Historical context

Malta is not the only small island in the central Mediterranean however it was the Grand Harbour that attributed a strategic importance to this archipelago that is not shared by other islands, like Pantelleria (Blouet, 1992). Defined as the best natural harbour in the Mediterranean (Karmon, 1980) it was this coastal feature that defined Malta's history. Its location may have also been considered as strategic since prehistoric times, given the concentration of megalithic structures along the coast of such a small land territory. Maritime transport already provided the life link for the islands at the time bringing in resources that were not locally present. The obsidian found in archaeological sites confirms such links (Trump, 2002).

During the 16th right up to the 20th century the focus on the coast centred around military defence with historic fortifications from this period still present. Local fishing communities concentrated along coastal embayments of Marsaxlokk, St. Paul's Bay, Mellieħa Bay and Marsalforn to exploit the surrounding sea which also served as reprieve in the hot summer months for the local population to cool off. For centuries the sea also served as a waste sink for untreated sewage.

With independence in 1964 a fledgling State sought alternative sources of foreign economic investment and increase employment opportunities. During this time the coast was perceived as a resource for tourism. Hotels were developed adjacent to every sandy beach, mirroring the sun, sand and sea tourism model already dominating the Mediterranean littoral. Industrial estates to support manufacturing were located at Hal Far and in the Xgħajra environs away from residential areas. As the tourism industry flourished over time, pressures on infrastructure were felt, with episodes of water shortages and increased incidents of sewage pollution in bathing areas. Innovative technology led to the development of desalination plants whilst more recently sewage treatment plants were constructed to eliminate the polluting effects from discharging raw sewage at sea.

Gradually, within a short time span in Malta's history, the services provided by the coast grew, with ports, harbours, power plants, waste landfills, hotels, industrial estates, desalination plants, agriculture, and recreation all seeking coastal space to accommodate the required needs. The multifunctional role of the coast for the social and economic well-being of the Maltese Islands was established. Yet it was not fully acknowledged by the time the land use planning system was undergoing a major over haul in the early 1990s.

The initial steps

The enactment of the Development Planning Act of 1992 and the adoption by Parliament of the Structure Plan for the Maltese Islands in the same year were the main instruments introduced at the time to counter the lack of systematic regulation of development. The ultimate aim of this new administrative system was to rein in the urban sprawl that was threatening the limited land resources, placing potential pressures on supporting infrastructure and degrading environmental quality in general.

The Structure Plan had a long term vision of twenty years. Foreseeing where to take the Maltese Islands and its population by 2020 demanded a break from the short-term and sectoral approach in policy development that was prevalent at the time. The preparation of the Structure Plan of the Maltese Islands was based on consultations and surveys resulting in a series of technical reports describing the land use issues at the time and presented policy options for the future. In 1989 a coastal zone survey was carried out by the University of Durham and the University of Malta to identify the natural and cultural assets and development related issues within a narrow coastal strip. On the marine side, the focus was on the identification of the marine park potential of the coastal waters (Planning Services Division, 1990).

During the preparation of the Structure Plan, the key strategic coastal issues that needed attention were three: (i) safeguarding the natural and historical environment; (ii) halting the impacts arising from tourism whilst recognising that the coast is an important asset for recreation; and (iii) promoting aquaculture as a new economic sector (Planning Services Division, 1990). The recommendations for the Structure Plan centred on the principles of coastal management, guided by the policy development advocated by the Mediterranean Action Plan at the time.

Recommendations called for the adoption of an integrated approach and to consider the coastal area as a unique environment with natural, ecological, aesthetic and historical value where the main goal was environment protection and conservation as well as adequate development (Planning Services Division, 1990). Recommended actions that could be taken to implement this approach included: (i) the identification of the coastal area on the basis of coastal ecosystems; (ii) the introduction of development control procedures on the basis of detailed plans; (iii) an integrated environmental zone to protect natural habitats on land and sea; and (iv) securing the rights of public access to shoreline and beaches. A tentative landward boundary for the coast based on visual and morphological criteria was presented as an initial attempt (Figure 1a).

The stated government policy considered the coast as a resource of which social and environmental use is to be made (Planning Services Division, 1990). Protection of agriculture, traditional settlements, recreation and fisheries was recommended whilst the promotion of aquaculture was recommended together with the restoration of seawater quality. At the same time active quarries, tourism development and industrial installations were identified as major serious problems on the coast together with waste, fly-tipping and the risk of coastal erosion. In the absence of robust scientific information at the time, recommendations linked with climate change were limited to raising awareness on the potential impacts of sea level rise.

These reports constitute Malta's first introduction to coastal management and the first attempts at adopting the ecosystems based approach to decision making. In the absence of human resources and information to guide the adoption of coastal management principles, the resulting strategic direction in the Structure Plan for the coast inevitably centred on capacity building, the preparation of a subject plan to provide detailed policy and one policy to safeguard public access. In addition, within the Structure Plan there were more than fifty policies that directly or indirectly had an impact on the coastal zone (Planning Authority, 2002). The key diagram accompanying the Structure Plan did not include any geographical definition of the coastal area, placing a challenge on how to interpret

the applicability of coastal related policies. However most of the western coastline was classified as Outside Development Zone (ODZ) corresponding with one of the richest natural habitats in the Maltese Islands: the coastal cliffs.

Prepared during the same time as ongoing negotiations were taking place an a global level for the World Conference on Environment and Development in Rio 1992, the Structure Plan incorporated the concepts of sustainable development as understood at the time. Noting that the term was only coined a few years earlier in 1987 by the World Commission on Environment and Development, the attempt to align national strategy with emergent global development policy was an ambitious step.

In parallel to the strategic policy framework, the planning legislation enacted at the time introduced another component that was in line with good governance and complemented the application of coastal zone management. The 1992 legislation introduced stakeholder participation through consultation at the decision making stage, both for policy development and decisions on individual development applications. On the policy front, this legal provision supported greater integration for a more comprehensive and co-ordinated approach particularly with government departments and agencies.

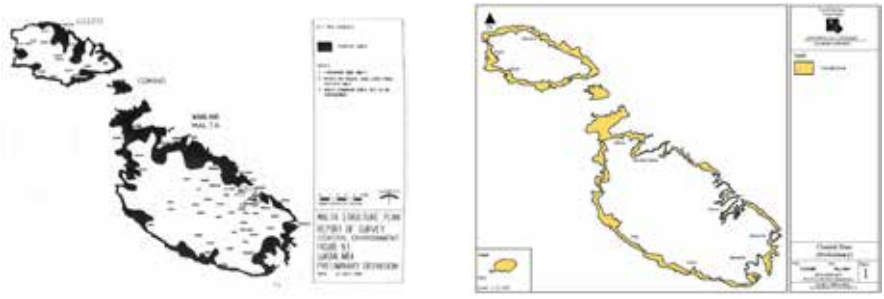
Developing a strategy for the coast

The impact of the Structure Plan policies and the planning legislation were comprehensively assessed in the Coastal Strategy Topic Paper prepared in 2002 as a stock-take proposing a new strategic policy framework in the Structure Plan review process. Changes to planning legislation in 1997 extended the planning system to the sea, bringing with it more experience through the development control process of coastal applications. Aquaculture and underwater recreation emerged as new maritime users enabling the testing of tools such as Environmental Impact Assessment and public consultations, to assist planners in decision making. In the absence of a defined geographical area policy implementation relied only on interpretation of potential impacts on a case by case basis. The potential risk for urban sprawl along the coast was augmented by the fact that the low lying rocky shoreline was classified as an opportunity area where some form of development may be considered without any distinction of what constitutes as acceptable development. This was further compounded by the fact that the limits to development for the Maltese Islands extended to the water's edge creating no distinction between the undeveloped shoreline and the hinterland (Planning Authority, 2002).

As a result, the first output of the Topic Paper was to introduce clarity by defining the coastal zone where coastal policies would apply. The intensity of activities and growing pressures on the coast, both on land and sea, required specific measures and therefore

a coastal zone boundary to assist the development of a locations strategy was identified. The resulting landward limit was delineated on the basis of ecological, physical and administrative criteria and is limited to the first road aligning the coast in urban areas whilst in rural areas the boundary is characterised by ecological systems and extends further inland, corresponding as much as possible to the limit of identified coastal habitats (Planning Authority, 2002). As illustrated in Figure 1b, similarities with the proposed boundary of 1990 can be found, with the 2002 boundary resulting closer to the coastline in urban areas. With the amendments to planning legislation that extended the planning system to the maritime space, the seaward limit of the coastal zone was identified as the 12 nautical mile boundary of the Territorial Sea in where national sovereignty extends (Planning Authority, 2002).

Figure 1: Definition of the landward limit of the coastal zone in Malta



1a: tentative boundary (1990) 1b: proposed boundary (2002)

Source: Planning Services Division (1990); Planning Authority (2002).

The second scope of the Topic Paper was to outline a strategy for this geographical area that was based on an understanding of the ecosystems and uses present. More than a decade had passed since the preparation of the Structure Plan and through the Environmental Impact Assessment process and specific surveys carried out for the preparation of the Local Plans in particular, more data on the status of the coastal and marine environment was collated. The experience from development control processes of coastal projects indicated the potential risks and possible mitigation actions that could be taken to reduce environmental impacts and social impacts particularly through loss of space or displacement of coastal activities mainly linked with recreation.

The strategy presented in 2002 was based on a refined zoning scheme for land use. To protect the distinctive qualities of the coast, safeguard natural resources within and manage existing and future uses, the terrestrial coast was classified into two general

categories, predominantly urban and predominantly rural, depending upon the prevailing characteristics and scale of uses present (Planning Authority, 2002). The strategy also set out the following objectives for development both on land and at sea:

- protect coastal and marine habitats and biodiversity;
- protect cultural heritage;
- protect coastal uses that necessitate a coastal location;
- promote and protect public access and use; and
- minimise existing and potential user conflicts.

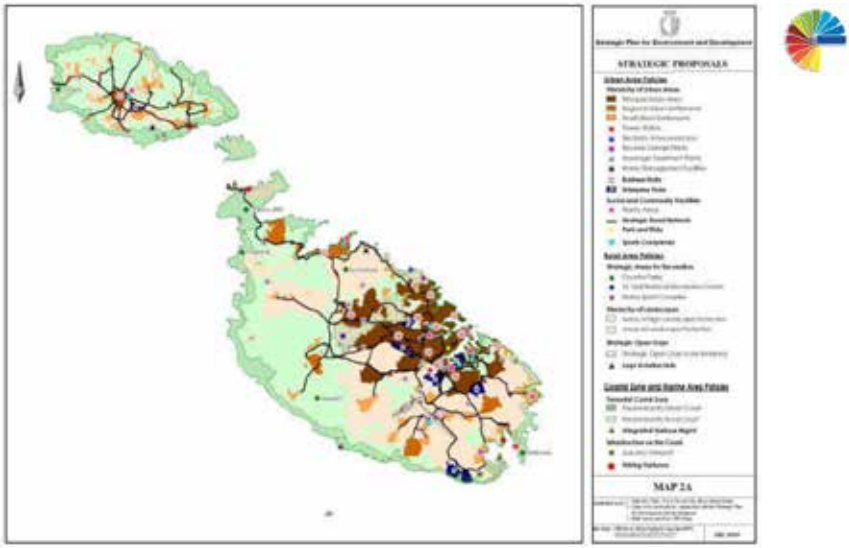
Adopting a Spatial Planning Framework for the Coast

The Strategic Plan for Environment and Development (SPED) was adopted in 2015 by the House of Representatives replacing the Structure Plan of the Maltese Islands as the national spatial plan. As a strategic document, it departs from the approach taken in the early 1990s on a number of counts. Firstly, as required by legislation, land use planning gave way to spatial planning, a significant step within the context of sustainable development.

With land use planning, as a public policy process, the aim is to facilitate and regulate the development and use of land and property (Taussik, 2007 cited in Smith Maes, Stojanovic, Ballinger, 2011). Spatial planning on the other hand links land use planning with social, economic and environmental development policies and promotes the concept of balance and sustainable polycentric development (Ballinger 2008, cited in Smith et al., 2011). The SPED views spatial planning as a process that translates economic, social, cultural and environmental policies into a geographical context (Government of Malta, 2015).

The second departure from the Structure Plan, as a consequence of adopting spatial planning, sees the SPED policy framework structured on the spatial context and therefore the geographical characteristics of the islands as opposed to the sectoral approach of the earlier document. Focusing on the spatial context facilitates the integration of social, economic and environmental objectives into a location strategy. The national spatial framework as adopted in the SPED identifies five spatial units on the basis of the natural characteristics present as well as administrative boundaries: the Urban Area, the Rural Area, the Coastal Zone, the Marine Area and Gozo (Government of Malta, 2015). Although distinct these spatial units are interlinked. Each spatial unit has a set of policies which are supplemented by a set of cross-cutting thematic policies that address socio-economic development, environment, climate change and travel patterns, applicable to all the spatial units, where relevant.

Figure 2: SPED strategic proposals on land

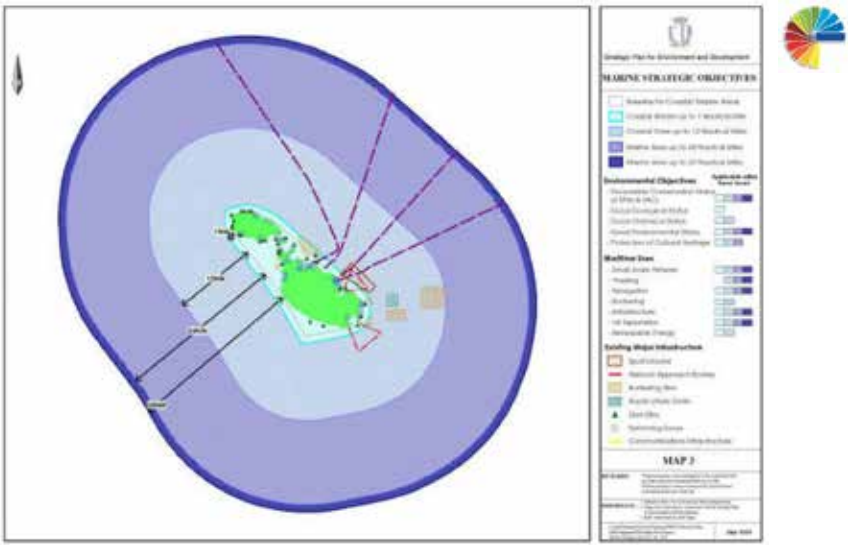


Source: Government of Malta (2015)

For the Coastal Zone the SPED adopts the 2002 coastal zone boundary and strategy for the predominantly rural and predominantly urban terrestrial coast (Figure 2). The policies for the Coastal Zone incorporate ICZM principles as they call for prioritisation in favour of legitimate coastal uses, i.e. uses that require a coastal location to operate; safeguarding not only public access but also use of the coast, and aim to prevent displacement of existing legitimate uses by safeguarding bathing areas, dive sites, fishing harbours from new activities. User conflict is also targeted particularly in coastal areas accommodating critical infrastructure related to energy and maritime transport by designated energy hubs and prioritising efficient use of land and maritime space in port areas.

The SPED policy framework incorporates the national objectives that emerged following accession to the European Union and links fisheries, energy, climate change, environment and growth of the maritime economy to provide a more detailed strategy for the maritime space then identified in 2002. The spatial strategy for the Marine Area extends beyond the limits of the coastal zone, up to the 25 nautical mile limit of the Fisheries Conservation Management Zone (Figure 3). Whilst directing the location of maritime uses, the policy framework lays out the respective environmental objectives which also need to be achieved, thus providing clarity for future investors. Effectively the SPED also constitutes the first maritime spatial plan of the Maltese Islands.

Figure 3: SPED marine strategic objectives



Source: Government of Malta (2015)

Being proactive and indicating locations were development can take place, regulating how different uses can be accommodated and ensuring strategic co-ordination through participation for enhance policy integration, enables spatial planning to contribute towards climate action, particularly adaptation (Davoudi, 2009). The SPED policies affecting the coast contain similar elements in their design.

The preparation of the SPED was complemented with a Strategic Environmental Assessment which further enhanced the take up of the ecosystems-based approach to the plan formulation process. With the available information at the time, and on the basis of knowledge gained not only through data on environmental quality and socio-economic trends, but also on emerging policy trends at a European and Mediterranean level, the strategic policy set out for the coastal zone in the SPED is expected to provide a sound basis to further sustainable development on the land-sea interface for the near future.

Conclusion

The approach adopted in the SPED is a result of the evolution that has taken place over twenty five years within the policy development process in the national planning system where a comprehensive and integrated policy framework has been developed that links the maritime territory with the hinterland in one policy document. From a peripheral

role in the 1990 Structure Plan, the coast in the 2015 Strategic Plan for Environment and Development acquired its rightful place as a distinct spatial unit with a vital role to fulfil in securing the long term and sustainable socio-economic growth of the Maltese Islands and wellbeing of its inhabitants.

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