

Integrated Coastal Zone Management and the Ecosystem Approach

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People for Ecosystem based Governance
in Assessing Sustainable development of
Ocean and coast

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Resume

The aim of this internal document is to review the conceptual basis of Integrated Coastal Zone Management (ICZM) and trace its relationship to the Ecosystem Approach (EsA). These are two important sets of ideas that set the context for Pegaso and it is vital that the connections between them are clearly documented. In addition to considering the relationships between ICZM and the Ecosystem Approach this document describes how the different components of Pegaso can be used to make these ideas operational and to promote discussion between consortium members about the implications that follow for the design of the Pegaso ICZM Governance Platform.

This is the final version of D2.1A which is an consortium internal document. It will feed into the overall D2.1 deliverable.

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1. Aims

The aim of this document is to review the conceptual basis for Integrated Coastal Zone Management (ICZM) and trace its relationship to the Ecosystem Approach (EsA)¹ in a geographical perspective. Although the rationale for ICZM is widely accepted and guidelines for its implementation developed and used (Appendix 1.1), it is nevertheless important to establish its relationship to other conceptual frameworks for sustainable development to map out the synergies between them and facilitate discussion between the different discipline areas and policy communities. This more integrated understanding will allow the definition of more effective sustainability actions as well as better criteria for the evaluation of ICZM initiatives in the Mediterranean and Black Sea Basins to be developed and alternative models for ICZM potentially to be discussed to accommodate regional and local issues and differences.

In addition to considering the relationships between ICZM and the EsA this document will describe how the different components of *Pegaso* can be used to make these ideas operational. In this way, the current document will form one of the building blocks needed for the designing future approaches to ICZM.

The document is structured as follows. Part 2 provides a brief review of the concepts themselves, and sets out the principles that underpin them. In this section we also examine how the key ideas contained in each framework to relate each other. Finally, in Part 3 we map out some of the operational requirements that follow and the contribution that *Pegaso* can make in taking the ICZM agenda forward.

2. Background

Ecosystem based management

While it is now widely acknowledged that the goals of sustainability require a balanced approach to the management of social, economic and environmental issues, the notion of 'integrated' or '**ecosystem-based**' management is not new. Douvère (2008) for example suggests that we can trace the ideas back at least to the 1930s in the US, where integrated, multiple-objective approaches to environmental management were being discussed. She suggests that subsequently these developments were heavily influenced by systems thinking and the environmental movements of the 1960s and 1970s. Thus a decade later we find them refined and articulated in the form of Integrated Coastal Zone Management, or alternatively Integrated Coastal and Marine Area Management (IMCAM).

In parallel to these developments, the **Ecosystem Approach** (EsA) also emerged as a topic of discussion in the late 1980s and early 1990s amongst the research and policy communities concerned with the management of biodiversity and natural resources (Hartje et al., 2003). As in the coastal and marine sectors, it was argued that a new focus was required to achieve robust and sustainable management and policy outcomes. An Ecosystem Approach, it was suggested, was needed to deliver more integrated policy and management at a landscape-scale and achieve the balanced use of ecosystem services for people.

¹ It should be noted that the literature contains a number of variations in terminology designed to emphasise different aspects of the idea. Reference is often made to an 'ecosystem-based approach', a term used mainly to promote holistic thinking in the design of specific management strategies for natural resource systems. More commonly the term 'Ecosystem Approach' is employed. The latter originates from the Convention on Biological Diversity (CBD) and emphasises the higher-level or more strategic issues surrounding decision making. In this report we are using the abbreviation EsA for the term 'Ecosystem Approach' as suggested by the IUCN CEM (written communication, 2007) (see also Potschin et al., 2008).



The ICZM and the EsA have therefore had similar origins, and the ideas that have shaped them have been derived largely from the same sources. Indeed, interest in both strands of thinking was heavily reinforced and stimulated by the outcomes of the Rio Conference in 1992 and the drafting of Agenda 21. However, as both have subsequently come to be described and applied by different constituencies, the underlying similarities and resonances can easily become blurred, and those new to the discussions might even think that they are alternative or competing frameworks. The discussion that follows is therefore premised on the position that they are both manifestations of an underlying desire to develop and promote an holistic and broad-scale approach to research, policy and management that takes account of both people and their relationship to environment.

Integrated Coastal Zone Management: Definition and Principles

There are a number of definitions of ICZM in the wider academic and policy literatures². For present purposes a useful starting point is that provided by the ICZM Protocol³ which views it as:

“...a dynamic process for the sustainable management and use of coastal zones, taking into account at the same time the fragility of coastal ecosystems and landscapes, the diversity of activities and uses, their interactions, the maritime orientation of certain activities and uses and their impact on both the marine and land parts.”

Cicin-Sain and Belfiore (2005) provide a more detailed account of the evolution of the concept, tracing its lineage from Rio through to the more contemporary expressions of the ideas in the EC document *Towards a European Integrated Coastal Zone Management (ICZM) Strategy*⁴, and the subsequent formulations that in support of the Convention on Biological Diversity (CBD) (Table 1). They argue that while the broad concept continues to evolve, we can now recognise an international model or norm (set of principles) that enjoys wide acceptance. Others, however, (e.g. McKenna et al., 2008) offered a critique of the tensions between the different elements of the concept. Thus, while there is a considerable body of experience in its application extending over three decades (e.g. Henocque, 2003), it has been suggested (e.g. O’Hagan and Ballinger, 2009) that more case studies describing the successful application of the idea are needed and further conceptual analysis is still probably required.

Table 1: Development of integrated coastal management (modified/added according to Cicin-Sain and Belfiore, 2005) (for a more detailed and graphical insight into these developments see also Appendix 3)

Year	Organisation	Guidelines
1992	UN	Agenda 21, Chapter 17
	OECD	Coastal Zone Management Policies
1993	World Bank	Guidelines for Integrated Coastal Zone Management
	IUCN	Cross-Sectoral, Integrated Coastal Area Planning (CICAP); Guidelines and Principles for Coastal Area Development
1995	UNEP	Guidelines for Integrated Management of Coastal and Marine Area: with special reference to the Mediterranean Basin
1996	UNEP	Guidelines for integrated planning and Management of Coastal and Marina Areas n the Wider Caribbean Region
1998	FAO	Integrated Coastal Management and Agriculture, Forestry ad Fisheries
	UNEP	Conceptual Framework and Planning Guidelines for Integrated Coastal Area and River Basin Management
1999	EC	Towards a European Integrated Coastal Zone Management (ICZM) strategy: General Principles and Policy Options
	Council of Europe	European Code of Conduct for Coastal Zones

² [www.coastalwiki.org/coastalwiki/The Integrated approach to Coastal Zone Management %28ICZM%29](http://www.coastalwiki.org/coastalwiki/The_Integrated_approach_to_Coastal_Zone_Management_%28ICZM%29)

³ IUNEP/MAP/PAP (2008): Protocol on Integrated Coastal Zone Management in the Mediterranean. Split, Priority Actions Programme.

⁴ <http://ec.europa.eu/environment/iczm/pdf/vol1.pdf>



2000	CBD	Review of Existing Instruments relevant to Integrated marine and coastal area management and their implementation for the Implementation of the Convention on Biological Diversity
2004	CBD	Integrated Marine and Coastal Area Management (IMCAM) Approaches for Implementing the Convention on Biological Diversity
2002-2006	ICZM Expert Group	Led by EC DG ENV to work on stock taking, a set of indicators and data in order to implement the ICZM Recommendations (2002/413/EC, QJ L148 of 6.6.2002)
2004-2006	DEDUCE project	Indicators developed (www.deduce.eu) to support countries in writing their National strategy on ICZM (2006)
2006-2010	EC DG ENV	Update on National ICZM strategies (Reporting guidance – DGENV.D.2/15.2.2010)

The Principles set out in the EC document on ICZM formed the basis of the 2000 *Communication from the Commission to the Council and the European Parliament on Integrated Coastal Zone Management: Strategy for Europe*⁵. Six overarching ideas for ICZM were initially proposed, namely that it should take a wide ranging perspective, that it should build on an understanding of specific conditions in the area of interest, that it should work with natural processes, use participatory processes, work to ensure the support and involvement of all relevant administrative bodies, and use a combination of instruments and approaches.

In the subsequent *Communication from the Commission*, the six themes of the *Strategy* became seven, with the idea about taking a wide ranging perspective being split to emphasise the need to consider on the one hand spatial and thematic issues, and on the other the temporal dimension.

Table 2 lists the ten principles proposed in the ICZM Protocol and cross-references them to the earlier set put forward in the 2000 *Communication from the Commission*. The ICZM Protocol expands and elaborates the original framework, and emphasises the need to promote and apply cross-sectoral approaches to policy and management in the coastal zone (Table 2, principles 1 & 2). The long-term perspective which is emphasised in principle 3, deals with ‘temporal integration, by referring explicitly to sustainable development and the implications it has for ensuring inter-generational equity. By emphasising that environmental and social aspects need to be considered simultaneously, the importance of ‘working with natural processes’ and within the carrying capacity of the coastal zone’ is also covered. Further links with notions of sustainable management are flagged up in Principle 8, which stresses the need for ‘balanced’ use of resources in the coastal zone, the implication being that the ‘three pillars’ of sustainability should be taken into account in decision making.

Strong emphasis is also given to governance issues in the principles of the ICZM Protocol. The need to account for needs of all relevant stakeholders and make a balanced decision is carried over from the earlier set of ideas in Principle 4, where the importance of participatory planning is emphasised. However, the design of appropriate institutional structures is given much greater emphasis in the Protocol, in Principle 5, which emphasises the need for ‘cross-sectoral organisations’ so that better coordination of policy and management can be achieved. The ICZM Protocol stresses the need for these institutions to develop appropriate plans and programmes (Principle 6). In developing policies and management strategies, the importance of taking account of local conditions is emphasised in both sets of principles. The assertion in the Commission document that ‘local specificity’ should be taken into account is somewhat stronger and more directed in the ICZM protocol, which stresses that in dealing with the ‘multiplicity and diversity’ of coastal zones, priority should be given to those institutions and activities that depend on immediate proximity to the sea (Principle 7).

⁵ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2000:0547:FIN:EN:PDF>



Table 1: Relationship between ICZM Protocol and other Conceptual Frameworks (See Appendix 1.2 for CBD EsA Principles)

ICZM Protocol	ICZM Strategy for Europe	CBD Ecosystem Approach
1. The biological wealth and the natural dynamics and functioning of the intertidal area and the complementary and interdependent nature of the marine part and the land part forming a single entity shall be taken particularly into account.	<ul style="list-style-type: none"> • Adopt a broad holistic perspective (both thematic and geographic). (1) • Work with natural processes. (5) 	<ul style="list-style-type: none"> • Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.(3)
2. All elements relating to hydrological, geomorphological, climatic, ecological, socio-economic and cultural systems shall be taken into account in an integrated manner, so as not to exceed the carrying capacity of the coastal zone and to prevent the negative effects of natural disasters and of development.	<ul style="list-style-type: none"> • Adopt a broad holistic perspective (both thematic and geographic). (1) • Work with natural processes. (5) 	<ul style="list-style-type: none"> • Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems. (3) • Ecosystem must be managed within the limits of their functioning. (6)
3. The ecosystems approach to coastal planning and management shall be applied so as to ensure the sustainable development of coastal zones.	<ul style="list-style-type: none"> • Adopt a long term perspective. (2) 	<ul style="list-style-type: none"> • Ecosystem must be managed within the limits of their functioning. (6) • Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term. (8)
4. Appropriate governance allowing adequate and timely participation in a transparent decision-making process by local populations and stakeholders in civil society concerned with coastal zones shall be ensured.	<ul style="list-style-type: none"> • Use participatory planning. (6) • Gain support & involvement of all relevant administrative bodies. (7) 	<ul style="list-style-type: none"> • The objectives of management of land, water and living resources are a matter of societal choices. (1) • The ecosystem approach should involve all relevant sectors of society and scientific disciplines. (12) • The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices. (11)
5. Cross-sectorally organized institutional coordination of the various administrative services and regional and local authorities competent in coastal zones shall be required.	<ul style="list-style-type: none"> • Gain support & involvement of all relevant administrative bodies. (7) 	<ul style="list-style-type: none"> • The ecosystem approach should involve all relevant sectors of society and scientific disciplines. (12)
6. The formulation of land use strategies, plans and programmes covering urban development and socio-economic activities, as well as other relevant sectoral policies, shall be required.	<ul style="list-style-type: none"> • Use of a combination of instruments. (8) 	<ul style="list-style-type: none"> • The ecosystem approach should be undertaken at the appropriate spatial and temporal scales. (7)
7. The multiplicity and diversity of activities in coastal zones shall be taken into account, and priority shall be given, where necessary, to public services and activities requiring, in terms of use and location, the immediate proximity of the sea.	<ul style="list-style-type: none"> • Adopt a broad holistic perspective (both thematic and geographic). (1) 	<ul style="list-style-type: none"> • Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. (4) • The objectives of management of land, water and living resources are a matter of societal choices. (1) • Management should be decentralized to the lowest appropriate level. (2)
8. The allocation of uses throughout the entire coastal zone should be balanced, and unnecessary concentration and urban sprawl should be avoided.	<ul style="list-style-type: none"> • Reflect local specificity. (4) 	<ul style="list-style-type: none"> • The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity. (10) • Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach. (5) • The ecosystem approach should be undertaken at the appropriate spatial and temporal scales. (7)



9. Preliminary assessments shall be made of the risks associated with the various human activities and infrastructure so as to prevent and reduce their negative impact on coastal zones.	<ul style="list-style-type: none">• Implement adaptive management during a gradual process. (3)	<ul style="list-style-type: none">• Management must recognize the change is inevitable. (9)• Ecosystem must be managed within the limits of their functioning. (6)
10. Damage to the coastal environment shall be prevented and, where it occurs, appropriate restoration shall be effected.		<ul style="list-style-type: none">• Ecosystem must be managed within the limits of their functioning. (6)

A final strand of thinking that is apparent in the principles of the ICZM Protocol is the importance of adaptive management. This theme is implicitly dealt with in Principle 9, which deals with the issue of risk, which would not only require potential impacts to be assessed at the planning stage, but also continued monitoring and surveillance to ensure the integrity of the coastal zone system.

Principle 10 of the ICZM Protocol perhaps introduces a new dimension into ICZM thinking that was not evident in the earlier principles put forward in the *Commission* document. It concerns the need both to prevent damage and restore damage once it occurs. This principle both introduces the notion of liability and compensation, and something of the moral position embodied in the concept of sustainable development, namely that natural capital be maintained **and** past loss restored (cf. O’Riordan, 2000).

The Ecosystem Approach: Definition and Principles

Much of the recent interest in the Ecosystem Approach (EsA) can be traced back to the influence of the Convention for Biological Diversity (CBD), which in 1995 adopted it as the ‘primary framework’ for action (Shepherd, 2004). Under the convention, the Approach is the basis for considering all the goods and services provided to people by biodiversity and ecosystems (Secretariat of the Convention for Biological Diversity, 2000). According to the CBD, the EsA:

“...places human needs at the centre of biodiversity management. It aims to manage the ecosystem, based on the multiple functions that ecosystems perform and the multiple uses that are made of these functions. The ecosystem approach does not aim for short-term economic gains, but aims to optimize the use of an ecosystem without damaging it”⁶

As with the idea of ICZM, the EsA is also taken to embody a core set of management principles⁷. These have been formally set down in Appendix 1.2, and cross-referenced to those of the ICZM protocol in Table 2. Although there is no simple ‘read-across’ between the two sets of propositions there are clearly strong resonances between them reflecting, in part, their common origins.

As with the ICZM Protocol, the principles of the Ecosystem Approach seek, for example, to promote an integrated approach to management that operates across both natural and social systems, and between different ecosystems. An understanding of the way in which natural and social systems are coupled is seen as particularly important because, it is argued, management decisions have to be seen in their economic and social context, i.e. people are an integral part of ecosystems. In keeping with ICZM, the principles proposed in the EsA therefore cover the conservation and renewable use of resources, and the sharing of benefits derived from natural resources throughout society. As is indicated in Table 2, EsA Principle 3, dealing cross-sectoral issues, Principle 5, which stresses the need to conserve ecosystem functioning, and Principle 6, dealing with environmental limits, all underpin the ICZM propositions that highlight the need for broad spatial, thematic and temporal perspectives, and cross-sectoral institutional structures that respect environmental capacity (ICZM Principles 1, 2 and 5, Table 2).

⁶ <http://www.iucn.org/themes/CEM/ourwork/ecapproach/index.html>

⁷ For more extensive documentation see <https://www.biodiv.org/programmes/cross-cutting/ecosystem/sourcebook/advanced-guide.shtml?approach>



The close coupling of social and environmental systems is also stressed in the EsA, which emphasises that decisions about policy and management are essentially a matter of societal choice. These echo strongly the priority given to participatory forms of governance in the ICZM Protocol (Principle 6). However the principles proposed by the CBD also recognise that decisions have to be grounded on a scientific understanding of biophysical limits that constrain ecological processes and the spatial and temporal scales at which they operate. Again these are strong themes in the ICZM Protocol, which also emphasises the need for the sustainable or balanced use of resources (ICZM Principles 8, 2 and 5, Table 2).

Both the ICZM principles and those of the EsA recognise the inherently dynamic nature of ecosystems and the uncertainties involved in any attempt to manage them. Thus both sets of ideas seek to promote a holistic, adaptive and flexible approach to natural resource management (See, for example, ICZM Principle 9, Table 2). One of the merits claimed for the Ecosystem Approach is that it helps focus decision makers on longer-term, more sustainable perspectives rather than on shorter-term fixes that may ultimately fail to deliver lasting, cost-effective socio-economic and environmental benefits; it is certainly the case that longer time –perspectives may change cost-benefit or cost-risk assessments and so affect decision outcomes. The same could be argued of the ICZM Framework.

There are therefore many similarities between the principles that underpin the ICZM Protocol and those of the CBD Ecosystem Approach, and the differences between them probably reflect nothing more than the emphasis that different groups have brought to the debate. They are, nevertheless worth considering side by side, so that the full range of issues that are relevant to the coastal zone can be taken into account. One point of interest, for example, is that the ICZM Protocol makes little explicit mention of the concept of ecosystem services, an idea that is included in the EsA framework. Similarly the issue of placing an appropriate value on environment resources (and ecosystem services) does not feature strongly in the set of ICZM Principles. Given current, widespread interest in the concepts of ecosystem services and their valuation, it is perhaps worth making more explicit reference to them in any future elaboration of the principles underpinning ICZM.

Similarly, while the EsA suggests that management should be at an ‘appropriate scale’, the approach embodied in the ICZM Protocol envisages more of a hierarchy of strategies operating at regional, national and local levels. In fact, could be argued that once we attempt to deal with problems in a holistic, cross-sectoral way, there is no ‘appropriate scale’ at which to operate, because different social and environmental components have different spatial and temporal footprints. Thus the ICZM framework is a more sophisticated treatment of scale issues than that implied by the EsA, and one that is more consistent with the needs to take account of processes in a cross-sectoral way.

Other differences between the two sets of principles that can be identified include the stronger emphasis that the ICZM protocol places on the processes of governance compared to the EsA. By contrast, the EsA tends to stress the role of ecosystems and biodiversity more explicitly than the ICZM framework. Some have argued that while the principles underpinning the Ecosystem Approach are valuable, the use of the term ‘ecosystem’ may mean that their relevance may not always be understood by the wider policy community or the public. The problem of communication has recently been highlighted in a study for Defra on the ‘Public understanding of the concepts and language around ecosystem services and the natural environment’ (Define, 2007), which emphasises that if the approach is to be taken forward, then we might need to develop a language and terminology that is more appropriate to the audiences being targeted. In this respect, the notion of ‘integrated coastal zone management’ might be easier to communicate.



3. Developing a Common Conceptual Framework

As the discussion presented above illustrates, the ‘principles’ that the CBD sees as making up the Ecosystem Approach are, of course, not unique to the Convention. Indeed, just as the Convention sought to capture and represent a range of concerns around the sustainable use of ecosystems that were being voiced at the time of its drafting, others have subsequently interpreted, extended and emphasised the ideas in a number of different ways. In this document we have emphasised the similarities with the notion of ICZM. Other frameworks which embody the same set of ideas include, for example, Integrated River Basin Management (IRBM) and Integrated Coastal Area and River Basin Management (ICARM).

While some have proposed that the EsA principles need to be revised and clarified to make them more useful operationally (e.g. Korn, 2006; Müller, 2006), the key point that emerges from recent debates is that there is probably no final definition of the concept, and that its meaning is likely to develop as it is applied and shortcomings detected. Indeed, as a number of commentators have observed, (Maltby, 2000; Smith and Maltby, 2003; Hartje et al., 2003), the fluidity of the EsA concept is a virtue, because the principles that underpin it are not equally applicable in all circumstances. Solutions have therefore to be tailored to meet the requirements of the problem in hand. The same has been said of the need to develop and adapt the principles of ICZM⁸.

In the context of taking forward the aims of the *Pegaso* project, we therefore provide an adaptation of the ICZM principles that makes more explicit reference to the ideas that underpin the EsA (Table 2). We do this to show more clearly how the Ecosystem Approach is embedded in ICZM thinking, and hence the fundamental consistency between them. This modified set of ICZM principles can be thought of as a way of customising and making operational the EsA in the context of the coastal zone, given the particular interests of the *Pegaso* consortium and its sponsors.

In redrafting the ICZM Principles with a view to strengthening the connection to the EsA several issues are evident, namely:

- That while the two sets of ideas are broadly consistent, the ICZM framework tends to focus more on institutional and *governance* issues compared to the EsA, which tends to present more of an ecosystem or biodiversity *management* perspective. Thus in using the ICZM Principles as the basis for the there is a partial shift in emphasis towards societal issues; to counter this tendency we have included reference to ecosystem services in Principle 1.
- That the ICZM principles are somewhat more prescriptive than those of the EsA in that it specifically mentions the problem of urban sprawl (Principle 8). Given that there are many problems affecting reference to the single issue of urbanisation seems out of place in a generic framework such as this, and so we have omitted it in the redrafting and suggest that it is covered in this proposition by the notion of ‘balance’ and the need to understand environmental capacities and limits.
- To the extent that EsA promotes sustainable use and conservation of natural resources is also covered here, but issues of liability and restoration of ecosystem function are not emphasised particularly strongly. Thus linkage to the ideas in the ICZM framework is therefore valuable in taking the CBD principles forward into an operational context.

⁸ [http://www.coastalwiki.org/coastalwiki/The_Integrated_approach_to_Coastal_Zone_Management_\(ICZM\)](http://www.coastalwiki.org/coastalwiki/The_Integrated_approach_to_Coastal_Zone_Management_(ICZM))



Table 2: Provisional redrafting of key ICZM Principles and their implications for the *Pegaso* work programme

Redrafted ICZM Principles	<i>Pegaso</i> Contribution and Tools
<p>1. ICZM seeks to take account of the wealth of natural capital in coastal zones represented by ecosystems and the output of ecosystem services that depend on the complementary and interdependent nature of marine and terrestrial systems. Thus policy makers and managers should consider the effects of their actions and activities on those social, economic and environmental systems that affect the coastal zone or are affected by processes within it or out of it, by considering the cross-sectoral implications of all plans and policies.</p>	<ul style="list-style-type: none"> A range of assessment methods exist to assist to examining the impact of plans and proposals, including Environmental Impact Assessment, Strategic Environmental Assessment and more wide ranging Sustainability Impact Assessments. For such methods to be used effectively, spatially disaggregated indicators and ecosystem accounts covering all aspects of the coastal zone should be provided by the Pegaso Platform, along with an understanding of their sensitivity to drivers of change.
<p>2. All elements relating to hydrological, geomorphological, climatic, ecological, socio-economic and cultural systems shall be taken into account in an integrated manner and in a long-term perspective, so as not to exceed the carrying capacity of the coastal zone and to prevent the negative effects of natural disasters and of development. Policies and plans in the coastal zone should therefore ensure that ecosystems are managed within the limits of their functioning.</p>	<ul style="list-style-type: none"> Ecosystem services provide a framework for making judgements about progress towards sustainable development goals, because they integrate understandings about the capacity of ecosystems to supply a given suite of services together with the demands that people place on these resources. As a result a more balanced approach to development might be achieved (cf. ICZM Principle 8) and the limits of ecosystem functioning might be identified. An understanding of risks and uncertainties is also required (Principle 9), as well as the capacities of ecosystems to meet ht needs of people (Principle 5)
<p>3. The ecosystem approach to coastal planning and management should be designed to ensure the sustainable development of coastal zones. This implied that not only should ecosystems be managed within the limits of their functioning, but also that full account is taken of the varying temporal scales and lag-effects that characterize ecosystem processes. As a result, ICZM should look to the long-term so that sustainable development can be achieved.</p>	<ul style="list-style-type: none"> If the management of coastal zone resources is matter of social choice, the proposed ICZM Governance Platform should provide tools and techniques by which these options can be identified, articulated and assessed. Thus the Pegaso Platform should disseminate both the contextual information needed to consider local and problem specific issues from a range of different perspectives, together with guidance and training on the use of participatory methods and tools (e.g. citizen’s juries, scenarios).
<p>4. Appropriate governance allowing adequate and timely participation in a transparent and well informed decision-making process by local populations and stakeholders in civil society concerned with coastal zones shall be ensured. In doing so ICZM recognises that the management of land, water and living resources is a matter of societal choice. This will require that all relevant sectors of society and scientific disciplines should be involved in framing the options, and that all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices be taken into account. In particular the way different groups value ecosystem services should be understood.</p>	<ul style="list-style-type: none"> The use of integrated assessment tools should be supported by access to systematic monitoring data for the key resources associated with the coastal zone. The Pegaso Platform can meet this need by providing access to integrated economic and environmental accounts and the methods used to evaluate the changes they show.
<p>5. Given the requirement for cross-sectoral management approaches in the coastal zone, the institutions dealing with social, economic and environmental issues must themselves be organised to ways that allow integrated approaches to the developed. This will require that appropriate institutional capacity be built and that decision makers should be competent in using all the forms of evidence that needs to be taken into account.</p>	<ul style="list-style-type: none"> This principle also requires the use of indicators and understandings of their sensitivity to the drivers of change. However, it also implies some way of valuing the output of services that coastal zones provide so that the full value of the environment can be taken into account when looking at the impacts across different types of capital. Thus the Pegaso Platform should help decision makers to use and understand different valuation methods, and how local contexts may change them. The effective management of resources can only be achieved at local scales if the factors motivating the actors at those scales are understood, or if appropriate incentive structures are developed.
<p>6. The formulation of land use strategies, plans and programmes covering urban development and socio-economic activities, as well as other relevant sectoral policies are needed for successful ICZM. However, their impacts need to be assessment, and the implications considered in terms of the trade-offs between the natural, economic, social and cultural capitals.</p>	<ul style="list-style-type: none"> The Pegaso Platform should provide decision makers with an understanding environmental capacities and limits, as well as economic and social costs and benefits
<p>7. ICZM is essentially place-based and should take account of geographical context. In particular, it must recognise and communicate the particular qualities, characteristics and opportunities in the coastal zone that arise from the proximity of land and sea, and take steps to protect and sustain them. Thus management should be decentralized to the lowest appropriate level to ensure that management or policy goals are understood and owned by those who affect their implementation and success.</p>	<ul style="list-style-type: none"> The Pegaso Platform should provide decision makers with an understanding environmental capacities and limits, as well as economic and social costs and benefits
<p>8. The allocation of uses throughout the entire coastal zone should be balanced. Moreover the coastal developments need to be balanced with related processes in the coastal hinterland</p>	<ul style="list-style-type: none"> The Pegaso Platform should provide decision makers with an understanding environmental capacities and limits, as well as economic and social costs and benefits



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| <p>9. Preliminary assessments shall be made of the risks associated with the various human activities and infrastructure so as to prevent and reduce their negative impact on coastal zones. Although such risk assessments should take account of the limits of ecosystem function, assessment must also recognise that change is inevitable, and so must be updated by periodic assessments in the light of changing circumstances. ICZM must be framed as an adaptive process.</p> | <ul style="list-style-type: none">• Risk based assessments are a vital part of building adaptive and resilient communities and ecosystems. The Pegaso Platform should provide tools to help decision makers better understand the risks and uncertainties associated with plans and activities, and guidance in setting and monitoring safe minimum standards for resource use. |
| <p>10. Damage to the coastal environment shall be prevented and, where it occurs, appropriate restoration shall be effected.</p> | <ul style="list-style-type: none">• The Pegaso Platform should provide stakeholders with tools such as full cost accounting methods for calculating damage and restoration costs, and the minimum levels of natural capital needed for sustainability. |
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In drawing up Table 2 we have also attempted to track some of the implications of the framework for the **Pegaso work programme** in general, and the design of the *Pegaso* ICZM Governance Platform in particular. Again a number of issues are evident, namely:

- That the application of the principles (e.g. Principle 1) will require the development an appropriate indicator set **and** a good understanding of the direct and indirect drivers of change. The task of developing indicators is covered in WP4 (T4.1), and although it is proposed that this work should be based on the DPSIR concept, which captures some aspects of causality, the use of such indicator for making impact assessments will only be successful if an empirical or expert-based modelling framework is also available to potential users (Potschin, 2009). The accounting framework being developed in WP4 might provide a way of looking at the relationships between indicators in a systematically way, although it is unlikely to cover all the relationships that would need to be considered.
- That given the emphasis that the principles give to the goal of achieving sustainable or balanced development, an understanding of environmental limits or capacities, and how these vary spatially, must be an essential part of any future Governance Platform. At present there is **no task** within the work programme (esp. WP4) that specifically **deals with the notion of thresholds and limits**, although these topics are implicitly covered in the scenario component (T4.3). In developing the future work programme for the consortium, the issue of limits and capacities could be introduced as a useful cross-cutting theme to link the futures work with that dealing with indicators. Given that decisions about limits and capacities are based on both scientific understandings and societal choice, it should also be a focus in the development of participatory tools and discussed in the Cases.
- That by emphasising the role of ecosystem services and the idea that decisions about them are a matter of social choice, then the issue of values and valuation must become a significant part of any future work programme. In the long term the Platform must therefore support users in exploring these issues, and in looking at how values might change in the context of different plans and policies. Economic valuation is a topic being explored in WP4 (T4.5), and it is essential that this work is taken forward by showing how it can be used in different decision making contexts, by linking it to the accounts work, the scenarios and participatory methods. Full-cost, accounting methods for natural capital represent one way forward in *Pegaso*, and potentially link valuation work to notions of 'safe minimum standards' and the formulation of sustainability limits.
- That by highlighting the importance of **understanding risk and uncertainty**, the revised principles highlight a potential gap in the current *Pegaso* work programme, in that there is no task in WP4 that specifically deals with these issues, nor that of resilience. Like the notion of limits and capacities, however, risk is a topic that cuts across many concerns, and could be used as a theme to link different work areas. However, in the long term, if the Platform is to support the implementation the ICZM Principles, it should explicitly support the use of more formal risk assessment methods.



- Finally, by emphasising the importance of ‘local specificity’ and the view that ICZM is essentially ‘place-based’, in developing tools and the training necessary to use them there has to be great emphasis on helping people to both frame issues for themselves and apply generic approaches to resolve them. The challenge for **place-based approaches** is to understand how knowledge and experience can be transferred from one location to another and across scales. The *Pegaso* work programme explicitly recognises the need to develop understandings across different scales, but in thinking about the support the ICZM Platform might eventually provide, topics such as benefit transfer, the customisation of production functions for ecosystem services might also be considered, alongside more informal methods such as knowledge networks.

4. The ICZM Process

A review of the relationships between the ICZM Principles and those of the Ecosystem Approach is useful in terms of helping to ensure that they seem as mutually reinforcing sets of ideas and not competing frameworks. The redrafting of the principles that makes explicit reference to the key ideas in both also helps ensure that both frameworks continue to develop in ways that are relevant. Thus the introduction of the terminology surrounding ecosystem services into the ICZM framework and a demonstration of how they can be made operational should be part of the contribution that *Pegaso* can make to wider debates.

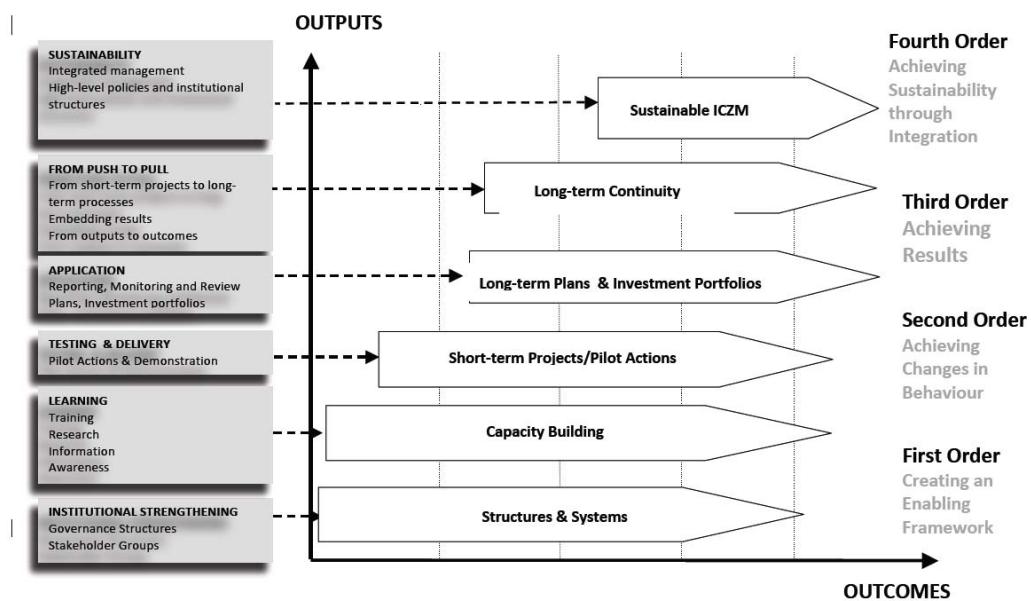
However, over-concern with redrafting the principles of ‘ecosystem-based management’ as they apply to the coastal zone might lead to an additional aspect of each of the frameworks being overlooked, namely that these ideas also need to be considered from a *process* perspective. That is they are as much about *designing* management and governance processes as they are in helping us set the objectives that that current or future management and governance structures might deliver. There are a number of case studies and other initiatives from which useful lessons can be drawn. For example, MAP has undertaken to implement an Ecosystem Approach (ECAP) at the regional scale of the Mediterranean, as a strategy for the comprehensive and integrated management of human activities affecting the marine ecosystem based on the best available scientific knowledge. This approach will follow the principles prescribed by the Convention on Biological Diversity (Nairobi, 2000). Other case studies and reviews include those of Diedrich et al. (2010), Cooper and Cummins (2009) and Hills et al. (2009). The importance of the *process* perspective on ICZM has recently been emphasised in the Final Report of SMAPIII Project⁹, *The Way Forward for the Mediterranean Coast*, and more generally in the UNEP Publication on *Ecosystem-based Management*¹⁰. Both seek to provide a way of understanding sustainable development as a sequence of ‘tangible levels of achievement’ that can both be planned for and used to monitor progress. Thus both publications use the so-called ‘Orders of Outcome’ framework as a tool for assessing progress towards sustainable development. Four different orders of outcome are identified and it is useful to reflect upon them in the light of the revised principles set out above the evolving *Pegaso* work programme, and the ‘Governance Platform’ that it eventually seeks to create (cf. Figure 1):

- First order outcomes involve creating the right ‘enabling conditions’ for sustainable development to occur, and can include the setting down of principles such as the ICZM Protocol, and the alignment of institutional structures, priorities and funding streams to the goals represented by these agreements. In this context, *Pegaso* can be seen as one of the developments that have occurred as a result of this enabling framework and its contribution must be judged against whether it facilitates the subsequent levels of outcome required for sustainable development; thus although the project has brought together a number of key stakeholders in the region the test will be whether the work can

⁹ <http://www.pap-thecoastcentre.org/pdfs/Final%20ICZM%20Policy%20Report.pdf>

¹⁰ http://gpa.unep.org/documents/ecosystem-based_management_english.pdf

Figure 1: Assessing ICZM Performance (after Shipman, 2010, original Shipman et al., 2009)



help stimulate the kinds of change needed for more sustainable use of the coastal zone to be achieved.

Second order outcomes concern achieving behaviour change. As indicated in **Error! Reference source not found.** this can involve training and awareness-raising, as well as research, and this seems to justify the emphasis that *Pegaso* is placing on capacity building. However, as the Figure also emphasises, behaviour change can only be achieved if it is underpinned by a social learning process that must involve including those training and capacity building activities in the context of a reflective phase of piloting and testing. All ecosystem-based approaches are fundamentally adaptive in their character, and involve an important element of learning by doing or 'community learning'. It therefore also include elements of problem focused 'action research' and trans-disciplinarily. The implication for the *Pegaso* work programme is that if the ICZM Principles are to be applied and developed and appropriate tools and other support mechanisms developed through the Governance Platform, then several iterative phases are required so that the lessons from earlier stages of the work can be digested and exploited. Thus ideally *Pegaso* must both reflect the principles of ICZM **and** the process by which it is implemented and develops. The resonances that the adaptive approach has with frameworks such as the implementation and appraisal cycles used in the business sector, and wider international management and reporting standards (e.g. ISO14001, CSR approaches) might also be examined of stronger links to the private sector are to be developed within *Pegaso*.

- Third order outcomes involve 'achieving results'. The lesson here for *Pegaso* is that if the switch from push to pull is to be achieved, then the outputs must be more an a pre-determined set of deliverables, but also include evidence on the ground of real behaviour change and real progress in overcoming current in the coastal zone. The role of the Cases work in *Pegaso* is perhaps key, in that they provide one way of generating the kinds of evidence required, although time-scales may prevent any 'final' outcomes from being achieved and assessed. The Cases should perhaps be viewed as open-air laboratories in which the ICZM principles and processes are tested even only partially, and not simply test-beds for the tools that *Pegaso* seeks to provide. The work in the cases, as presently set up, will not, for example, allow the various stages in the ICZM Planning Process (Shipman, 2010) to be worked through and the barriers to implementing such a process examined.

- Fourth order outcomes involve ‘achieving sustainability’, and clearly involve achieving full integrated policy and management approaches and lasting institutional reform. The timetable and resources available for *Pegaso* clearly prevents any demonstrable outcomes being achieved at this level. However, the need to identify the adequacy of existing approaches and structures does make the case for the ‘stock-taking’ activities that are planned as part of WP2. The outcomes from this work must set an agenda for the kinds of long-term change that are required to transform the particular examples of best-practice and success at the project level to a more general patterns of activities. Part of the capacity building activities should, for example, include stimulating new consortia that can bid for funding and monitoring their success.

5. Conclusion

The aim of this document has been to review the conceptual basis of Integrated Coastal Zone Management (ICZM) and trace its relationship to the Ecosystem Approach (EsA). These are two important sets of ideas that set the context for *Pegaso* and it is vital that the connections between them are clearly documented. The review has emphasised that while both sets of ideas are now widely accepted and institutionalised in such documents as the ICZM Protocol for the Mediterranean, these frameworks continue to evolve as they come to be applied and new concepts develop. In reflecting upon the principles the ICZM Protocol in the context of the *Pegaso* project, we have suggested how they might be adapted to include more explicit reference to ecosystem services and the problem of valuation, which are only considered implicitly in current formulations.

This review of the principles of the ICZM Protocol has also emphasised that they must be considered both in terms of the way they help us shape the goals of policy and management **and** design the governance processes are needed to deliver them. The implications of accepting the precepts of ICZM and EsA as fundamentally adaptive, problem solving techniques are profound for *Pegaso*, in that suggests that its work programme should be designed to achieve demonstrable social learning outcomes and documented behaviour change.

Despite the long history of ICZM and the application of the EsA, it is clear that considerable challenges remain in embedding both in decision making. As McKenna et al. (2009, p.953) have argued not only must we attempt to express the principles that underlie such approaches clearly and precisely, but also emphasise that they constitute an ‘indivisible set that cannot be picked through to find one to serve a specific policy outcome.’ Achieving a balance between strategic and local concerns is perhaps one of the most difficult issues that we face in coastal zone management, along with the question of how we ensure that a narrow focus on coastal issues does not undermine or conflict with policy in the marine and terrestrial domains. A conclusion that we might draw from this analysis is that one of the key contributions that the *Pegaso* Governance Platform might make in the long terms, is helping to develop a framework of understanding in which such tensions and challenges can be resolved.



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Appendix 1.1: ICZM Principles (source: Protocol on Integrated Coastal Zone Management in the Mediterranean¹¹)

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- (a) The biological wealth and the natural dynamics and functioning of the intertidal area and the complementary and interdependent nature of the marine part and the land part forming a single entity shall be taken particularly into account.

 - (b) All elements relating to hydrological, geomorphological, climatic, ecological, socio-economic and cultural systems shall be taken into account in an integrated manner, so as not to exceed the carrying capacity of the coastal zone and to prevent the negative effects of natural disasters and of development.

 - (c) The ecosystems approach to coastal planning and management shall be applied so as to ensure the sustainable development of coastal zones.

 - (d) Appropriate governance allowing adequate and timely participation in a transparent decision-making process by local populations and stakeholders in civil society concerned with coastal zones shall be ensured.

 - (e) Cross-sectorally organized institutional coordination of the various administrative services and regional and local authorities competent in coastal zones shall be required.

 - (f) The formulation of land use strategies, plans and programmes covering urban development and socio-economic activities, as well as other relevant sectoral policies, shall be required.

 - (g) The multiplicity and diversity of activities in coastal zones shall be taken into account, and priority shall be given, where necessary, to public services and activities requiring, in terms of use and location, the immediate proximity of the sea.

 - (h) The allocation of uses throughout the entire coastal zone should be balanced, and unnecessary concentration and urban sprawl should be avoided.

 - (i) Preliminary assessments shall be made of the risks associated with the various human activities and infrastructure so as to prevent and reduce their negative impact on coastal zones.

 - (j) Damage to the coastal environment shall be prevented and, where it occurs, appropriate restoration shall be effected.
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¹¹ <http://www.pap-thecoastcentre.org/razno/PROTOCOL%20ENG%20IN%20FINAL%20FORMAT.pdf>

Appendix 1.2: The Principles of the Ecosystem Approach

***Adopted by The Conference Of The Parties to the Convention On Biological Diversity at its Fifth Meeting, Nairobi, 15-26 May 2000. Decision V/6, Annex 1. CBD COP-5 Decision 6
UNEP/CBD/COP/5/23***

1. The objectives of management of land, water and living resources are a matter of societal choice.
2. Management should be decentralised to the lowest appropriate level.
3. Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
4. Recognising potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:
 - a. Reduce those market distortions that adversely affect biological diversity;
 - b. Align incentives to promote biodiversity conservation and sustainable use; and
 - c. Internalise costs and benefits in the given ecosystem to the extent feasible.
5. Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the Ecosystem Approach.
6. Ecosystems must be managed within the limits of their functioning.
7. The Ecosystem Approach should be undertaken at the appropriate spatial and temporal scales.
8. Recognising the varying temporal scales and lag-effects that characterise ecosystem processes, objectives for ecosystem management should be set for the long term.
9. Management must recognise that change is inevitable.
10. The Ecosystem Approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
11. The Ecosystem Approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
12. The Ecosystem Approach should involve all relevant sectors of society and scientific disciplines.

Note: These are the principles set down in the 1998, 'Malawi workshop'



Appendix 3: Poster presented at PEGASO Project Meeting in Romania, July 2011 (source and © PAP/RAC) – zoom in for details