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Investigating experiential knowledge for Integrated Coastal Zone Management in the Mediterranean

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D.R.R.S.

04

Doctor of Philosophy in Risk and Environmental,
Territorial and Building Development

2019

Coordinator: Prof. Michele Mossa

XXXII CYCLE

ICAR/20 - Urban and Regional Planning

DICATECh

Department of Civil, Environmental,
Land, Building Engineering
and Chemistry

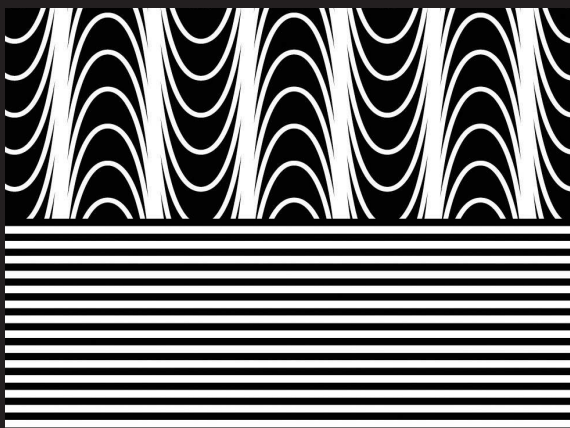
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**Investigating experiential knowledge
for Integrated Coastal Zone
Management in the Mediterranean**

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EXTENDED ABSTRACT (ENG)

Coastal systems are subject to the complexity of socio-economic and environmental problems included in the general concept of “coastal risks”, intensified by the many negative impacts of climate change, and often also by incorrect engineering works and management practices.

During the twentieth century, both population and activities in coastal areas have increased dramatically, producing widespread conversion of natural coastal landscapes, overexploitation of resources, and the worsening of coastal systems resilience.

As a matter of fact, coastal areas are vulnerable systems and climate change, which is already negatively impacting coasts, exacerbates their vulnerability causing several consequences. The general impacts of climate change on coastal communities will be enormous, increasing the exposition to specific hazards such as flooding and coastal erosion with extreme climate events.

Moreover, often coastal areas are facing critical situations due to inappropriate engineering works built to protect coastal areas from hazards such as flooding and coastal erosion, as well as lack of adequate forms of land use planning and environmental management.

Another aspect increasing the complexity of these systems is the fact that they are prone to tensions and conflicts between different actors with contrasting interests in such territories.

For this reason, there is the necessity to give articulated answers (technical, normative, economic, social, cultural, management) to deal with the complexity of coastal systems.

It is widely recognized that the traditional coastal management policies, based on hard approaches, mainly focused on engineering works for coastal protection and used for many decades as the only way to manage coastal risks, are unsuccessful. Likewise, purely regulatory approaches to coastal planning, essentially based on constraints and prohibitions, have proved insufficient.

The failure of these methods, devices and measures in dealing with coastal risks requires not only a deep understanding of the main physical phenomena to be addressed, but also acknowledgment about stakeholders' and local communities' knowledge, role,

objectives, interdependencies and network of interactions.

Therefore, to analyze and manage coastal risks in an effective way, there is the necessity to create a diverse, scientific and technical interdisciplinary knowledge base, including different experts with different backgrounds. This should be paralleled by an improvement of interfaces between knowledge creation and decision-making in which stakeholders and local society can interact and participate into the management processes. In this sense, the production of shared knowledge on phenomena, processes and related risks would help to define appropriate forms of management.

In line with this, also in the light of climate change consequences, the international scientific as well as policy debate has developed on the design, and even more so, on the implementation of an approach to the use and management of coastal areas, which is appropriate to address the complexity of the problems in these areas. It is known as Integrated Coastal Zone Management (ICZM). It is the first, and as of today the only international legal instrument specifically addressing coastal zones management, which requires “appropriate involvement” of stakeholders, including the general public.

In the last forty years, several are the events occurred and the international, European and national agreements signed for the spreading of ICZM.

In this sense, the Mediterranean Countries have begun to collaborate and take measures to better manage the coastal areas of the Mediterranean Basin. However, the fragmented mosaic of legal and regulatory regimes, land rights, institutional structures and administrative cultures has created a legal institutional gap in Mediterranean coastline management, reflect delays in the ratification of the Protocol on Integrated Coastal Zone Management in the Mediterranean.

Thus, this thesis tried to understand, with reference to two selected Mediterranean case studies, in Italy and in Greece, some reasons behind the difficulties of implementing Integrated Coastal Zone Management.

Each case study was investigated using different approaches according to the different contexts, with the common aim of understanding to what extent and how the risks affecting coastal areas were perceived by the different stakeholders and the public at large. In both case studies such direct investigation was related to the specific features of the contexts, as it emerged from the analysis of statistics and official documents (legislation, plans...).

The case study of Margherita di Savoia (Puglia Region, Italy) is characterized by risk of erosion and flooding among the most impacted in Italy due for its particular urban conformation and the close relationship with the sea-related economy. An overview of the main coastal pressures, hazards and climate change impacts in Italy, as well as the complex and fragmented multi-level governance for coastal areas, is the background knowledge for the analysis through direct inquiry of experiential knowledge in Margherita di Savoia. This was carried out using two different, and to some extent complementary methods: the questionnaires and the Scenario workshop.

The Greek case study focuses on Pagasitikos Gulf, a semi-enclosed gulf characterized by the presence of several uses along the coast and in the sea in addition to urbanization, which led to anthropogenic pressures worsening especially the sea water quality. After an overview of the main coastal pressures, hazards and climate change impacts in Greece, as well as the legal-Institutional framework, the coastal risks in the Pagasitikos Gulf has been investigated through a field analysis of the experiential knowledge based on an iterative process which combines semi-structured interviews and “fuzzy” cognitive maps.

The analysis highlights a general lack of awareness of the complexity of the problems and related risks despite their evidence. This limit can be overcome through the involvement of different actors and through a continuous interaction between them to build and increase shared knowledge.

However, it should be aware of the intrinsic limits of the so-called ‘participatory approaches’ for an effective analysis of experiential knowledge and even more for the use of experiential knowledge in the integrated management of coastal areas. The knowledge that emerges from this involvement cannot be taken for granted because stakeholders may not be naïve and neutral. Moreover, the involvement of stakeholders and local society in planning processes takes longer and therefore this work could only offer some insights.

Key-words

Mediterranean Basin, Coastal Risks, Case-study approach, Integrated Coastal Zone Management, Experiential Knowledge

EXTENDED ABSTRACT (ITA)

I sistemi costieri sono soggetti alla complessità dei problemi socioeconomici e ambientali compresi nel concetto generale di “rischi costieri”, esacerbati dai molti impatti negativi dei cambiamenti climatici, spesso gestiti attraverso opere di ingegneria non corrette e modalità di gestione inadeguate.

Nel corso del ventesimo secolo, sia la popolazione che le attività umane sono aumentate notevolmente in queste aree, provocando un’ampia conversione dei paesaggi naturali costieri, uno sfruttamento eccessivo delle risorse e il peggioramento della resilienza dei sistemi costieri. Le aree costiere sono sistemi vulnerabili e il cambiamento climatico, che sta già avendo un impatto negativo sulle coste, aggrava la loro vulnerabilità causando diverse conseguenze. Gli impatti generali del cambiamento climatico sulle comunità costiere saranno enormi, aumentando l’esposizione a rischi specifici come le inondazioni e l’erosione costiera con eventi climatici estremi. Inoltre, spesso le aree costiere si trovano ad affrontare situazioni critiche a causa di opere ingegneristiche non corrette costruite per proteggere le aree costiere da rischi come le inondazioni e l’erosione costiera, nonché della mancanza di adeguate forme di pianificazione degli usi del suolo e di gestione dell’ambiente.

Un altro aspetto che aumenta la complessità di questi sistemi è il fatto che essi sono soggetti a tensioni e conflitti tra diversi attori spesso con interessi contrastanti.

Per questo motivo, c’è la necessità di dare risposte articolate (tecniche, normative, economiche, sociali, culturali, gestionali) per affrontare la complessità dei sistemi costieri.

È ampiamente riconosciuto che le tradizionali politiche di gestione costiera, basate su approcci ‘hard’ focalizzati principalmente sulle opere di ingegneria per la protezione delle coste e utilizzati per molti decenni come l’unico modo per gestire i rischi costieri, sono inefficaci. Analogamente, approcci unicamente regolativi alla pianificazione delle aree costiere, essenzialmente basati su vincoli e divieti, si sono dimostrati comunque insufficienti.

Il fallimento di tali metodi, dispositivi e misure nell’affrontare i rischi costieri richiede non solo una profonda conoscenza dei principali fenomeni fisici, ma anche il riconoscimento delle conoscenze, del ruolo, degli obiettivi, delle interdipendenze e della rete di interazioni degli stakeholder e delle comunità locali.

Quindi, per analizzare e gestire i rischi costieri in modo efficace, c'è la necessità di creare una base di conoscenze diverse, scientifiche e tecniche di tipo interdisciplinare, che includano esperti con diversi background. Ciò dovrebbe essere accompagnato da un miglioramento delle interfacce tra la creazione di conoscenza e il processo decisionale, in cui gli stakeholder e la società locale possano interagire e partecipare ai processi di gestione. In questo senso, la produzione di conoscenze condivise su fenomeni, processi e rischi correlati contribuirebbe a definire forme appropriate di gestione.

In linea con questo, anche alla luce delle conseguenze del cambiamento climatico, si è sviluppato il dibattito scientifico internazionale e politico sulla progettazione, e ancor più sull'implementazione di un approccio all'uso e alla gestione delle aree costiere, che sia adeguato ad affrontare la complessità dei problemi in queste aree, noto come Gestione Integrata delle Zone Costiere (GIZC). Questo approccio è il primo e ad oggi l'unico strumento giuridico internazionale che si occupa specificamente della gestione delle zone costiere e che richiede un "adeguato coinvolgimento" dei soggetti interessati, compreso il pubblico in generale.

Negli ultimi quarant'anni si sono verificati diversi eventi e accordi internazionali, europei e nazionali con l'obiettivo di diffusione della GIZC.

In tal senso, i paesi del Mediterraneo hanno iniziato a collaborare e ad adottare misure per la gestione delle zone costiere del bacino del Mediterraneo.

Tuttavia, il fragile mosaico di regimi giuridici e normativi, diritti fondiari, strutture istituzionali e culture amministrative ha creato un vuoto giuridico-istituzionale nella gestione delle coste del Mediterraneo, che riflette i ritardi nella ratifica del Protocollo sulla Gestione Integrata delle Zone Costiere nel Mediterraneo.

La tesi ha quindi cercato di comprendere alcune ragioni alla base delle difficoltà di attuazione della gestione integrata delle zone costiere con riferimento a due casi studio selezionati nel Mediterraneo, in Italia e in Grecia.

I due casi di studio sono stati analizzati utilizzando approcci diversi, con l'obiettivo comune di capire fino a che punto e come sono stati percepiti i rischi che interessano le zone costiere dai diversi stakeholder e dal pubblico in generale. In entrambi i casi tale indagine diretta è stata correlata alle caratteristiche specifiche dei contesti, come è emerso dall'analisi delle statistiche e dei documenti ufficiali (legislazione, piani...).

Margherita di Savoia, in Puglia, è tra i comuni italiani più colpiti da erosione costiera

e inondazione per la sua particolare conformazione urbana e per lo stretto rapporto con l'economia legata al mare. Una panoramica delle principali pressioni costiere, dei pericoli e degli impatti dei cambiamenti climatici in Italia, così come la complessa e frammentata governance multilivello delle aree costiere, è la conoscenza di base per l'analisi attraverso l'indagine diretta della conoscenza esperienziale a Margherita di Savoia che è stata realizzata attraverso due metodi diversi e in qualche misura complementari: il questionario e lo Scenario workshop.

Il caso di studio greco si concentra sul Golfo del Pagasitikos, un golfo semi-chiuso caratterizzato dalla presenza di diversi usi lungo la costa e nel mare in aggiunta all'urbanizzazione, che ha portato a pressioni antropiche peggiorandone soprattutto la qualità dell'acqua del mare. Dopo una panoramica delle principali pressioni costiere, dei pericoli e degli impatti del cambiamento climatico in Grecia, così come del quadro giuridico-istituzionale, i rischi costieri del Golfo di Pagasitikos sono stati analizzati attraverso un'analisi sul campo della conoscenza esperienziale basata su un processo iterativo che combina interviste semi-strutturate e mappe cognitive "fuzzy".

Dall'analisi emerge una generale mancanza di consapevolezza della complessità dei problemi e dei rischi correlati, nonostante le loro evidenze.

Questo limite può essere superato attraverso il coinvolgimento di diversi attori e attraverso una continua interazione fra essi per costruire e accrescere la conoscenza condivisa.

Tuttavia, si dovrebbe essere consapevoli dei limiti intrinseci dei cosiddetti "approcci partecipativi" per un'analisi efficace della conoscenza esperienziale e ancor più per l'utilizzo della conoscenza esperienziale nella gestione integrata delle aree costiere. La conoscenza che emerge dal coinvolgimento non può essere data per scontata perché gli stakeholder possono non essere naïve e neutrali. Inoltre, il coinvolgimento dei soggetti interessati e della società locale nei processi di pianificazione richiede tempi più lunghi e quindi questo lavoro ha potuto offrire soltanto degli elementi di riflessione.

Parole chiave

Bacino del Mediterraneo, Rischi costieri, Casi di studio, Gestione Integrata delle Zone Costiere, Conoscenza esperienziale

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INTRODUCTION

Coastal areas, recognized as preferred sites for urbanization, are facing huge challenges, such as tackling the issue of coastal risks exacerbated by climate change.

During the twentieth century, both population and activities in coastal areas have increased dramatically, producing widespread conversion of natural coastal landscapes, overexploitation of resources and the worsening of coastal systems resilience. Moreover, such systems are under an ever increasing threat deriving from their mismanagement (Mosley, 2014; Barragán and de Andrés, 2015; Mega, 2016).

As a matter of fact, coastal areas are vulnerable systems. Literature defines vulnerability as a multidimensional feature, which considers not only bio geophysical responses of coastal areas, but involves also economic, institutional and socio-cultural aspects (Mustelin et al., 2010). Woodroffe (2007: 45) describes vulnerability as “the degree to which a coast is likely to be affected by, or its incapability to withstand the consequences of, impact”. The impact may derive from different aspects: natural events, e.g. flooding and storms, or human actions and may cause hazards such as coastal erosion, recognized as one of the major associated to coastal areas (Woodroffe, 2007).

Furthermore, climate change, which is already negatively impacting coasts, exacerbates their vulnerability causing several consequences. Literature shows that sea level rise is considered as one of the main factors causing negative impacts on coastal areas. Global mean sea level is already rising and is expected to rise due to human-induced warming during the 21st century (UNISDR, 2017; IPCC, 2012; Nicholls, 2002). The general impacts of climate change on coastal communities will be enormous. Climate change will approximately affect 2.7 billion people (USAID, 2009), and ecosystems, increasing the exposition to specific hazards such as flooding and coastal erosion with extreme climate events.

Moreover, often coastal areas are facing critical situations due to incorrect engineering works built to protect coastal areas from hazards such as flooding and coastal erosion. It can therefore be argued that coastal systems are subject to the complexity of socio-economic and environmental problems associated with coastal risks, exacerbated by the many negative impacts of climate change, often managed through incorrect engineering works.

Another aspect increasing the complexity of these systems is the fact that they are prone to tensions and conflicts between different actors with contrasting interests in such territories (Soma and Vatn, 2014; van der Molen et al., 2015). For this reason, there is need to give articulated answers (technical, normative, economic, social, cultural, management) to deal with the complexity of coastal systems.

The comprehension of coastal risks requires not only a deep understanding of the main physical phenomena to be addressed, but also acknowledgment about stakeholders' and local communities' knowledge, role, objectives, interdependencies and network of interactions (IRGC, 2017).

Thus, to analyze and manage coastal risks in an effective way, there is the necessity to create a diverse, interdisciplinary and scientific knowledge base, including different experts with different backgrounds. This should be paralleled by an improvement of interface between knowledge creation and decision-making in which stakeholders and local society can interact and participate into the management processes. In this sense, the production of shared knowledge on phenomena, processes and related risks would help to define appropriate forms of management.

In line with this, also in the light of climate change consequences, the international scientific as well as policy debate has developed on the design, and even more so, on the implementation of an approach to the use and management of coastal areas, which is appropriate to address the complexity of the problems in these areas. It is known as Integrated Coastal Zone Management (ICZM). It is the first, and as of today the only international legal instrument specifically addressing coastal zones management, which requires "appropriate involvement" of stakeholders, including the general public.

In the last forty years, several international, European and national agreements were adopted and signed for the spreading of ICZM.

In this context, the Mediterranean countries have begun to collaborate and take measures to better manage the coastal areas of the Mediterranean Basin. However, the fragmented mosaic of legal and regulatory regimes, land rights, institutional structures and administrative cultures has created a legal- institutional gap in Mediterranean coastline management, reflect delays in the ratification of the Protocol on Integrated Coastal Zone Management in the Mediterranean (entered into force in 2011).

Thus, this thesis tries to understand, with reference to two selected Mediterranean case studies, in Italy and in Greece, some reasons behind the difficulties of implementing integrated coastal zone management.

Each case study was investigated using different approaches, with the common aim of understanding to what extent and how the risks affecting coastal areas were perceived by the different stakeholders and the public at large. In both case studies such direct investigation was related to the specific features of the contexts, as it emerged from the analysis of statistics, official documents (legislation, plans...).

The case study of Margherita di Savoia (Puglia Region, Italy) is characterized by risk of erosion and flooding among the most impacted in Italy due for its particular urban conformation and the close relationship with the sea-related economy. An overview of the main coastal pressures, hazards and climate change impacts in Italy, as well as the complex and fragmented multi-level governance for coastal areas, is the background knowledge for the analysis through direct inquiry of experiential knowledge in Margherita di Savoia. This was carried out using two different, and to some extent complementary methods: the questionnaires and the Scenario workshop.

The Greek case study focuses on the Pagasitikos Gulf, a semi-enclosed gulf characterized by the presence of several uses along the coast and in the sea in addition to urbanization, which led to anthropogenic pressures worsening especially the sea water quality. After an overview of the main coastal pressures, hazards and climate change impacts in Greece, as well as the legal-institutional framework, the coastal risks in the Pagasitikos Gulf will be investigated through a field analysis of the experiential knowledge based on an iterative process which combines semi-structured interviews and “fuzzy” cognitive maps. The analysis of this case study took place thanks to a visiting period at the Department of Planning and Regional Development of the University of Thessaly.

The methods chosen for the analysis of the experiential knowledge for both case studies have been selected starting from the following research questions:

- Does this lack of attention and of public policies be related to low level of knowledge about the problem? And which kind of knowledge?
- Is there a lack of collective perception of the problem, and therefore public

bodies do not work towards its solution?

- Is there a lack of willingness to solve (and understand) the problem because of established interests that benefit from the status quo?
- Is it still considered that problems relating to coastal risks can be solved only by means of engineering infrastructure works (e.g. coastal defense works)?

Thus, trying to provide some answers to the above listed research questions, the thesis aims at contributing to single out some pitfalls and potentials for an effective integrated management in coastal areas.

The thesis is structured as follow:

- Chapter 1 gives a general overview on coastal systems, based on the main actual literature review;
- Chapter 2 gives an overview on the main framework tools, important basis for the work;
- Chapter 3 focuses on the Mediterranean Basin, in order to setting the scene for the case studies;
- Chapter 4 outlines the empirical research design, on which the survey developed on the two selected case studies was based;
- Chapter 5 focuses on two case studies and it is divided in three parts: Part 1 explores the case of Margherita di Savoia (Puglia Region, on the southern Adriatic coast); Part 2 analyzes the case of Pagasitikos Gulf (Thessaly Region, Greece); Part 3 presents some considerations;
- Conclusions will answer to the above mentioned research questions, highlight limitations of the work and propose further research perspectives.

CHAPTER 1

CONCEPTUAL BACKGROUND

The present chapter aims at giving a general overview on coastal systems, based on the main actual literature review. Firstly, the complexity of coastal systems will be described, putting the attention on the main elements which characterize it. Hazards and risks will be defined and the relation with coastal areas will be highlighted. Secondly, the impacts of climate change on coastal systems will be described in order to understand their role in exacerbating hazards and arising the vulnerability of these systems. Finally, the concluding paragraph illustrates potential ways to deal with the complexity of coastal systems.

1.1. The complexity of coastal systems

Coastal systems are complex non-linear dynamic systems (Woodroffe, 2007), subjected to changing of forms and processes at different time and space scales due to geomorphological and oceanographical factors (Woodroffe, 2007; Mustelin et al., 2010).

Even if only 6% of the global surface is covered by coastal ecosystems (UNU-IDHP, 2015), coastal areas accommodate more than half of the worldwide human population (Masselink and Gehrels, 2014). It is quite impressive the fact that coastal population growth is multiplied by 6.6 in respect to the data of 1945 concentrating 1.453 billion people in 2012 (Barragán and de Andrés, 2015). A phenomenon that emphasizes this aspect even more is the fact that sixty percent of the world's major cities are located in coastal areas (Baztan et al., 2015) as it is clearly visible from the global view of Earth at night, produced by NASA (Fig. 1). Furthermore, population density in coastal areas is three times larger than the average with future population growth projections that are the highest worldwide (Masselink and Gehrels, 2014).

As a matter of fact, the fast growth in population of coastal areas has led to a widespread conversion of natural coastal landscapes to mainly residential, touristic and

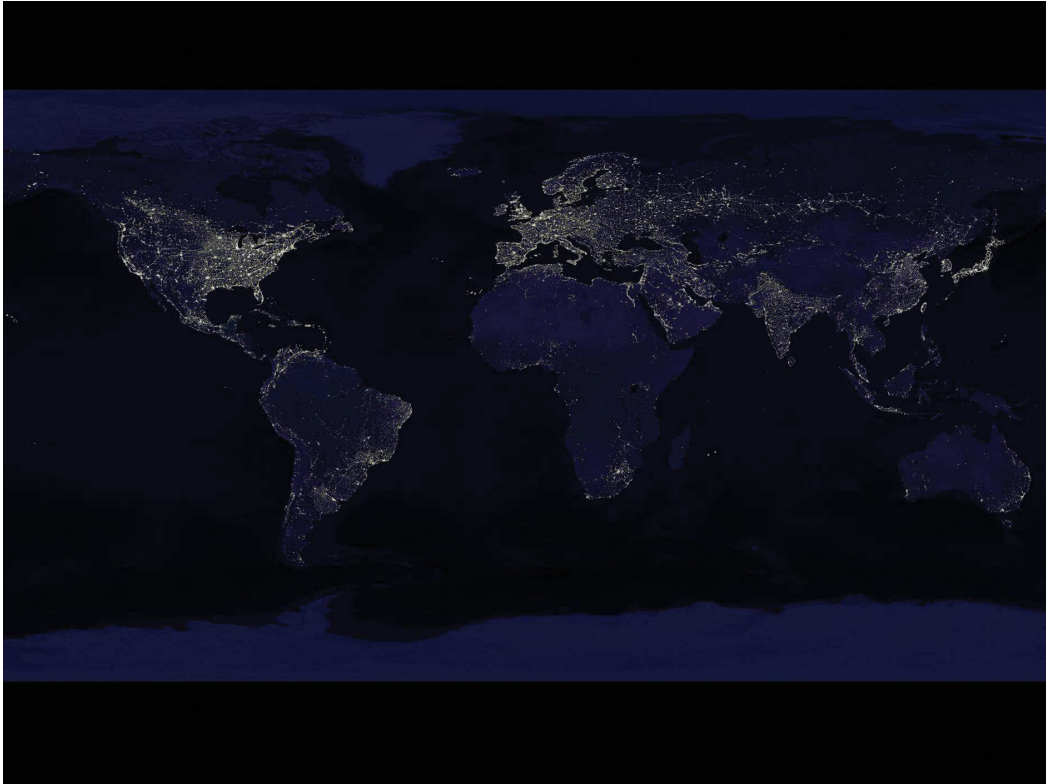


Fig. 1 - Global view of Earth at night (NASA/NOAA, 2017)

industrial uses (Barragán and de Andrés, 2015; Mega, 2016). During the twentieth century, activities in coastal areas have increased dramatically and this situation has led to an increase of pressures on the coastal resource systems (Masselink and Gehrels, 2014).

Many uses are taking place in the coastal areas for their wide range of essential resources and activities (Motta Zanin and Santoro, 2018), e.g. i) navigation and communication ii) living marine resources iii) mineral and energy resources iv) tourism and recreation v) coastal infrastructure development vi) waste disposal and pollution vii) coastal environmental quality protection viii) beach and shoreline management ix) military activities and research (Masselink and Gehrels, 2014).

Some of these uses lead to an overexploitation of resources and the worsening of

coastal systems resilience (Motta Zanin and Santoro, 2018). Moreover, coastal systems are under an everincreasing threat deriving also from their mismanagement (Mosley, 2014).

Coastal systems are comprising interconnected systems in which the natural system is interconnected within the socio-economic ones (Woodroffe, 2007).

As stated by Woodroffe (2007: 45) “the complexity and intricacy of the feedbacks surrounding human use of the coast and coastal resources mean that there is rarely consensus on the degree to which human actions have modified natural processes”.

For instance, tourism is one of the main activities of coastal systems. It is a dominant source of income, investment and employment in coastal communities (Grant, 2015). It is dynamic and flexible, but it is subject to a huge number of vulnerabilities unique to this sector (Motta Zanin, 2017). In this sense, as highlighted by Nguyen Imamura and Iuchi (2016: 4), «tourism represents a paradox as on the one hand, the industry relies heavily on positive images of safety, stability and low risk, but on the other, the intrinsic aspects that the industry is built upon are often vulnerable to natural hazards».

As a matter of fact, vulnerability is an important aspect regarding coastal areas.

Vulnerability can be defined as “the degree to which a coast is likely to be affected by, or its incapability to withstand the consequences of, impact” (ibid: 45). It consists of multiple underlying factors (Mustelin et al., 2010) and, as is it possible to see in Fig. 2, it is multi-dimensional, taking into account not only bio geophysical responses of coastal areas, but also involving economic, institutional and socio-cultural aspects (Woodroffe, 2007). Its impacts may derive from different aspects: from natural events, e.g. flooding and storms, or from human actions or events (ibid.).

To give an example of the multidimensionality of the vulnerability factors, the overdevelopment of coastal areas has significantly increased their vulnerability to coastal erosion and flooding, whilst at the same time the increased reliance on hard coastal engineering structures for coastal protection has reduced their resilience (Masselink and Gehrels, 2014). Moreover, the urbanization of coastal areas has other consequences, e.g. enlargement of natural inlets, dredging of waterways for navigation (Mega, 2016). In this sense, the increase of the shoreline retreat and risk of flooding of coastal areas are critically linked with the degradation of coastal ecosystems by human activities (ibid.).

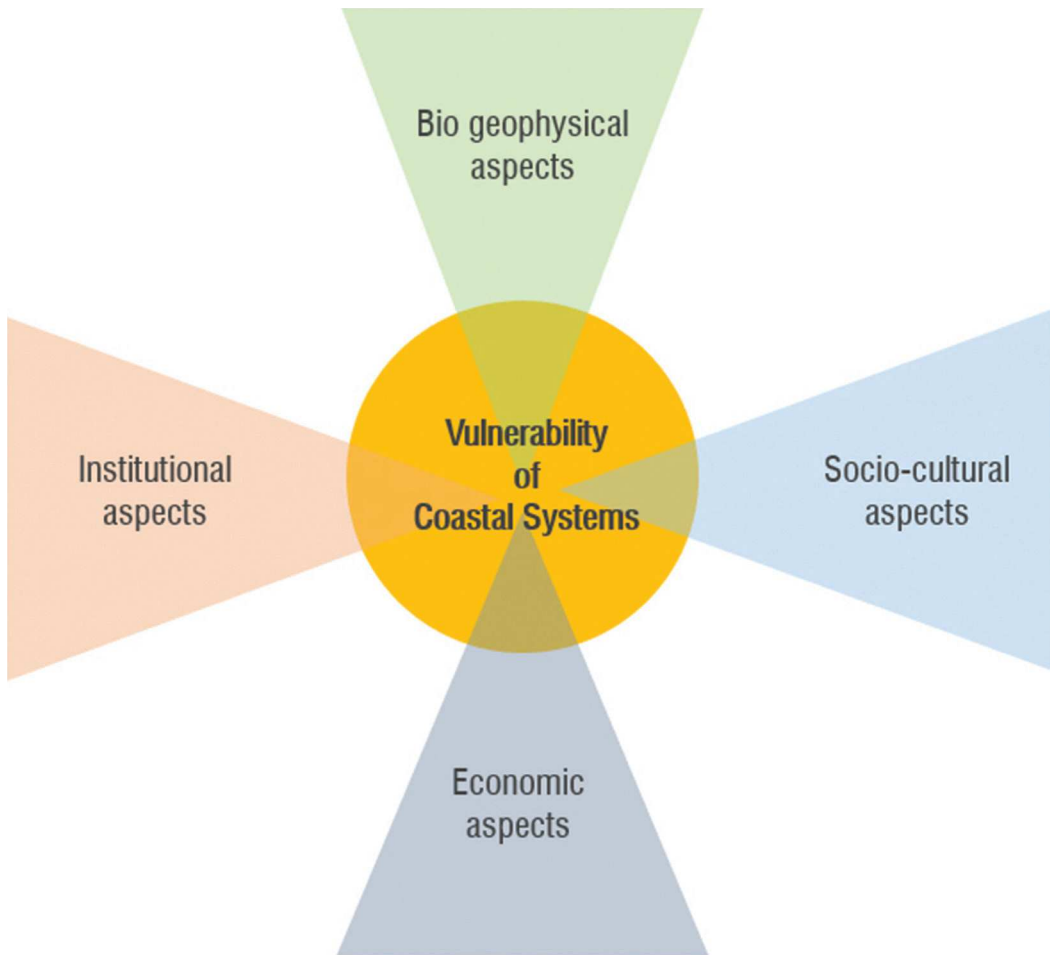


Fig. 2 - Vulnerability and its components (source: author's own)

1.1.1. Hazards and risks in coastal areas

At first sight, the terms 'hazard' and 'risk' might seem synonymous, but they are not. Scientific literature has given many definitions of both and some of them are reported in Table 1 and Table 2.

Table 1 - Definitions of hazards (source: author's own)

Definition	Source
A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental	UNISDR, 2009:17
Refers to a situation, event or substance that can become harmful for people, nature or humanmade facilities	Renn and Rohrman, 2000:14
The expression of danger	Alexander, 2002:29

Table 2 - Definitions of Risk (source: author's own)

Definition	Source
The combination of the probability of an event and its negative consequences.	UNISDR, 2009:25
The product of (the probability of) a hazard and its adverse consequences.	Kron, 2014:20
Possibility that an undesirable state of reality (adverse effects) may occur as a result of natural events or human activities	Renn and Rohrman, 2000:13
The likelihood of impacts	Alexander, 2002:29

Furthermore, considering the term 'risk', Renn and Rohrman (2000) stress the fact that its definition is not commonly accepted because it differs widely across sciences and scientists. In disciplines such as engineering, risk is mainly defined as "the probability and physical measurements or corresponding utilities of negative outcomes" (ibid: 13). On the contrary, social sciences give much importance on the qualitative aspects of risk because they are crucial facets of the concept (ibid.).

To better understand the differences and the interconnections between ‘hazard’ and ‘risk’, Fig. 3 gives an explanation through a simple example of three different situations: i) no risk ii) low risk iii) high risk. In this sense, if a hazard occurs in an unpopulated area, the risk is zero. If the same hazardous event happens in a well-prepared region with low vulnerability, risk is low. Alternately, risk is high if a hazard harms people and/or their properties in an area with high vulnerability.

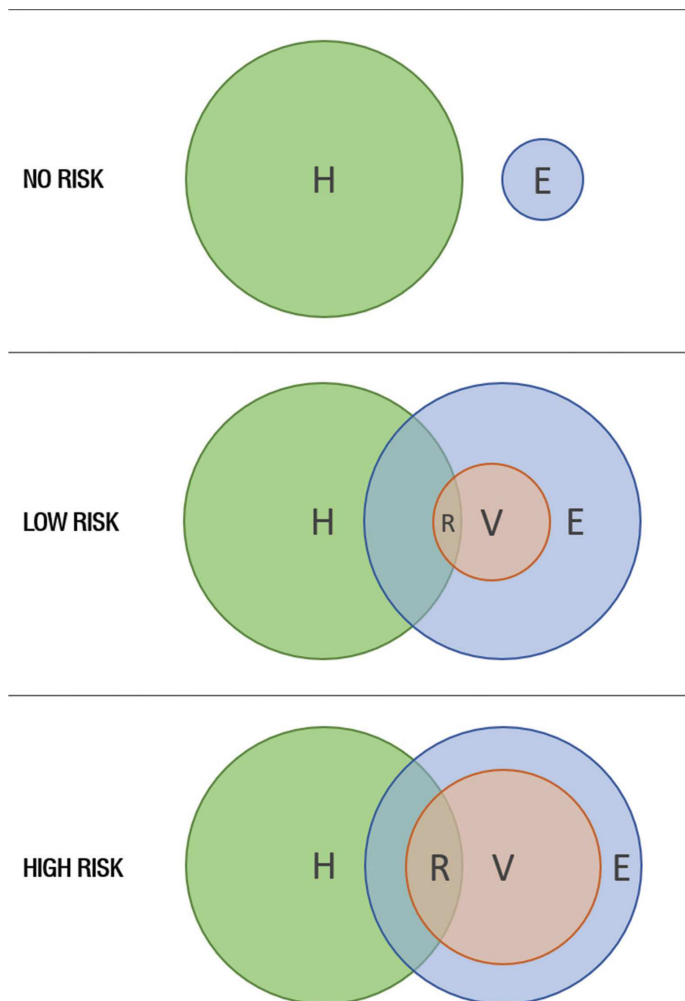


Fig 3 - Dependency of Risk (R) on the variables Hazard (H), Exposure (E) and Vulnerability (V) (adapted from Kron, 2014)

It can be assumed that risk is strictly dependent on the three variables Hazard (H), Exposure (E) and Vulnerability (V) and it can be calculated as the product of these three elements:

$$R=H*V*E \text{ (1)}$$

In this figure vulnerability is intended as the damageable exposure. In this sense, 100% vulnerability means an expected total loss (Kron, 2014). As a matter of fact, where no people or values can be affected by a phenomenon there is no risk (Kron, 2014). In this regard, it can be said that ‘uncertainty’ is one of the main key words that identifies the risk (Renn & Rohrmann, 2000; Kron, 2014).

As highlighted before, coasts are vulnerable systems. Particularly, urbanized coastal areas are characterized by some elements that make them more vulnerable to hazards, as described in Table 3.

Table 3 - Main elements which make urbanized coastal areas more vulnerable to hazards (UNU-IDHP, 2015:9)

Elevation	Most urbanized coastal areas are at sea level, or very close to sea level, making them more vulnerable to hazards such as flooding and coastal erosion caused by increases in sea level, storms, and tidal waves.
Topography	Many urbanized coastal areas are surrounded by mountains and other topographic features that can generate extreme precipitation. Many more lie on estuarine or other low-lying topography exposed to riverine as well as coastal flooding.
Land use	Many urbanized coastal areas are hubs of intensive economic activity generating exposure for people as well as infrastructure that may be critical for national, regional and global economic and business continuity. With urban development, there is a high proportion of impervious spaces (relative to green space) in coastal cities, increasing flood impacts. Urbanized landscapes also contribute to the high temperature of coastal cities relative to the less-settled areas that surround them.

Sea/Land Breezes	Tidal waves can be moderated by the interaction of air, land, and water along the coast, but development in some cities impedes this ecosystem service. Coastal breezes can also concentrate and re-circulate pollutants, thereby affecting air quality and compounding the health effects of high temperatures.
Population Density	High population density generates concentrated human exposure and challenges the capacity of transport systems in evacuation and of response and reconstruction capacity.

Floods and coastal erosion are considered as the major hazards associated to coastal areas. The United Nations Office for Disaster Risk Reduction (2017) states that floods are the natural hazard with the highest frequency and the widest geographical distribution worldwide. Floods in coastal areas mainly occur as a result of storm surges associated with tropical cyclones, tsunamis or high tides. To give an example, considering the three scenarios from Fig. 3 and looking at the case of floods as hazard, it can be argued that: i) in the first situation, if strong flood in an uninhabited region occurs, no exposure will be affected and, thus, there will be no risk; ii) in the second situation a strong flood in a well prepared region occurs, hence low vulnerability and low risk will be registered; iii) finally, in the third situation a strong flood in a poor prepared region occurs and, therefore, there will be high vulnerability and high risk.

Instead, coastal erosion is usually driven by the action of waves and currents and by mass wasting processes on slopes and subsidence (UNISDR, 2017). This phenomenon can be associated with extreme weather events, such as storms and flooding, but human activities can also strongly influence it. In this sense, various can be the transformation processes of coastal areas that lead to their increasing vulnerability to coastal erosion risks (Douglas and Crowell, 2000; UNISDR, 2017; Sowmya et al., 2018; Francis, Kim and Pant, 2019), such as:

- the removal of sediments through dredging and sand mining;
- the construction of coastal defense systems;
- the damming of rivers;
- land use changes.

As understandable from Table 1, coastal erosion becomes a hazard “when society does not adapt to its effects on people, the built environment and infrastructure” (UN-ISDR, 2017: 72).

1.1.2. Climate change impacts

In coastal systems, climate represents a key environmental boundary condition (Masselink and Gehrels, 2014). Climate change is already negatively impacting coasts, and exacerbating their vulnerability (Usaid, 2009). Furthermore, the consequences will be significant and immediate for goods, services and coastal communities (ibid). As explained in Fig. 4, climate change may affect coastal areas causing several conse-

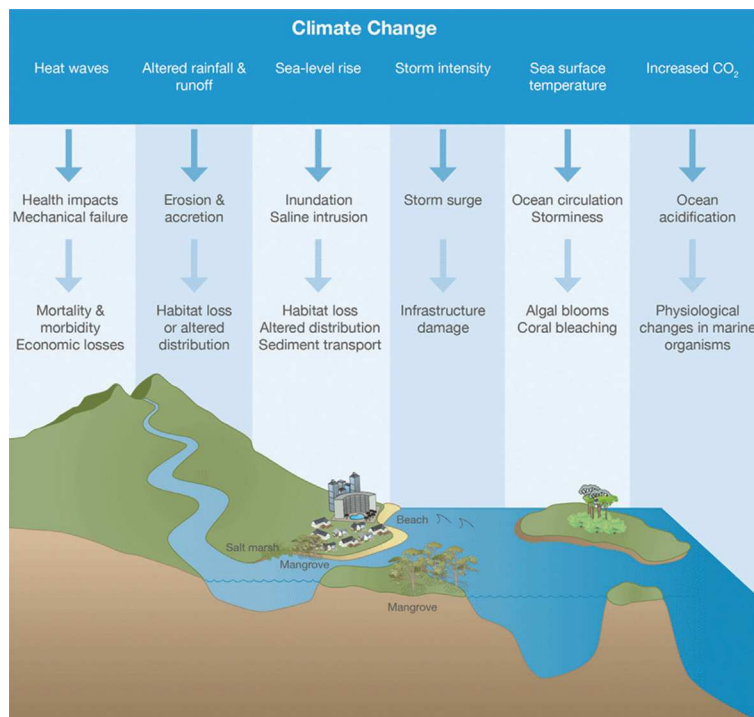


Fig. 4 - Climate change factors and related consequences on coastal areas (ian.umces.edu)

quences. Mean temperatures will increase worldwide; precipitations will increase in the global mean but drying and rainfall period will affect many different areas; Mid-latitude storms and tropical cyclones will lead to direct changes in extreme winds, and indirect by causing storm surges (Nicholls, 2004).

As a matter of fact, these biophysical changes exacerbated by climate change would provoke several socio-economic impacts such as loss of infrastructures and coastal resources with the decline of economic, ecological, cultural and subsistence aspects (Motta Zanin and Santoro, 2018).

Literature shows that sea level rise is considered as one of the main factors causing negative impacts on coastal areas. Evidences demonstrate that from 1993 to 2009 the mean sea level has risen to 3.3 ± 0.4 mm/year suggesting an acceleration of this phenomenon (Nicholls and Cazenave, 2010).

Global mean sea level trends, measured through satellite altimetry, highlight that sea level is rising unevenly (Nicholls and Cazenave, 2010). Fig. 5 shows the differences

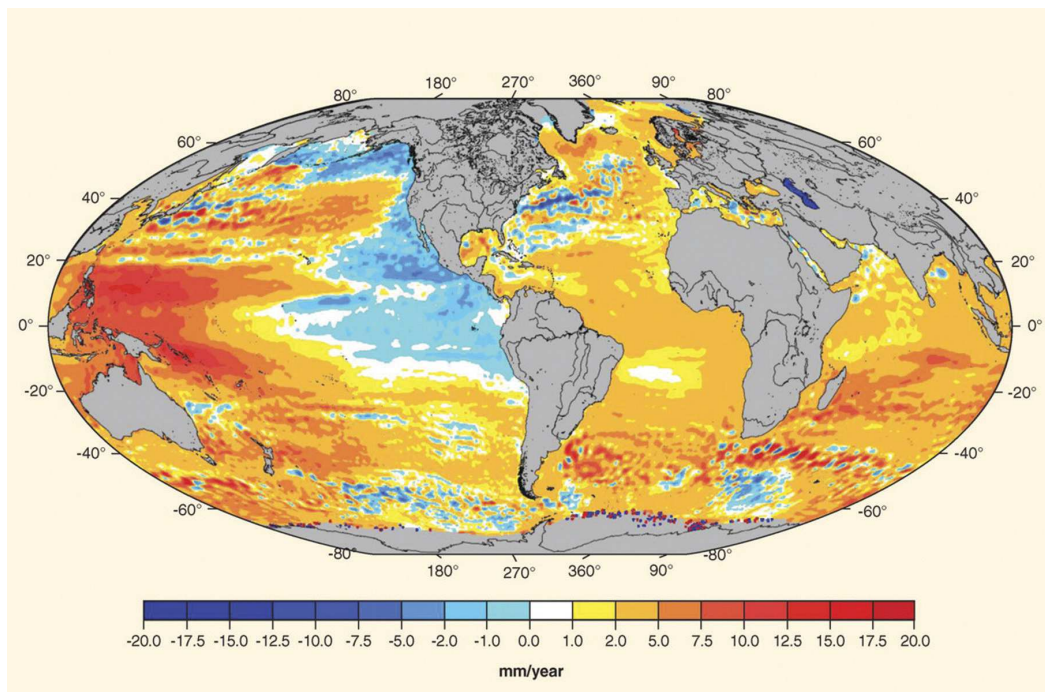


Fig. 5 - Regional sea level trends from 1992 to 2009 (Nicholls and Cazenave, 2010)

in sea level trends worldwide, highlighting that in some regions it has risen up to three times faster than the global mean since 1993 (ibid.).

Two seems to be the main factors which contribute to sea level rise: i) the thermal expansion of sea water due to ocean warming (Fig 6) and ii) water mass input from land water reservoirs and land ice melt. In this sense, measurements show that the glacier contribution to sea level rise from 1993 to 2009 may be around 30%.(ibid.).

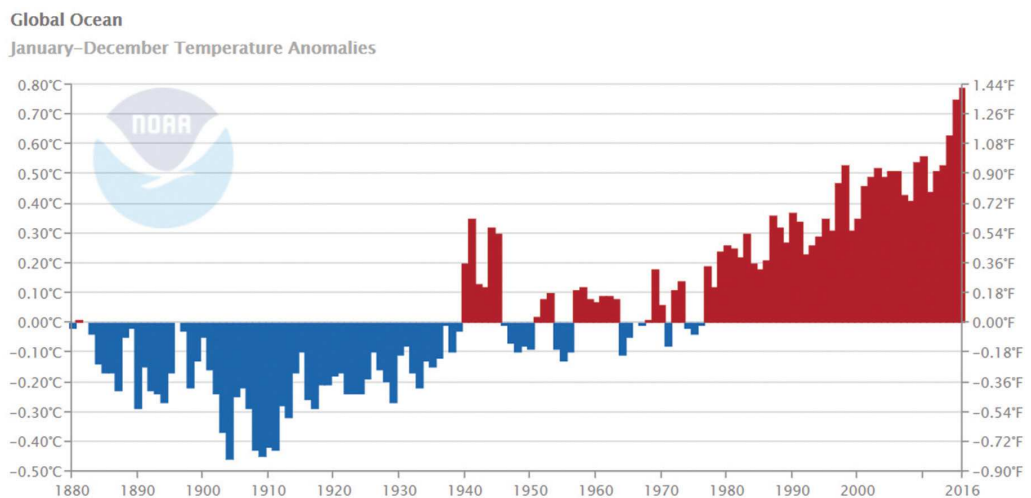


Fig 6 - Global Ocean surface temperature anomalies (NOAA, 2019)

As a matter of fact, sea level is expected to continue to rise due to human-induced warming during the 21st century (UNISDR, 2017; IPCC, 2012; Nicholls, 2002).

Nicholls (2002) highlights the main sea level rise bio-geophysical effects, which are:

- Inundation, flood and storm surge
- Wetland loss and change
- Erosion
- Saltwater intrusion
- Rising water tables/impaired drainage

Particularly, these effects may cause several socio-economic impacts (Nicholls and Lowe, 2004: 234), such as:

- Increased loss of property and coastal habitats
- Increased flood risk and potential loss of life
- Damage to coastal protection works and other infrastructure
- Loss of renewable and subsistence resources
- Loss of tourism, recreation, and transportation functions
- Loss of non-monetary cultural resources and values
- Impacts on agriculture and aquaculture (decline in soil and water quality)

Furthermore, the general impacts of climate change on coastal communities will be enormous. Climate change will approximately affect 2.7 billion people, and ecosystems, increasing the exposition to specific hazards such as flooding and coastal erosion with extreme climate events (Adger, 2005; Usaid, 2009; Mustelin et al., 2010; Tobey et al., 2010; Mosley, 2014; Kulp and Strauss, 2019).

1.2. How to deal with the complexity of coastal systems

As it is possible to understand from the previous paragraphs, coastal systems are subjected to the complexity of socioeconomic and environmental problems related to coastal risks and exacerbated by the many negative impacts of climate change. Further, coastal systems are prone to tensions and conflicts between different actors with contrasting interests in such territories (Soma and Vatn, 2014; van der Molen et al., 2015). For this reason, there is the necessity to give articulated answers (technical, normative, economic, social, cultural, management) to deal with the complexity of coastal systems. As already stated before, in the modern age, coastal areas have been subjected to new uses and activities that have increased their vulnerability. This has led to the use of defense measures against sea and weather events that have stiffened coastal systems (Bobbio, 2014; Besio, 2014). This traditional coastal management approach, based on hard approaches, has led to settlements that are more protected but less able to adapt to subsequent changes in the environmental context (Boström, Dreyer and Jönsson,

2011; Besio, 2014). Despite the development of construction techniques and hydraulic sciences, maritime defense works could have the opposite effect to expectations. As a matter of fact, they often alter the wave motion at the shore exacerbating the erosion processes and altering the contribution of sediments necessary for the replenish of the beaches (Besio, 2014). This situation has triggered the vicious spiral that would have led to the thinning of the beaches and the artificialization of the coastline (Bobbio, 2014). Thus, these hard approaches used for many decades as the only way to manage coastal risks, have proved unsuccessful and inefficacious (Boström, Dreyer and Jönsson, 2011; Besio, 2014). Even from the maritime engineering perspective it is no longer sufficient to satisfy only the economic aspect or the aspects of national interest for the planning of the exploitation of the coastal resources (Besio, 2014). It is also necessary to take into account the environmental and social aspects. In addition, the development of coastal management processes must not forget or neglect the social and economic aspects related to their implementation, trying to pursue social equity and the involvement of all stakeholders affected by the transformations and exploitation of the coastal areas. Thus, the hard approaches need to be combined with soft approaches, based on nature-based solutions, such as nourishments and dune stabilization, and on experiential knowledge.

As a matter of fact, the comprehension of coastal risks requires not only a deep understanding of the main physical phenomena to be addressed, but also acknowledgment about stakeholders' and local communities' knowledge, role, objectives, interdependencies and network of interactions (IRGC, 2017).

To analyze and manage coastal risks in an effective way, firstly there is the necessity to create a diverse, interdisciplinary and scientific knowledge base, due to the inclusion of different actors with different backgrounds (van der Molen et al., 2015).

This should be paralleled by an improvement of interfaces between knowledge creation and decision-making in which stakeholders and local society can interact and participate into the management processes (ibid.).

Different types of participation may exist during a planning process. In a literature review on the deployment of participation in coastal zone management, Puente-Rodríguez (2014) singles out three central dimensions of participation: *power*, understood as the control or influence capacities of actors within the decision-making process; *knowl-*

edge, which refers to the expected results at the level of knowledge by the deployment of participation; *nature*, which concerns the different understandings or visions held by human actors about nature.

As a matter of fact, participative processes can have different goals for different individuals and their success would be assessed in relation to the diverse expectations revolving around their use (Bobbio, 2019).

In this sense, the Arnstein's "ladder of citizen participation" (1969) illustrated in Fig. 7, well synthetizes it.

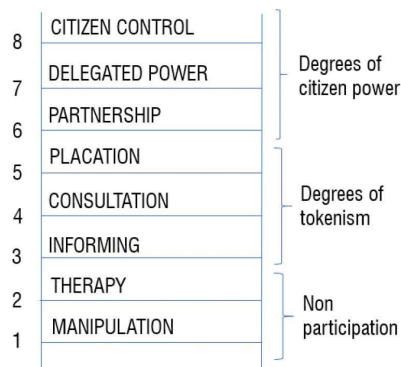


Fig. 7 - Arnstein's ladder of citizen participation (Adapted from Arnstein, 1969)

As stated by Puente-Rodríguez (2014: 432), although the Arnstein's ladder concerns citizen participation, it can be used also for understanding the power exercised by the different stakeholders on coastal management.

In Arnstein's ladder, each group of steps coincides to changes in involvement degrees through three main dimensions: i) non-participation, aiming to maintain the status quo and therefore to exclude; ii) tokenism (or consultation), which are symbolic forms of participation where the public has a voice but, in the end, it might or might not influence the final decision; iii) citizen/stakeholders power, in which citizen/stakeholders highly influence decision-making processes (ibid.).

As a matter of fact, within a management process, participation could be used for different reasons. Bobbio (2019: 42) stated that “it is not always used for designing the substance of a policy. It can be also be undertaken for normative or ideological reasons, that is, for example, the desire to implement policy in a fully democratic way and give people a chance to be heard, or sometimes for instrumental reasons in the hope to increase the legitimacy of the policy choices (and of those who make them)”. In this sense, participation can have ambivalent aspects, i) it gives voice to citizens, but it can also be used for gaining legitimacy; ii) it opens to new solutions, but at the same time frequently forces people to accept what has been already done; iii) it aims to get policy makers to learn from citizens, but meanwhile puts people in a situation where they have to debate within predetermined agendas and problems that are already in place (ibid.)

The combination of hard approaches with soft approaches have long been recognized as essential by official documents on coastal zone management. In particular, the Integrated Coastal Zone Management (ICZM) protocol, the first, and as of today the only international legal instrument specifically addressing coastal zones management, aims to connect and systematize protection actions, risk reduction, reestablishment of environmental balances by framing them in the long-term planning and requiring “appropriate involvement” of stakeholders, as stated in Article 14:

“With a view to ensuring efficient governance throughout the process of the integrated management of coastal zones, the Parties shall take the necessary measures to ensure the appropriate involvement in the phases of the formulation and implementation of coastal and marine strategies, plans and programmes or projects, as well as the issuing of the various authorisations, of the various stakeholders”.

Also the Sendai Framework for Disaster Risk Reduction 2015 – 2030, a voluntary, non-binding agreement which recognizes that the States have the primary role to reduce disaster risk, highlight the importance to share knowledge and pragmatic guidance in the context of the development and implementation of local, national, regional and global plans and strategies with other stakeholders including local government, the private sector and other stakeholders.

In line with this, also in the light of climate change consequences, new planning strategies and management activities are required by means of a reliable, understandable

and timely knowledge of processes affecting coastal hazards, getting decision makers, stakeholders and local communities involved (IRGC, 2017).

Accordingly, Fig. 8 shows an overview scheme of how to deal with the complexity of coastal systems: an inclusive approach able to frame, assess, evaluate, manage and communicate risk issues, often marked by complexity, uncertainty and ambiguity (IRGC, 2017).

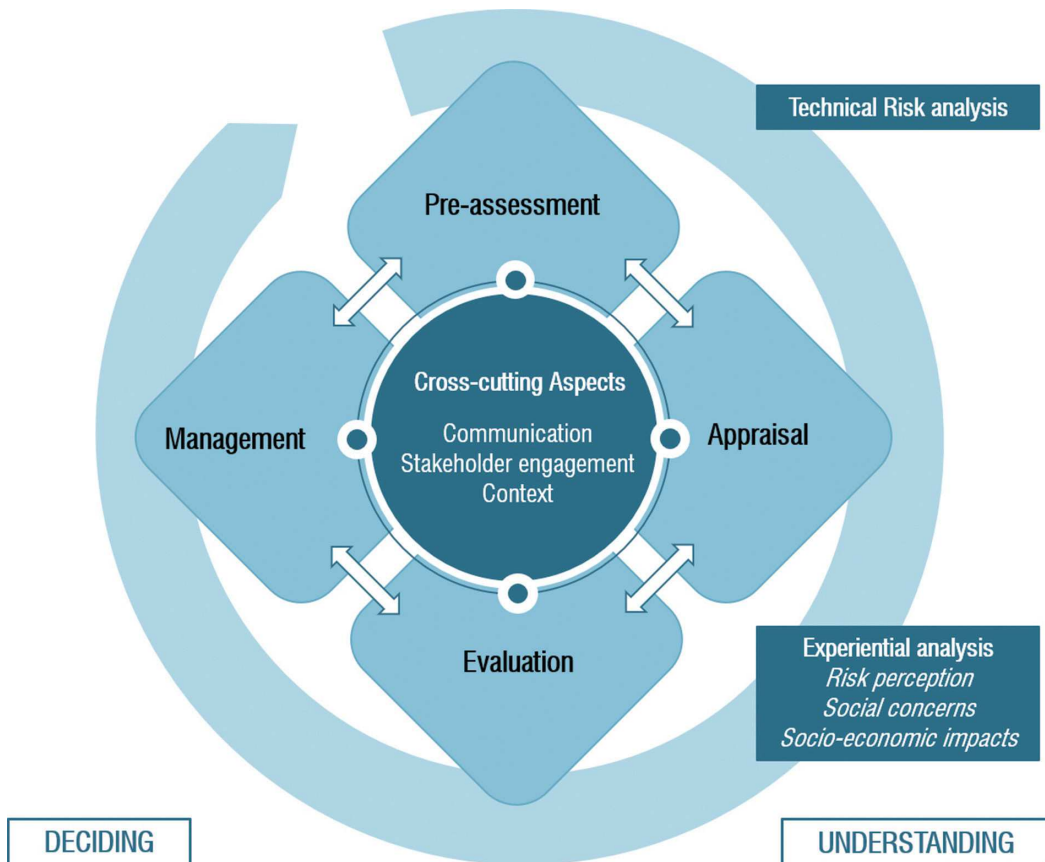


Fig. 8 - Risk Governance Framework (Adapted from: International Risk Governance Council – IRGC, 2017)

As it is possible to see in the figure above, this approach makes a distinction between ‘understanding a risk’, for which a risk assessment is the key procedure, and ‘deciding what to do about a risk’, in which risk management is the key activity. This clear division of risk assessment and risk management is intended to maximize the objectivity and responsibility of both activities (ibid.).

This supports the usefulness of the distinction, proposed by Puente-Rodríguez (2014), between knowledge (related to understanding and assessing) and power (related to deciding). Furthermore, it comprises interlinked elements, which are described in Table 4 (IRGC, 2017).

Table 4 - Interlinked elements which characterize the Risk Governance Framework approach (IRGC, 2017)

Elements	Description	
	General	Detailed
Pre-assessment	Identification and framing; setting the boundaries of the risk or system	Problem framing; Early warning; Screening; Determination of scientific conventions
Appraisal	Assessing the technical and perceived causes and consequences of the risk	a) Risk Assessment: Hazard identification; Exposure and vulnerability assessment; Risk characterization b) Concern Assessment: Risk perception; Social concerns; Socio-economic impacts
Evaluation	Making a judgment about the risk and the need to manage it	Judging the tolerability, acceptability and the need for risk reduction measures
Management	Deciding on and implementing risk management options	a) Decision making: Option identification and generation; Option assessment; Option evaluation and selection b) Implementation: Option realization; Monitoring and control, Feedback from risk management practice
Cross-cutting Aspects	Communicating, engaging with stakeholders, considering the context	

Moreover, this approach highlights the importance of the cross-cutting aspects, in particular communication and stakeholder engagement, which brings back to the importance of participation into risk governance approaches, both in risk assessment and risk management.

CHAPTER 2

APPROACHES, POLICIES AND MEASURES

This chapter will give a critical exploration on the main framework tools, important basis for this work. Climate change issue will be explained through a brief account of the history of climate change regime and existing climate change mitigation and adaptation options. Then, Integrated Coastal Zone Management will be described, for its important role on coastal issues.

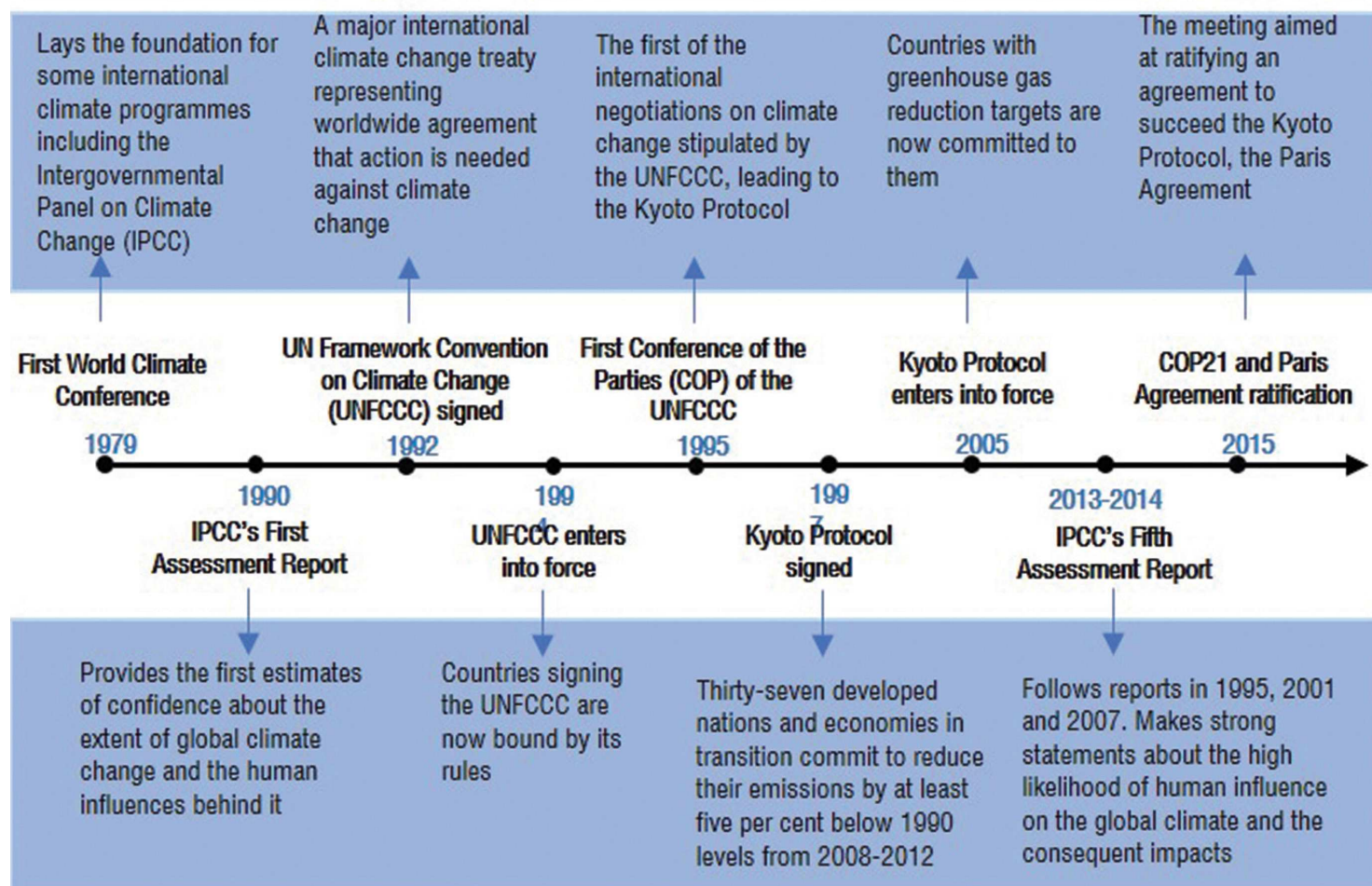
2.1. Climate Change Regime

Climate change has started to be considered a matter of concern in the late 1970s. As highlighted in Table 5, during the First World Climate Conference 1979, concerns about global warming grew with worldwide scientists concluding that “climate change is a serious threat to mankind” (Pattberg and Widerberg, 2017: 4).

Furthermore, in 1988 this event led to the creation of the Intergovernmental Panel on Climate Change (IPCC) by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) (Luterbacher and Sprinz, 2001). It aims at investigating and reporting on scientific evidences on climate change and possible international responses to climate change (Cherni et al., 2014).

IPCC has a central role in the debates and processes around the development of climate change policies (ibid.). In 1990, the First IPCC Assessment Report was designed, and it contributed to produce the United Nations Framework Convention on Climate Change (UNFCCC), signed in Rio de Janeiro in 1992 by 154 countries and the European Community (Depledge, 2005).

Table 5 - History of the Climate change regime (Adapted from Kelman, 2015)



UNFCCC established the basic institutional structure of the climate change regime, including the Conference of Parties (COP), a supreme decision-making body (Depledge, 2005). The global climate change regime, with its norms, rules, and decision-making procedures has experienced a notable transformation over the last decade (Pattberg and Widerberg, 2017).

Initially, UNFCCC acted as a top-down mechanism “through which economy-wide emissions reduction targets (made legally binding in the 1997 Kyoto Protocol) have been agreed among participating countries” (ibid. 2).

In fact, the Kyoto Protocol, signed in 1997 by 37 developed nations and economies in transition, represents a considerable enhancement of the climate change regime (Depledge 2005). It obliged GHG emission reduction targets and timetables for 2008-2012 for all industrialized countries (Cherni et al., 2014; Pattberg and Widerberg, 2017).

As a matter of fact, its design did not produce the desired effects, partially because the world rapidly changed in terms of production and consumption of energy (Pattberg and Widerberg, 2017). Moreover, United States and Australia did not ratify the Protocol, defending the idea to impose limit to GHG emissions also to developing countries (Cherni et al., 2014). Many public debates, mainly financed by oil industries, were reinforcing these arguments, posing questions on the scientific basis for the prediction of climate change, in some cases also denying the phenomenon (ibid.).

Finally, in 2015 at COP21 in Paris, a new global agreement was adopted by the UNFCCC, the Paris Agreement. It has been signed in Paris by 195 nations and focuses on five main points:

- Limit the global warming to 1,5/2°C;
- Funding to support developing countries;
- Transparency to ensure that the commitments undertaken are maintained;
- Long-term objectives for achieving zero emissions;
- Countries strengthen climate action every five years.

As stated by Pattberg and Widerberg (2017: 2) it “marked a watershed moment in the history of global climate governance by formalizing a new institutional architecture built on voluntary contributions by countries to reduce greenhouse gas emissions and adapt to climate change”.

2.1.1. Mitigation and adaptation strategies

As can be seen from the previous paragraph, over the years, the issue of climate change has become increasingly important for the political agendas.

IPCC, as well as providing regular assessments of the scientific basis of climate change, its impacts and future risks, provides feasible options for mitigation and adaptation.

On the one hand, mitigation is defined as “a human intervention to reduce the sources or enhance the sinks of greenhouse gases” (IPCC, 2014b: 4). On the other hand, adaptation is defined as “the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects” (IPCC, 2014a: 5). Both options, together, are needed and can be effective in order to reduce the risks and threats associated with climate change (Cherni et al. 2014).

Attention to the mitigation of climate change impacts dominated early discussions of how best to respond, based partly on a belief that impacts would be disruptive and partly on a hope that many threats could be avoided by internationally coordinated action by the countries of the world (IPCC, 1990). Within the past few years, however, the conventional view has changed. It now seems almost certain that climate change impacts will not be avoided. As a result, adaptation to climate change should no longer be considered a hypothetical possibility best kept in the background lest it reduce the felt urgency of mitigation. It is in fact a necessity, and it has begun to receive attention in international assessments and policy deliberations. The IPCC Third Assessment gave prominent attention to potentials for adaptation. The importance of considering adaptation as a response to climate change jointly with mitigation is being addressed in negotiations to implement the UNFCCC (Wilbanks and al., 2003).

Moreover, mitigation and adaptation contribute to the objective of the UNFCCC described in Article 2: “The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time

frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner” (United Nations, 1992: 4).

However, adaptation can be interpreted by policy makers in a variety of ways and it poses various challenges (Davoudi et al., 2012; Kythreotis and Bristow, 2016). It implies to navigate through a series of information produced at different scales and to involve a wide range of actors in transforming the latter into socially and politically acceptable adaptation options despite the considerable degrees of uncertainty (Davoudi et al., 2012: 325). This situation may also reflect how relevant socio-institutional processes of human behavior, decision making and agency differentiate in the assessment and knowledge of specific risks and the ability and willingness to embrace change (Kythreotis and Bristow, 2016).

It should be noticed that stakeholders and citizens, with their current and past experiences in coping with hazards, are crucial for responding to climate change impacts. Through their involvement, adaptive strategies could be developed combining scientific information with local knowledge and experience of changes and responses over time (Burton, Malone and Huq, 2004).

Moreover, factors influencing adaptation may be different than mitigation because of timescale mismatches between changes in behavior and a change in perceived risk. Understanding how the influence of factors, such as perceptions of risk, trust, and uncertainty vary throughout different stages of adaptation planning remains an important area of research (Kettle and Dow, 2016).

2.2. Integrated Coastal Zone Management

Historically, as already explored in Chapter 1, coastal management has been dominated by engineering actions in order to protect coastal areas. More recently, coasts became more complex because of the many socio-economic activities present in such areas. Furthermore, they must face the complexity of socioeconomic and environmental problems related to coastal risks and the negative impacts of climate change are expected to further increase their exposure to such risks.

As a matter of fact, the task of coastal management became more complicate, requiring a more interdisciplinary and integrated management process (Turner and Salomons, 1999).

Therefore, the debate is being held on the design of a new approach to use and management, known as Integrated Coastal Zone Management (ICZM).

Several are the events occurred and the international and national agreements signed for the spreading of ICZM since then. Table 6 gives a briefly overview of the main actions that have been taken place according to ICZM (Ahlhorn, 2018).

Table 6 shows the many efforts that have been performed in order to spread ICZM but an alarming aspect should be noted. In 2013, the European Commission has been proposed a framework for maritime spatial planning and integrated coastal management in order to allow to have a broader and connected approach on these two close topics. However, in 2014 the framework has been adopted dropping the term integrated coastal management from its title.

Post and Lundin (1996: 1) define ICZM as a “process of governance consisting in the legal and institutional framework necessary to ensure that development and management plans for coastal zones are integrated with environmental (including social) goals and are made with the participation of those affected”.

This approach aims at coordinating different policies related to coastal zones and activities such as nature protection, fisheries, agriculture, industry, shipping, tourism, development of infrastructure and mitigation and adaptation to climate change. In this sense, it aims at maximizing the benefits provided by coastal zones and to minimize the conflicts and harmful effects of activities upon each other (Post and Lundin, 1996). Moving to the European context, in 2002 the European Parliament and the Council of Europe adopted a Recommendation on ICZM. The main purpose was to overcome and to improve the existing excessive fragmentation of coastal management (EC, 2002). Since that moment, all EU Member States are committed to the preparation of a national strategy for ICZM.

Table 6 - History of the Integrated Coastal Zone Management worldwide
(Adapted from Ahlhorn, 2018)

1948/1958	UN Convention in Geneva for the adoption of the International Maritime Organization (IMO), entry into force in 1958
1965	Establishment of the San Francisco Bay Conservation and Development Commission to conduct an integrated management approach for the protection of the Bay
1968	Stratton Commission in the USA released the report " Our Nation and the Sea " containing the recommendation for the initiation of a national coastal zone management program
1969	Bonn Agreement for cooperation in dealing with pollution of the North Sea by oil (replaced in 1983 by a new agreement covering also other harmful substances)
1972	US Coastal Zone Management Act was enacted
1972	Oslo Convention adopted in 1972 was to control the dumping of harmful substances from ships and aircraft into the sea
1972	United Nations Conference on the Human Environment resulting in the " Stockholm Declaration " containing 26 principles concerning the environment and development
1972	RAMSAR Convention on wetlands of international importance, especially waterfowl habitat
1973	MARPOL is the international Convention for the prevention of pollution from and was modified by the protocol of 1978
1973	Resolution on the protection of coastal areas by the Council of Europe
1974	Paris Convention on land-based sources of marine pollution
1974	Helsinki Convention on the protection of the marine environment of the Baltic Area (renewed and signed in 1992)
1976	Barcelona Convention for protection of the Mediterranean Sea against pollution
1982	United Nations Convention on the Law of the Sea (UNCLOS) defines the rights and responsibilities of nations with respect to their use of the world's oceans
1984	First Conference on ICZM in South and Central America

1985	Workshop in the USA to define the term ICZM
1987	Publication of the report Our Common Future, known as Brundtland Report from the UN World Commission on Environment and Development
1992	UN Conference on Environment and Development (UNCED), known as Earth Summit Rio 1992 , where the Agenda 21 and the Rio Declaration on Environment and Development were adopted. The Agenda 21 contains different chapters with recommendations and statements to several issues, especially Chap.17 is relevant for ICZM. It provides statements according to the protection of the oceans, all kinds of sea, including enclosed and semi-enclosed areas, and coastal areas and the protection, rational use and development of their living resources
1992	Adoption and ratification of the OSPAR Convention which is the combination and the update of the Oslo and Paris Convention
1993	On the World Coast Conference (WCC) in "Noordwijk (The Netherlands)" the "Noordwijk Guidelines on Integrated Coastal Zone Management" were developed and adopted by participants from 90 coastal nations, 20 international organizations and 23 NGOs
1994	The European Union requested the Member States in the Council Resolution of 6 May 1994 on a Community strategy for integrated coastal zone management (94/C135/02)
1996	The European Commission initiated a Demonstration Program on Integrated Coastal Zone Management from 1997 till 1999
2000	Getting into force of the European Water Framework Directive (WFD)
2002	The recommendations on ICZM (2002/413/EC) were approved by the European Parliament and the Council and published in June
2013	The European Commission released a proposal on the establishment of a framework for maritime spatial planning and integrated coastal management
2014	Adoption of the Framework for maritime spatial planning

The Recommendation identifies eight principles of good ICZM, resumed in Table 7.

Table 7 - Principles of good ICZM (adapted from (European Commission - DG Environment, 2011))

Principle 1	A broad overall perspective (thematic and geographic) which will take into account the interdependence and disparity of natural systems and human activities with an impact on coastal areas
Principle 2	A long-term perspective which will take into account the precautionary principle and the needs of present and future generations
Principle 3	Adaptive management during a gradual process which will facilitate adjustment as problems and knowledge develop. This implies the need for a sound scientific basis concerning the evolution of the coastal zone
Principle 4	Local specificity and the great diversity of European coastal zones, which will make it possible to respond to their practical needs with specific solutions and flexible measures
Principle 5	Working with natural processes and respecting the carrying capacity of ecosystems, which will make human activities more environmentally friendly, socially responsible and economically sound in the long run
Principle 6	Involving all the parties concerned (economic and social partners, the organizations representing coastal zone residents, non-governmental organizations and the business sector) in the management process, for example by means of agreements and based on shared responsibility
Principle 7	Support and involvement of relevant administrative bodies at national, regional and local level between which appropriate links should be established or maintained with the aim of improved coordination of the various existing policies. Partnership with and between regional and local authorities should apply when appropriate
Principle 8	Use of a combination of instruments designed to facilitate coherence between sectoral policy objectives and coherence between planning and management

An essential element of ICZM process (recognizable in Principle 6) is full participation of all stakeholders, including the general public. In an integrated process, it is fundamental that, already in the planning phase, all stakeholders participate (Turner and Salomons, 1999). Certainly, this is a demanding task. However, even if this can imply that decisions could take much longer to be reached, it generally allows to avoid conflicts among all parties involved and to create a more effective integrated coastal zone management (EUCC, 2006).

The latest document which has reported the official implementation status of the EU ICZM Recommendation by all Member States dates to 2011 and is summarized in the “Analysis of Member States progress reports on ICZM: Final Report”. At that time, the implementation status of ICZM in Europe was as follows.

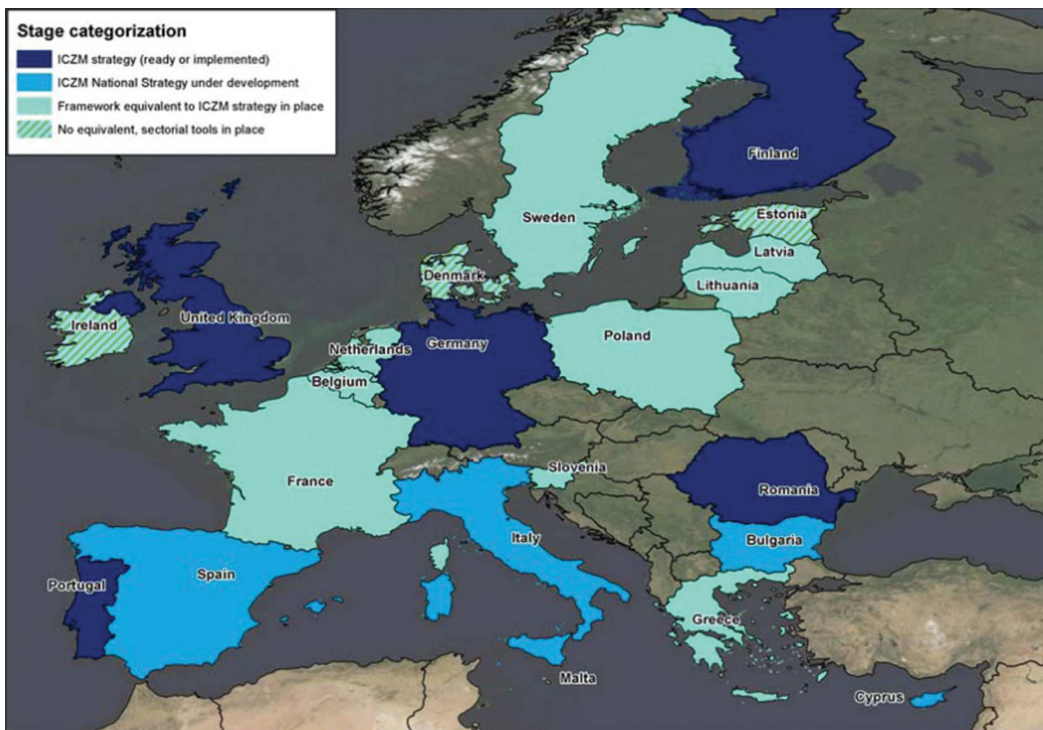


Fig. 9 - Implementation status of ICZM in Europe (EC – DG Environment, 2011)

As it is possible to see from the figure above, even if all EU Member States are committed to prepare and implement a national strategy for ICZM, only few are the countries which have performed it.

2.3. Examples of programs helping for the implementation of the ICZM Protocol

In order to overcome the lack of implementation of the ICZM Protocol in Europe, various programs have been designed, aiming at helping the EU Member States to implement the ICZM Protocol. In particular, the following will be described:

As a matter of fact, the following will be briefly presented:

- 1) CAMP Project;
- 2) Mare Nostrum Project;
- 3) Action Plan for the implementation of the ICZM Protocol: 2012-2019.

1) The CAMP Project (Coastal Area Management Programme) is part of the Mediterranean Action Plan (MAP) from the Environment Program of the United Nations.

Its main objectives are the following:

- implement coastal management projects in selected Mediterranean coastal areas (Fig. 10) following the ICZM Protocol guidelines;
- facilitate the implementation of the ICZM Protocol at the local level;
- develop strategies and procedures for a sustainable development;
- identify and use appropriate methodologies and tools;
- contribute to strengthening capacities at local, national and regional level;
- ensure wider use of the results obtained in the region.

Furthermore, the proposed actions to be performed should especially aiming at the reduction of coastal erosion, loss of biodiversity and pollution (Falco and Barbanente, in press). As a matter of fact, CAMP Project should be designed and implemented in close synergy with the future ICZM Strategy (ibid.).

To give an example, the CAMP Italy project, composed of 14 pilot projects, aims at helping to integrate, standardize, share and implement tools and procedures in order to better manage coastal resources and assets. Furthermore, it aims at favoring ICZM in



Fig. 10 - CAMP Project website

Italy, through the selection of areas that may represent the whole national situation and through the promotion of an agreed governance among the local, regional and national administrations (Satta et al., 2016).

2) Mare Nostrum is an EU-funded cross-border project which ended in 2016. It's primary goal was to bridge the policy-implementation gap between existing ICZM tools and their actual effects on the ground. It tried to identify local impediments to implementation and leverages insights gathered from local successes into improved policy-making (Mare Nostrum, 2016).

Even though the project has been focused in the countries where the project partners came from (Israel, Greece, Spain and Malta) the findings may be useful for all the Mediterranean Basin. Mare Nostrum was based on a comparative analysis between different legal-regulatory aspects of planning (ibid.).

It's final goal was to enhance the socio-economic and environmental sustainability of the Mediterranean coast, and at the same time increase its resilience to natural and anthropic hazards.

Furthermore the projects tried to:

- enhance public awareness of coastline management issues;
- increase accessibility of spatial planning data;
- enhance dialogue between stakeholders;
- more local society involvement;
- encourage conflict mitigation and intercultural dialogue.

3) The Action Plan for the implementation of the ICZM Protocol 2012-2019 has been drawn up by UNEP/MAP. It aims at supporting the remaining Mediterranean Countries in their ratification processes, and the support for all Parties in their transposition and the implementation of the ICZM Protocol.

The Plan aims at implementing the Protocol based on country-based planning and regional coordination.

In particular it will help to (PAP/NFP, 2011):

- Support the effective implementation of the ICZM Protocol at regional, national and local levels;
- Strengthen the capacities of Contracting Parties to implement the Protocol and use in an effective manner ICZM policies, instruments, tools and processes;
- Promote the ICZM Protocol and its implementation within the region and promote it globally.

CHAPTER 3

THE MEDITERRANEAN BASIN

This chapter focuses on the Mediterranean Basin, in order to setting the scene for the case studies. Firstly, a description of the main characteristics of this area, identified as one of the most vulnerable regions in the world, will be sketched. Secondly, the impacts of coastal hazards and climate change in the Mediterranean will be illustrated in order to better understand the complexity of this territory. Finally, the framework for the coastal management in the Mediterranean will be described, through a brief overview of its history.

3.1. Framing the Mediterranean Basin

The Mediterranean Basin is considered as the area comprising all the marine waters bounded to the West by the Strait of Gibraltar and to the East by the Marmara Sea (EUROSTAT, 2011).

As it is possible to see in Fig. 11, the Mediterranean Sea is a semi-enclosed sea, which covers an area of 2.5 million km² with a coastline length of about 46000 km (Brochier and Ramieri, 2001). About 54% of the coastline is rocky and 46% is sedimentary (ibid.).



Fig. 11 - The Mediterranean Basin (NASA)

This territory is identified as one of the most vulnerable regions worldwide mainly due to its population density and concentration of economic activities along the coasts and its climatic borderline balance (Ferragina and Quagliarotti, 2008).

As a matter of fact, about a third of the Mediterranean population is concentrated along its coastal regions with a population density much higher than inland, estimated at 96 inhabitants/km² (Fig. 12) (UNEP/MAP - Barcelona Convention, 2012). The rate of growth has been rapid, from 95 million in 1979 to 143 million in 2000. Moreover, demographic projections foresee a growth of up to 174 million by 2025 (ibid.).

The Mediterranean region is one of the most popular and successful tourist destinations worldwide (Perry, 2000; Salvati, 2014; UNEP, 2017). Representing 5.7% of the world's land mass, it accounts for 27% of world tourism with about 300 million tourists on an annual basis (UNEP, 2017). Projections foresee an increase of tourism of up to 500 million attendance by 2030 (ibid.). Furthermore, UNEP (2017) highlights that the Mediterranean coast attracts 50% of total arrivals and that they are mainly concentrated in the northern coast, in Italy, Greece, Spain and France.

The high concentration of population and tourism in the Mediterranean coastline increases anthropogenic pressures (Brochier and Ramieri, 2001; Cramer et al., 2018).

In this sense, the coastline is threatened by coastal development because of the modification of the coastline through building and infrastructure construction to support residential, tourism, commercial and transportation activities (UNEP, 2017). The European Environment Agency (2006:29) stresses the fact that "tourism in Europe, especially in the Mediterranean, is closely linked with 'construction', e.g. hotels, second residences, apartments, leisure and commercial infrastructures, which facilitates the expansion of artificial areas".

As a matter of fact, the coastline urbanization has increased rapidly and around 40% of the Mediterranean coastal areas are artificially created (UNEP, 2017). The EEA Report (2006) highlights that more than 8% of the Mediterranean coasts are converted into artificial areas such as harbors, artificial beaches, dams and sea walls.

Furthermore, the Mediterranean Sea is characterized by the presence of the richest fauna and flora worldwide. Moreover, fishing overexploitation, eutrophication and contaminants arising from agriculture, industrial activity and population growth are contributing to the worsening of the quality of the water and of the fauna and flora (ibid.).

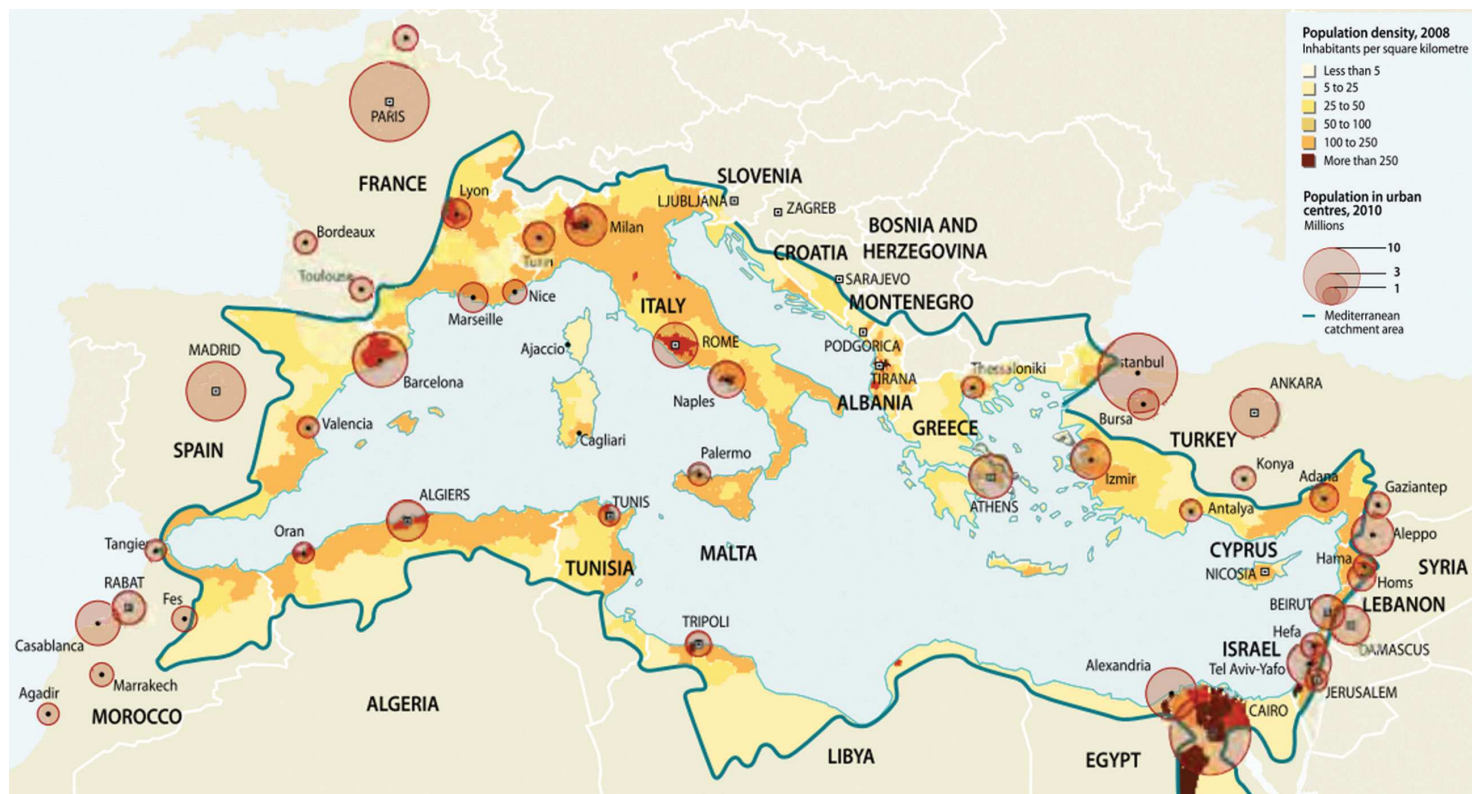


Fig. 12 - Population density and urban centers in the Mediterranean basin (UNEP/MAP – Barcelona Convention, 2012)

This situation causes irreversible damages to landscapes, habitats and biodiversity, as well as to coastal configuration by disrupting sediment movement (ibid.).

3.2. Coastal hazards and climate change in the Mediterranean Basin

The human-induced pressures in the coastal areas of the Mediterranean Basin are recognized to be closely related to the process of coastal erosion which accounts to almost 30% in the Mediterranean Sea (Fig. 13), defining this area as one of the most critical erosion hotspots in Europe (EEA, 2006).

As a matter of fact, the most affected economic sector by coastal erosion in the Mediterranean Basin is beach tourism, which faces an increase in its fragility and vulnerability (Perry, 2000). For example, the reduction of sandy beaches due to their erosion will cause several disadvantages for coastal tourism. Negative implications will also be found in cases where coastlines are flat with tourist accommodation and other infrastructures next to the beaches (ibid.).

Agriculture may be also affected by coastal erosion. In this case, the most important effects are related to the inundation of agricultural areas (Sanchez-Arcilla et al., 2011). Furthermore, the degradation of coastal areas and the overexploitation and unsustainable practices along the coasts and in the sea, will negatively impact fishing activities. (UNEP/MAP - Barcelona Convention, 2012).

Furthermore, the Mediterranean coasts are affected by impacts of other phenomena (e.g. storms, floods, sea level rise), exacerbated by climate change (UNEP, 2001; EEA, 2017; Satta et al., 2017). As it is possible to see in Fig. 14, sea-level has varied in the last years, but studies demonstrate that the change along most of the European coastline is projected to be reasonably similar to the global average (EEA, 2017). According to Satta et al. (2017: 4), the Mediterranean sea-level rise “is an issue of concern showing increasing trends of more than 0.6 cm/year, and others showing decreases of more than 0.4 cm/year in absolute sea level from 1992 to 2013 as observed by satellites, against a global mean of about 0.3 cm/year over the last two decades”. Furthermore, the IPCC evidences the possibility of future changes in the Mediterranean sea level in the range of 10-30 cm by 2015 and of 10-90 cm by 2100 (ibid.).



Fig. 13 - Coastal erosion and fragile ecosystems in the Mediterranean (GRID-Arendal, 2013)

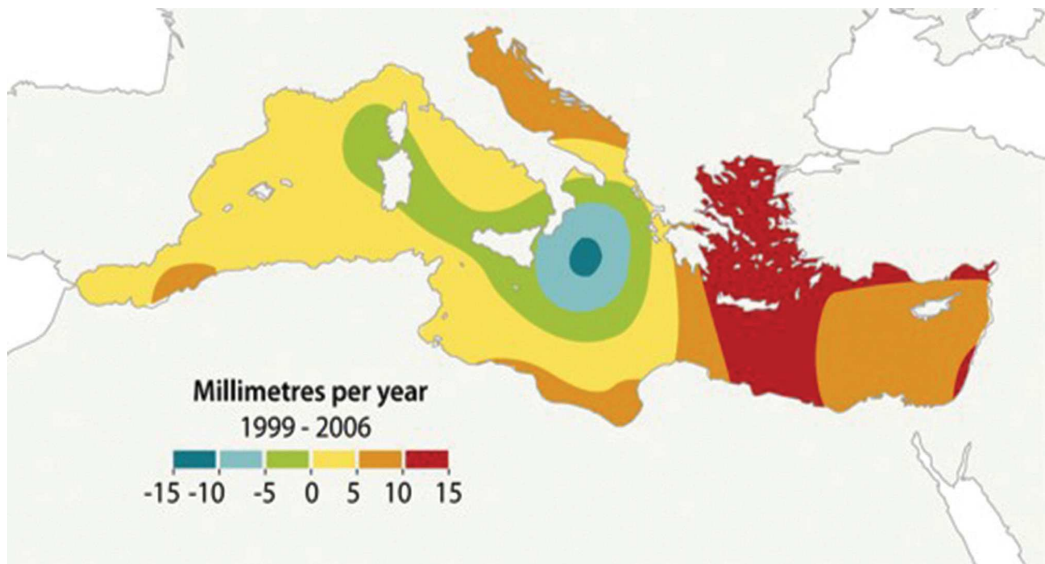


Fig. 14 - Sea level variations in the Mediterranean (GRID-Arendal, 2013)

As previously examined in Chapter 1, sea level rise can be attributed to an increase in the ocean water volume because of global warming and of sea surface warming (Nicholls and Cazenave, 2010). Moreover, global sea level trends underline the huge influence that could have the transport of water through the Strait of Gibraltar, causing considerable impacts on Mediterranean coastal hazards (Cramer et al., 2018), increasing also the risk of coastal flooding, which would affect people, communities and infrastructure (EEA, 2017).

In this sense, sea level rise could cause “devastating effects on water resources, natural ecosystems (both terrestrial and marine), human activities (e.g. agriculture, recreation, tourism) and health” (Giorgi and Lionello, 2008: 103).

3.3. Framework for the management of the Mediterranean Basin

As stated in the previous paragraphs, the Mediterranean is one of the most vulnerable regions in the world due to the pressures on the coastal systems and related

hazardous impacts. As such, the need to take measures to better manage this territory has begun to be recognized.

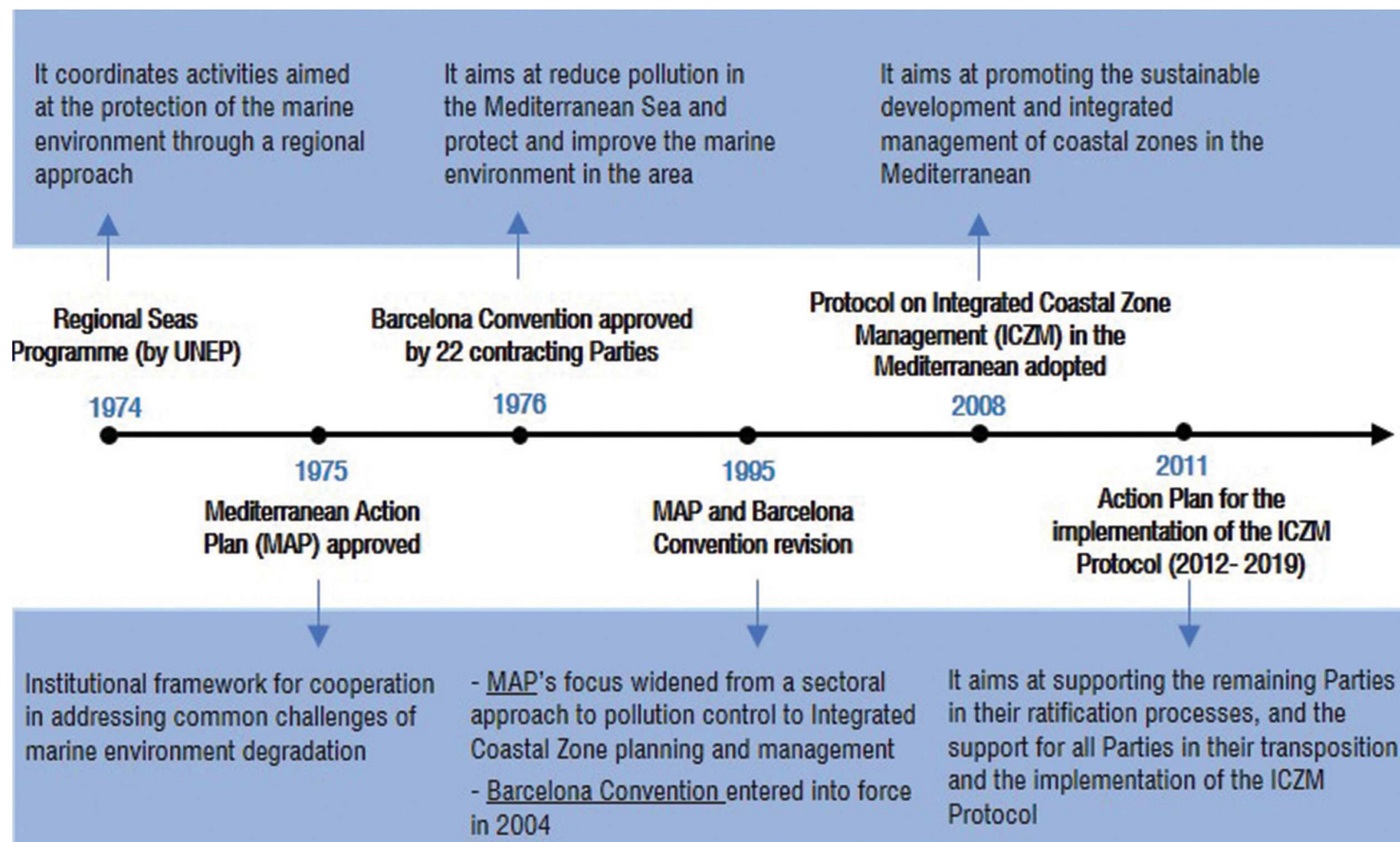
As shown in Table 8, more than 40 years ago the United Nations Environment Programme (UNEP) established its first tool for the protection of the marine environment, the *Regional Seas Programme*. Afterwards, in 1975, the Mediterranean States and the European Community decided to design and to approve the first tool for the protection of the Mediterranean Sea against pollution, the *Mediterranean Action Plan (MAP)*. *The following year, the Barcelona Convention for the protection of the Mediterranean Sea against pollution* was adopted and ratified by 22 Contracting Parties: Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia, Turkey and the European Union.

Plan Bleu (2010: 2) describes that the Barcelona Convention “stipulates that the signatories should individually or jointly take all necessary measures to protect and improve the marine environment in the Mediterranean Sea in view of assisting its sustainable development and in order to prevent, reduce, combat and, as far as possible, eliminate pollution in the area.” In particular: i) pollution caused by dumping from ships and aircraft, ii) pollution from ships, iii) pollution resulting from the exploration and exploitation of the continental shelf, the seabed and its subsoil, iv) pollution from land-based sources.

Over the years, MAP’s focus widened gradually from a sectoral approach to pollution control to integrated coastal zone planning and management (PAP/NFP, 2011). This happened because it turned out that socio-economic trends with poor management and planning are the roots of most environmental problems (UNEP/MAP - Barcelona Convention, 2012).

As a matter of fact, in 1995 a consistent revision of the MAP and the Barcelona Convention was adopted by the Contracting Parties. The MAP revision was renamed *Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean* (MAP Phase II) and one of its main objective was to ensure the sustainable management of natural marine and land resources and to integrate the environment in social and economic development, and land-use policies. Furthermore, the *Barcelona Convention* was renamed *Convention for the Protection*

4 Table 8 - Mediterranean Basin legal framework (source: author's own)



of the Marine Environment and the Coastal Region of the Mediterranean, entering into force in 2004.

To complete the MAP legal framework, seven Protocols addressing specific aspects of the Mediterranean environment conservation were designed. One of these seven protocols is the Protocol on Integrated Coastal Zone Management in the Mediterranean adopted in 2008 and entered into force in 2011, laying the basis for an ICZM development.

3.3.1. The Integrated Coastal Zone Management in the Mediterranean

In 2011, the European Commission – DG Environment published the “Analysis of Member States progress reports on Integrated Coastal Zone Management (ICZM): Final Report” focusing on the ICZM implementation status on the Mediterranean Sea. In this context, it was observed a general positive trend in activities carried out to support ICZM. Regarding the progress in ICZM principles, some progress was made at the regional scale, particularly in the coordination of different levels and sectors of institutions and in public involvement.

However, in order to move towards an effective ICZM process several constraints (illustrated in Table 9) were identified.

Table 9 - Constraints that hinder effective ICZM processes in the Mediterranean (adapted from EC – DG Environment, 2011)

The remaining lack of appropriate national legal frameworks for ICZM;

The need to re-assert ICZM as the powerful arbiter between the land and sea;

The short-term, stop-go nature of the individual projects based on the project funding cycles that has led to a loss of essential continuity and capacity;

The relentless and overwhelming pace of development along the coast that has led to a gap between the rapid, exponential rate of development with its consequent environmental degradation, and the capacity of ICZM to deal with the development-management gap;

The stubbornly persistent perception of ICZM as an environmental management activity - a pressing need exists to embed ICZM into other areas of policy;

The still patchy and inconsistent enabling frameworks for national capacity building and regional actions such as awareness building, that takes place in parallel and often behind local action;

The relatively poor public visibility of ICZM projects.

In this sense, the fragmented mosaic of legal and regulatory regimes, land rights, institutional structures and administrative cultures has created a legal- institutional gap in Mediterranean coastline management.

However, despite the several efforts to overcome difficulties, only 12 Contracting Parties have ratified the Protocol.

The failure of the ratification of the Protocol can be a sign of a deeper problem of lack of awareness of the importance of the issue of the protection and management of coastal areas. It is recognized that this implies a lack of public policies for coastal zone management in many countries, since what is crucial about public policy is the existence of a problem that is collectively considered relevant, and thus problem requires a public intervention (Dunn, 1981; Dente 2014). More specifically, “policy-making presupposes the recognition of a policy problem. Problem recognition itself requires that a social problem has been defined as such and that the necessity of state intervention has been expressed”, and “the means and mechanisms of problem recognition and issue selection are tightly connected with the way a social problem is recognized and perceived on the public/media agenda” (Jann and Wegrich, 2007).

Thus, this thesis try to understand, with reference to two Mediterranean case studies,

in Italy and in Greece, some reasons behind the difficulties of implementing integrated for coastal zone management.

In particular, it will be performed through the following research questions:

- Does this lack of attention and of public policies be related to low level of knowledge about the problem? And which kind of knowledge?
- Is there a lack of collective perception of the problem, and therefore public bodies do not work towards its solution?
- Is there a lack of willingness to solve (and understand) the problem because of established interests that benefit from the status quo?
- Is it still considered that problems relating to coastal risks can be solved only by means of engineering infrastructure works (e.g. coastal defense works)?

In this sense, it is important to understand that the lack of implementation of Integrated Coastal Zone management is a problem of collective relevance.

CHAPTER 4

THE EMPIRICAL RESEARCH DESIGN

This chapter aims at briefly explaining the empirical research design, in order to introduce the further two chapters focused on the analysis of the two case-studies analyzed for the present research. The reasons for adopting the case-study approach will be synthesized, describing the main aspects that characterize this approach and a focus on the case-study design will be carried out, to justify the case study choice and the structure chosen for the analysis.

4.1. The use of the case-study approach

The necessity to use case-studies as a research approach emerges from the desire to understand complex social phenomena (Yin, 2009: 4). As stated by Zainal (2007: 2) they are usually adopted “as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used”. As a matter of fact, case-study cannot be defined as a method, but as a research strategy (Yin, 2009).

The present research focuses on coastal areas with high risk of natural hazards and with high anthropogenic pressures. As it was possible to understand from Chapter 3, the Mediterranean Basin is one of the most vulnerable regions in the world mainly due to its population density and the concentration of economic activities along the coasts. Furthermore, it is also one of the most popular and successful tourist destinations worldwide, with a huge concentration of arrivals in the northern coasts, especially in Italy and in Greece.

For this reason, the research focuses on two case studies, which experience high anthropogenic pressures and high level of coastal risks, the first in Southern Italy (in Apulia Region) and the second one in Greece (in Thessaly Region). The case-study approach can be defined as a linear but iterative process (Fig. 15) (Yin, 2003).

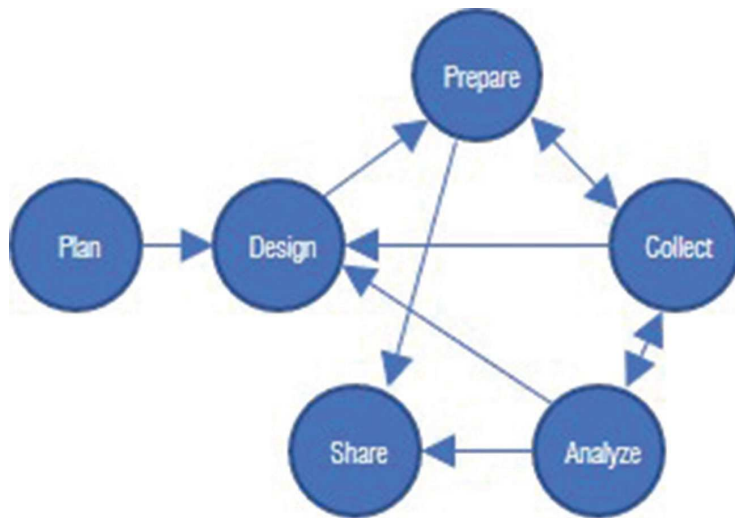


Fig. 15 - Process of case-study research (Adapted from Yin, 2009)

One of the main reasons that has led to the choice of this approach is that it gives the possibility to go over the quantitative statistical results and comprehend the behavioral situations through the actor's point of view (Zainal, 2007). Furthermore, by integrating quantitative and qualitative data, case studies contribute to explaining the process and outcome of a situation through comprehensive observation, reconstruction and analysis of the examined cases (ibid.).

In order to collect all the data in a proper way, some overriding principles, stated by Yin (2009), have been followed:

- the use of multiple sources of evidence (documents, interviews, direct observation, participant-observation) allows to highlight evidence from two or more sources but converging on the same facts or conclusions;
- a case-study database allows to have a formal collection of evidence distinct from the final case study report;
- a chain of evidence is useful to explicit links between the questions asked, the data collected, and the conclusions drawn.

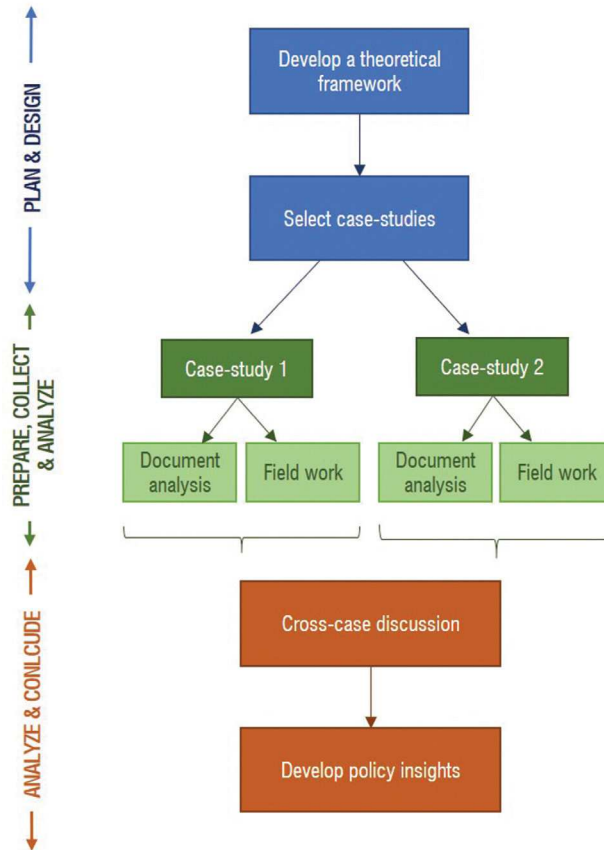


Fig. 16 - Structure of the case-studies analysis
(source: author's own)

As it is possible to see above, the structure of the analysis is the same for both case studies. However, the methods used for the “field work” part of the analysis are different because of the specificity of the situations and they will be described in the following chapter.

Although it is possible to see the advantages which characterize this approach, there is also criticisms mainly due to its lack of rigor and the tendency to interpret the collected data in a distort way. For this reason, it was important to comply with all these aspects.

CHAPTER 5

RISK PERCEPTION AND COASTAL MANAGEMENT IN TWO MEDITERRANEAN COASTAL AREAS

This chapter will focus on two case studies, both characterized by an intense use of the territory and high vulnerability due to many pressures, coastal hazards and climate change impacts. Part 1 will explore the case of Margherita di Savoia (Puglia Region, on the southern Adriatic coast). This is a small coastal town characterized by risk of erosion and flooding among the most impacted in Italy due for its particular urban conformation and the close relationship with the sea-related economy. Part 1 is divided into three sections. Firstly, an overview of the main coastal pressures, hazards and climate change impacts in Italy (5.1). Secondly, the complex and fragmented multi-level governance for coastal areas will be depicted (5.2). Against this backdrop, the coastal risks in Margherita di Savoia will be investigated through a field analysis of key-actors' perceptions of the current problems, related risk factors and possible actions to be taken in order to face the complexity and fragmentation of the multilevel-governance for coastal areas (5.3).

Part 2 will analyze the case of Pagasitikos Gulf (Thessaly Region, Greece). The treatment of this case is also divided into three parts, dedicated respectively to: an overview of the main coastal pressures, hazards and climate change impacts in Greece (5.4), as well as the legal-Institutional framework (5.5), in order to set the scene for the case study. Then, the investigation of coastal risks in the Pagasitikos Gulf will be presented, based on a field analysis of the experiential knowledge (5.6). This was carried out in order to understand the key-actors' perceptions on the current problems, related risk factors and possible actions to be taken for a more effective coastal management of Pagasitikos Gulf.

Finally, Part 3 will present some considerations based on a cross-case comparison of the main results from Margherita di Savoia and Pagasitikos Gulf expert and experiential knowledge investigation.

PART 1: THE CASE OF MARGHERITA DI SAVOIA, ITALY

5.1. Resources and problems in Italian coastal areas: an overview

5.1.1 The importance of coastal areas

Italy (Fig. 17) has almost 7500 km of coastline, the second longest in the Mediterranean, after Greece (ISPRA, 2014).



Fig. 17 - Italy within the Mediterranean Basin (source: author's own)

More than a third of the coasts are high, which develop with very often articulated and jagged rocky stretches. The low coasts, sandy and rocky, are generally widespread on all coastal fronts. They are often alternate with high rocky stretches or enclosed between two promontories. The Adriatic coast can be considered as an exception because it consists almost exclusively of long straight stretches of sandy or delta coast-

lines and the largest lagoon environments in the country. About 70% of the low coasts are made up of sandy or pebble beaches, with a total length of 3270 km and a covering an area of over 120 km² (ISPRA, 2014).

Fifteen out of twenty Italian regions are bathed by the sea and 644 municipalities are located along the Italian coastline, corresponding to 8.1% of all municipalities (Fig. 18) (ISTAT, 2018).



Fig. 18 - Italian coastal municipalities (adapted from Falco and Barbanente, in press)

The coastal municipalities occupy a total area of 43084 km², amounting to 14.3% of the total, and are inhabited by 28.4% of the entire Italian population (ibid.). As a consequence (see Fig. 19), the coastal areas are the most densely populated: 398 inhabitants per km² compared to 167 for non-coastal areas (ibid.), which have been progressively

depopulated by the “downstream rolling” of people and economic activities that has affected large parts of Italy after the Second World War.

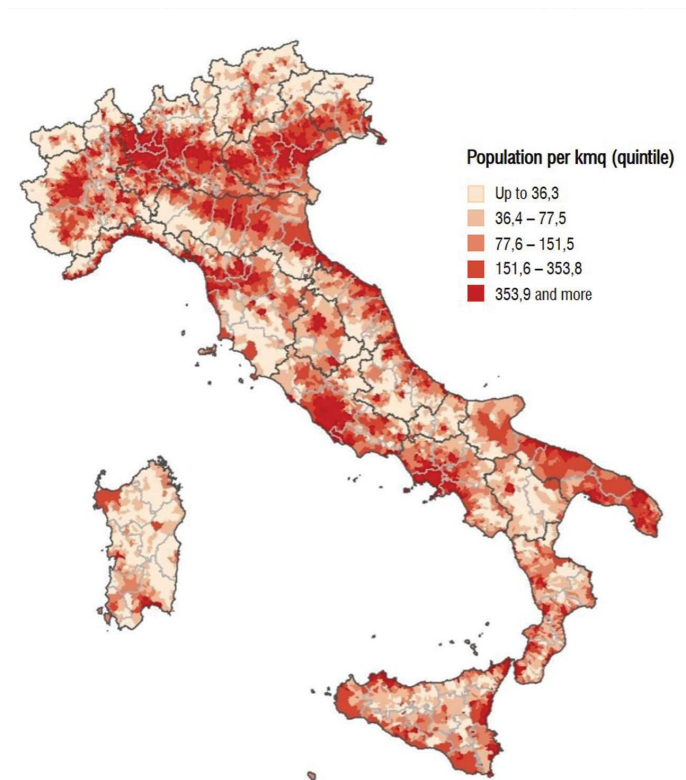


Fig. 19 - Population per km² (ISTAT, 2011)

Moreover, especially in the seventies and eighties of the twentieth century, there was a remarkable development of second homes along the coast, both authorized and illegal. In addition to primary and holiday homes, coastal areas have been affected by considerable tourism development during the same period. As shown in Table 10, the coastal municipalities offer 56% of the beds and contribute 52,7% to the total number of tourists registered in 2016 (ISTAT, 2017).

Table 10 - Beds and presences in accommodation establishments by type of municipality (adapted from ISTAT, 2017)

Municipality tipology	N. of beds	% beds	Presences	% Presences
Coastal	2.767.807	56,0	212.502.896	52,7
Inland	2.174.705	44,0	190.459.217	47,3
Total	4.942.512	100,0	402.962.113	100,0

In these territories, the concentration factors are also evident in terms of seasonality (Table 11). In the coastal municipalities 71,2% of the presences are concentrated in the summer period (June-September), compared to 49% of the presences recorded in the same four-month period in the other Italian municipalities (ibid.).

Table 11 - Presences in accommodation establishments by type of municipality of destination and seasonality (adapted from ISTAT, 2017)

Municipality tipology	% presences in the summer season	% presences in the rest of the year
Coastal	71,2	28,8
Inland	48,9	51,1
Total	60,7	39,3

These processes are reflected in the high share of coastal landscapes transformed by urbanization: 3291 km, i.e. 51% of the total. But the most impressive figure is the consumption of coastal areas by low-density settlements: 1653 km, i.e. 25% of the entire coastline. These have ‘devoured’ natural and agricultural soil, with the result that distant urban centers have often joined together, creating a continuity that has physically and perceptually cancelled the administrative boundaries between one municipality and another, and sometimes even between regions (Manigrasso, 2017).

While the investigation referred to above demonstrates the seemingly unstoppable nature of the coastal urbanization process, an important activity taking place along the Italian coastal areas, namely fishing, has long been in decline.

In 2008, the operators in the fishing sector amounted to 29349. Over the years, there has been a loss of employment with a reduction of more than 8% in 2014.

In 2014 (latest available data), national production reached 176778,38 tons. Sicily is the region with the highest number of catches (Fig. 20), fishing fleets and ports for the sector Fig. 21, followed by Puglia region (Andaloro et al., 2016).

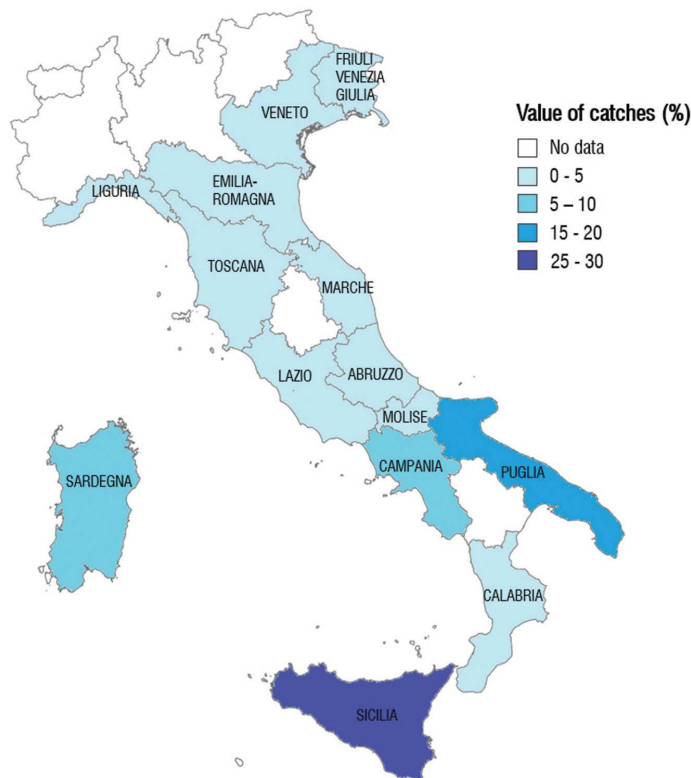


Fig. 20 - Value of fish catches for regions (Adapted from Iborra Martín, 2008)

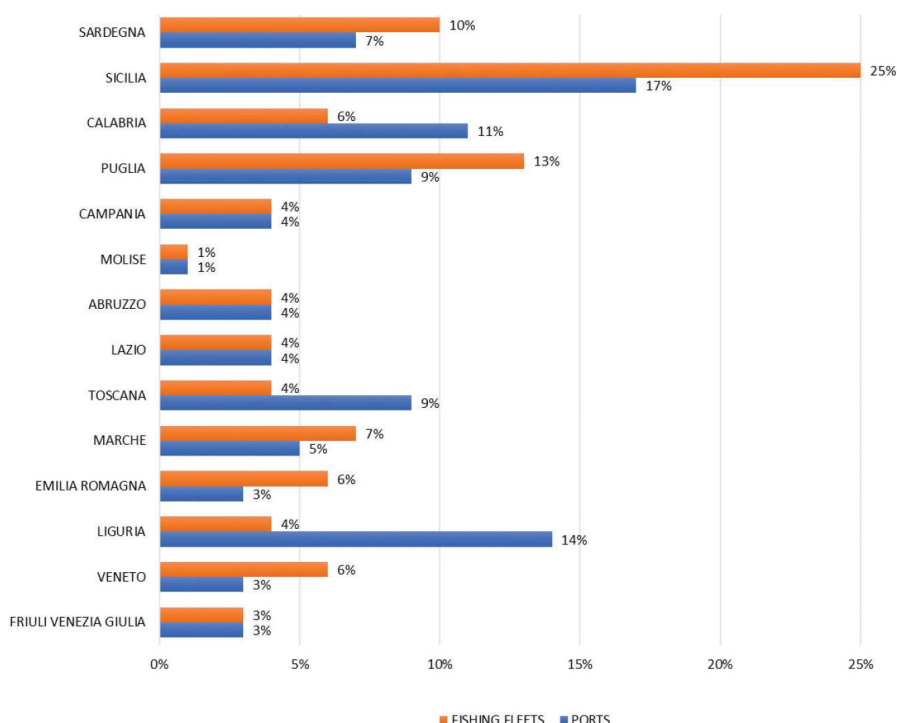


Fig. 21 - Percentage of fishing fleets and ports (Adapted from Iborra Martín, 2008)

5.1.2. Pressures, coastal hazards and climate change

The Italian coastal areas have changed radically over the past century. This has happened mainly due to anthropic actions, such as (WWF, 2012):

- Human settlements and overbuilding;
- The reclamation of marshes and the securing of the territory;
- The railway and the infrastructural connection with the rest of the country;
- The transformation of beaches from open places to touristic facilities;
- Industrial settlements and the new tourist economy.

The ISPRA Report of 2014 describes the main aspects increasing the pressures and coastal hazards in the Italian coastal areas. Firstly, it highlights that 731 km², i.e. 35.8% of the national territory included in the setback zone of 300 m from the shoreline (an

area that the legislation, since 1985 with Law 431, and still today with Legislative Decree 42/2004, includes among the goods to be protected for their landscape value), is urbanized. This percentage rises to 51% considering the urbanized part of the coastline (Zanchini, Manigrasso, 2017).

This figure is comparable with the results of the ISPRA analysis (2014), according to which 53% of the internal limit of the beaches is now artificial and the relative 87% is represented not only by dense urban fabric of coastal towns but mainly by scattered dwellings, largely used as second homes for beach tourism (ISPRA, 2014).

Furthermore, the ISPRA analysis recognized that this stiffening of the internal limit of the beaches and of the land-sea interface with permanent artificial structures, cause serious effects on the physical and ecological equilibrium of coastal habitats. These effects are sometimes in addition to the natural causes (wave motion, tide, sea currents, etc.) which affect the dynamics and environmental characteristics of many stretches of coasts. In particular, 675 km of the Italian coast, are occupied by coastal engineering works carried out close to the shoreline.

The artificial coastal areas are mainly composed of:

- coastal defense works on the shoreline, which occupy 414 km of coastline (62% of the total artificial coast);
- port facilities, which occupy 252 km of coastline (37% of the total);
- reclamation linked mostly to the construction of new facilities for industrial or port activities, which occupy the remaining 9 km of coastline (1%).

Moreover, between 2000-2007, other 14,2 km of coastline were artificialized, mainly for the construction of new port facilities and of new defense works.

The Report highlights also that Sicily, Liguria, Puglia and Campania region, are the territories with the most kilometers of artificial coasts. It is mainly due to the large urban maritime areas existing in such regions and for the presence of the largest port infrastructures and of greatest economic and industrial interest.

Other aspects increasing the pressures on the coastal areas is the pollution, affecting coastal and bathing waters. This is mainly due to i) insufficient or untreated wastewater and sewage and ii) soil runoff for agricultural use (ISPRA, 2014).

Therefore, urban wastewater treatment plants, industrial activities, agricultural activities (fertilizers, pesticides, etc.), livestock farming, and solid waste treatment are recognized

all as potential sources of pollution (ibid.).

The composition of these pressures causes significant geomorphological evolutions, leading to a predominance of coastal erosion (ISPRA, 2014).

Fig. 22 shows the coastal variation from 1960 to 2012. As it is possible to see, many of the areas are susceptible to coastal erosion.



Fig. 22 - Coastal transformation from 1960 to 2012
(Adapted from (Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2017))

The Italian Ministry of Environment (MATTM) highlights that about 42% of the over 4000 km of beaches are subject to coastal erosion activity as shown in Table 12 (Falco and Barbanente, in press).

Table 12 - Coastal erosion by region (adapted from Falco and Barbanente, in press)

Region	Coastline Length (Km)	Beach (Km)	Erosion (km)	Erosion (%)
Sardegna	1897	459	195	42
Sicilia	1623	1117	438	39
Puglia	865	302	195;	65
Calabria	736	692	300;	43
Campania	480	224	95	42
Liguria	466	94	31	33
Toscana	442	199	77	39
Lazio	290	216	117	54
Marche	172	144	78	54
Veneto	140	140	25	18
Emilia Romagna	130	130	32	25
Abruzzo	125	99	50	50
Friuli Venezia Giulia	111	76	10	13
Basilicata	56	38	28	74
Molise	36	22	20	91
Total	7569	3952	1681	42

As already stated in Chapter 3, the consequences of the expected climate change for coastal areas are mainly due to rising sea levels and an increase in the frequency of extreme events leading to flooding (Breil, Catenacci and Traversi, 2007). Furthermore, indirect impacts concern changes in the functions of coastal ecosystems and in human activities on the coasts, due both to the transformation of coastal areas, and to the changed climatic conditions expected for the Mediterranean area, in terms of frequency of rainfall and temperature variation (ibid.).

As a matter of fact, the Italian coastal area is highly vulnerable to loss of ecosystems and marine-coast biodiversity, due to the use of coastal land and morphological characteristics. For the year 2100 the increase of the marine level is estimated between 20-70 cm. The risk of flooding may increase even more if the intensity of marine weather phenomena increases and if the population living along the coast increases. Furthermore, the

problems will not be the same for all coastal areas but they will be greater where there are already conditions of coastal erosion (Ferretti et al., 2003).

In order to understand the level of coastal risks in the Italian coastal areas, ISPRA (2007), based on the modality proposed by EUROSION Project (2004) has calculated and mapped the following aspects: i) the Coastal Sensitivity Index, ii) Coastal Vulnerability Index and iii) Coastal Risk (Fig. 23).

Firstly, the Coastal Sensitivity Index, based on the value calculated for each coastal municipality, was calculated. This value, variable in a range from 0 to 12, was obtained by giving a score that measures the predisposition of the coastal municipality to be home to phenomena of erosion and/or flooding.

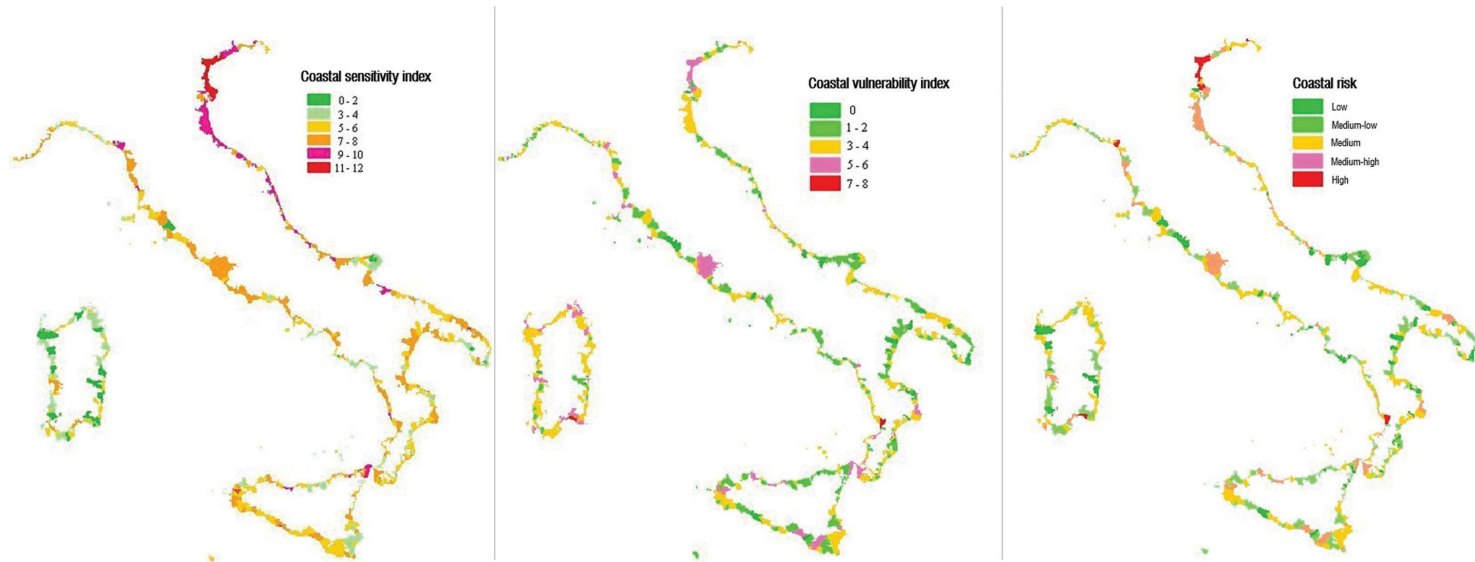
Secondly, the Coastal Vulnerability Index was identified. Also this value, variable in a range from 0 to 8, was obtained by giving a score that measures the potential impact on the environment, on man and on the human activities of the coastal municipality due to phenomena of erosion and/or flooding.

Finally, the mapping of the Coastal Risk was defined, according to the risk class identified for each coastal municipality. The Coastal Risk Index was obtained as a product of the Sensitivity Index for the Vulnerability Index. It measures the percentage of risk with respect to the maximum value obtained when all the pressure factors (sensitivity) and all the damage factors (vulnerability) are present.

The study revealed that the Coastal Sensitivity Index has high values on the Adriatic coast, especially in the northern Adriatic (Veneto and Friuli Venezia Giulia). On the contrary, Sardinia, shows a general low coastal sensitivity index. The Coastal Vulnerability Index shows a much more discontinuous distribution than the Coastal Sensitivity Index, especially for higher vulnerability values and often connected to the presence of highly urbanized realities. Finally, the Coastal Risk Index shows a territorial distribution in which there is a “medium-high” and “high” risk area in the northern Adriatic. Otherwise, the “Medium-High” and/or “High” risk situations appear discontinuously, strongly conditioned by the presence of urban settlements and anthropic activities.

However, this phenomenon cannot be underestimated, affecting only the “medium-high” or “high” coastal risk, an area of 336,746 ha (1.12% of the national surface) and a population of 2.133.041 (3.69% of the total population).

Fig. 23 - Italian coastal risk mapping (adapted from ISPRA, 2007)



5.2. Coastal legislation, planning and management: a multi-level and fragmented system

In Italy, the management of coastal areas is characterized by a marked division of competences between the state, regions and municipalities as well as different sectors of the public administration. Since 2004, the main competences regarding planning and protection of the maritime public domain have passed from the State to the Regions. However, e.g. environmentally protected areas are planned and managed jointly by the regions and the State. Municipalities are involved in the maintenance and management of the maritime public domain within their administrative limits, although permissions for erecting removable structures within the public domain, as they fall within the landscape protected 300 meters setback area, require the authorization by the local representatives of the Ministry for Cultural Heritage Activities and Tourism, so called Soprintendenze. Moreover, port authorities, basin authorities and harbor master's offices assume management and responsibility roles.

Coastal protection was firstly introduced in 1939, when the law *Protection of Natural Beauty* (L. 1497/39) was drawn.

In 1942 the Italian *Civil Code* was enacted, and the Article 822 defined the sections of land along the coast that should become part of the public domain: the seashore, the beach, the bays and the ports (Falco and Barbanente, in press).

As shown in Table 13, after almost forty years two laws strengthened the legal coastal areas protection.

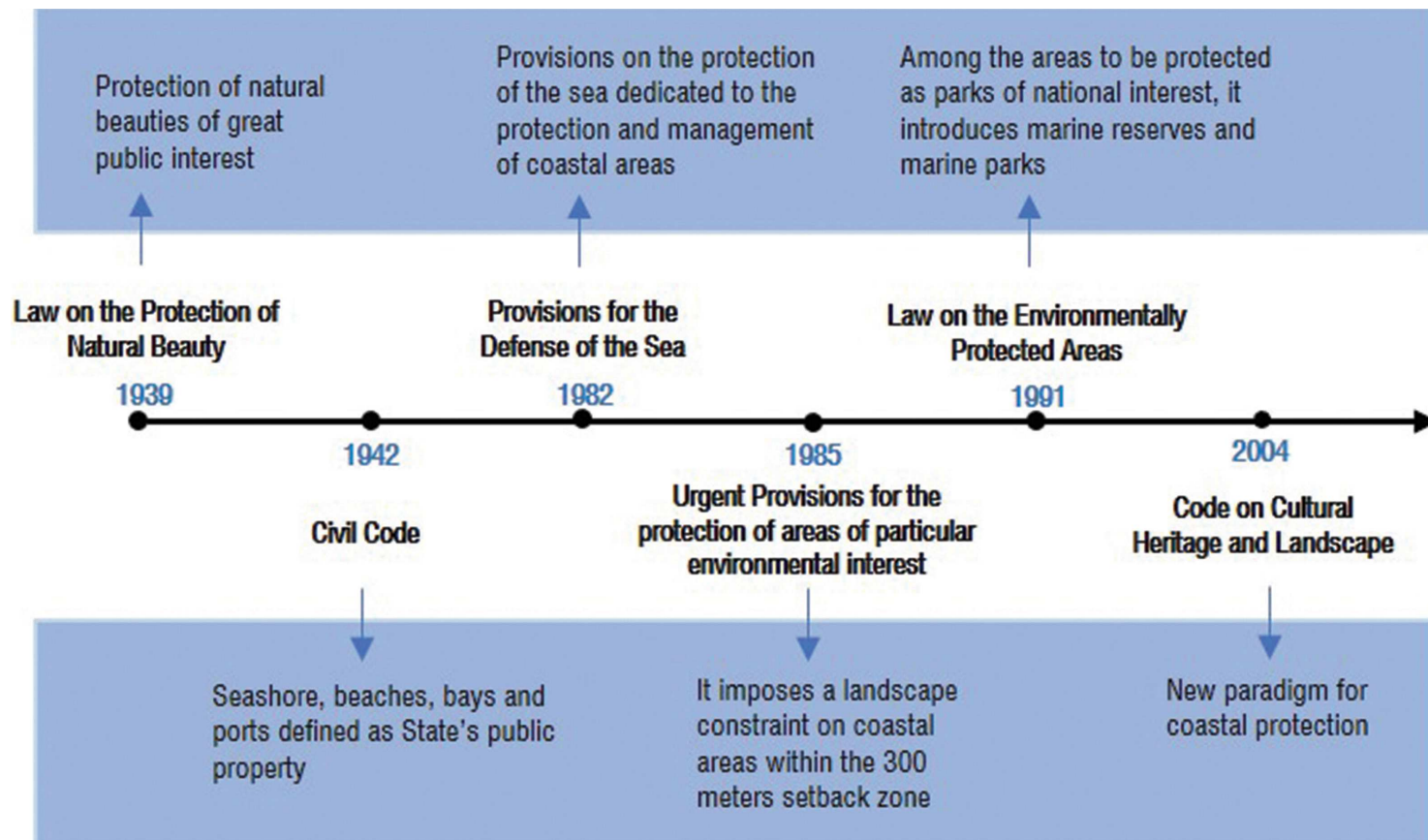
The first law *Provisions for the Defense of the Sea* (L. 979/82), dated 1982, created a framework for preparing a national General Mercantile Plan for the safeguard of sea and coasts, which was never designed.

The second law *Urgent provisions for the protection of areas of particular environmental interest* (L. 431/85), so called Galasso Law, from 1985, introduced a landscape constraint on coastal areas within the 300 meters setback zone (ibid.).

It is important to stress the fact that, until 1967, the regulations of the uses in the maritime public domain had priority over urban planning legislation and plans.

The *Amendments and additions to the town planning law 1150/1942*, called "Bridge Law", established that public works, including maritime public domain, are subjected

8 Table 13 - Italian legal framework on coastal areas (source: author's own)



to urban planning policies and regulations (ibid.).

It was only in 2004 that *Code on Cultural Heritage and Landscape* (L. 42/2004) changed the Italian coastal protection paradigm, entailing the transfer of the main competences on the coast from the State to the Regions.

Since then, in addition to maintaining the 300 meters setback zone, the Code gives the Regions the task of regulating specific restrictions, through landscape planning.

An important aspect to be taken into account when considering Italian coastal areas is the demarcation of the coastline (Falco and Barbanente, in press). It is defined on the basis of the official cadaster and the Minister for the Environment is responsible for its delineation. Through landscape planning, Regions may define and demarcate their coastlines in collaboration with the State, helping with the delineation of the maritime public domain. Furthermore, in 2015, the *Decree 78/2015* specifies that Regions and the State should collaborate to periodically redefine the maritime public domain.

Moreover, even though Italy has signed the Mediterranean ICZM Protocol in 2008, this has not been ratified. As a matter of fact, a clear policy on the application of ICZM has not yet emerged, so each Region is providing autonomous strategies (Bertollini, 2010). As possible to see in Fig. 24, different are the existing plans.



Fig. 24 - Italian regional and local plans (source: author's own)

At the regional level, the planning system is characterized by different strategic plans. The Regional Landscape Plan has been introduced by the Code on Cultural Heritage and Landscape in 2004. This Plan focuses on the landscape protection and environmental values, including development restrictions. It is binding, and local plans must be conformed to them (Falco and Barbanente, in press). Moreover, *Regional Coastal Plans* aimed specifically at protecting coastal environment and are subordinated to *Regional Landscape Plans*.

At the local level, local authorities must draw up local urban plans. In some cases, such as Puglia Region (see paragraph 5.3), local authorities must define *Municipal Coastal Plans*.

5.2.1. Management and use of the maritime public domain

An essential element for the coastal management is the regulatory framework concerning the use of the maritime public domain. Thus, it is important to understand how it really works in Italy.

The use of the maritime public domain needs a concession, which is an authorization between the managing authority and who would like to use the area.

The concessions are regulated by the Navigation Code and are divided in three categories: i) over fifteen years, ii) between four and fifteen years, iii) less than four years.

For the concessions of over fifteen years, the responsible for granting them is the Ministry for Infrastructure and Transportation, while the other concessions are under the responsibility of the Maritime Authority (Falco and Barbanente, in press).

Until 2011, concessions for beach resorts and commercial activities were automatically renewed for six years (L. 296/2006 Financial and Budget Law, amending the Decree 400/1993 Provisions to determine fees for MPD concessions) (ibid.).

The European Union Directive 2006/123/EC, known as the Bolkestein Directive, set the objective of establishing the equality of all companies in access to European Union markets and, consequently, the obligation to submit to periodic public evidence procedure the allocation of concessions for beach resorts and commercial activities in the maritime public domain.

In 2008, the European Commission started an infringement procedure against Italy on account of the incompatibility of its policy of automatically renewing concessions and the Bolkestein Directive. For this reason, the Italian Parliament has passed legislation introducing a transitional regime that provides for the expiry of concessions instead of automatic renewal, even if it is granting a further concessions extension until 2034.

It is worth mentioning, however, that the European Court of Justice deemed insufficient these measures: in its judgment of 14 July 2016 (C-458/14), it declared that EU law (Article 49 TFEU) does not allow concessions in the maritime public domain to be extended automatically in the absence of any selection procedure for potential candidates. Thus, this problem is still pervaded by uncertainty, tension, and sometimes even conflict.

The Regional Coastal Plan is the planning instrument in charge of managing the maritime public domain through three primary policy aiming at i) safeguarding the environmental and landscape heritage, ii) guaranteeing free access to the shore and iii) promoting the development of sustainable tourism and recreation activities (ibid.).

However, there is still an institutional separation between the levels of government: national, regional, provincial and municipal, as well as a lack of coordination between the many actors and instruments that have competence over maritime state property (Dalla Via, 2012).

5.3. The example of Margherita di Savoia (Puglia Region)

Puglia Region (Fig. 25) is situated in the extreme south-eastern tip of the country. It has the longest coastline in the whole country, of about 865 km. It is recognized as one of the severest Italian areas affected by coastal erosion and flooding with huge related economic impacts on traditional maritime activities as well as other sectors, namely tourism and agriculture.

Margherita di Savoia is a small coastal town of almost 18000 inhabitants, located in the Province of Barletta-Andria-Trani along the Gulf of Manfredonia. It extends from the border with the Municipality of Zapponeta, in the west, to the border with the Municipality of Barletta, i.e. the left bank of the “Old mouth of the river Ofanto”, in the east of the “Village La Fiumara”.

It is characterized by a particular urban conformation: it is long and narrow because it is enclosed between the sea and the saltworks. The history of this town is linked to the saltworks and their use. The coastal landscape, once characterized by large swampy plains, has been profoundly transformed by the reclamation and cultivation of the lakes.



Fig. 25 - Margherita di Savoia within Puglia Region (source: author's own)

Salso and Salpi, which started at the end of the nineteenth century and then was realized especially from the thirties onwards by the Consorzio di Bonifica della Capitanata, whose waters have also been used to expand the saltworks.

Furthermore, as possible to notice from the comparison between Fig. 26 and Fig. 27, an increase of urbanization and intense use of the territory has been registered during the last seventy years.

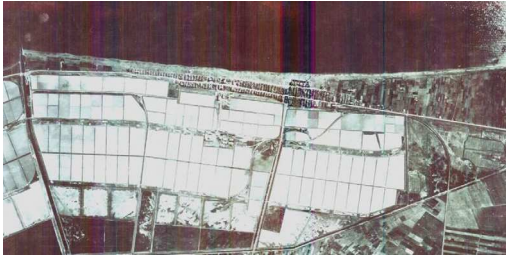


Fig. 26 - Margherita di Savoia, Year 1943 (Mossa, 2016)



Fig. 27 - Margherita di Savoia, Year 2019 (source: google Maps)

Nowadays, the relationship between the inhabitants and sea-related economic activities is still strong.

As a matter of fact, the coastal area of Margherita di Savoia, long 18 km and made up of low sandy coast, is characterized by many different uses and activities (Fig. 28), such as:

- beach tourism and related activities;
- port activities;
- residential use;
- agriculture;
- saltworks.



Fig. 28 - Overview of Margherita di Savoia

Furthermore, this territory is facing huge problems of coastal erosion and flooding, enhancing the related risks and damages which are impacting the economic activities and uses of the coastal area, in particular beach tourism and agriculture.

In the past, the equilibrium of the coast was guaranteed by the contribution of sediments from the Ofanto River, south of Margherita di Savoia. The construction of numerous dams has interrupted the flow of sediment, resulting in great retreats and criticalities along the coast. The result of these actions is shown in Fig. 29, which indicates the variation of the coastline near the mouth of the Ofanto River for the period from 1943 to 2013. The coastlines were obtained from a series of aerial photographs of the area taken at different times. In particular, they have been digitized and suitably overlapped for the comparison (Mossa, 2016).



Fig. 29 - Ofanto River mouth transformations (Mossa, 2016)

Furthermore, the construction of the Port of Margherita di Savoia in 1952 has interrupted the flow of sediment, subjecting on the one hand, the western coastline to remarkable stresses (Regione Puglia and Politecnico di Bari, 2012). On the other hand, the beach has grown considerably due to the sediment of sand in the eastern part, which has allowed the increase of its use for beach tourist purposes (Mossa, 2016). Over the years, an attempt has been made to curb the phenomenon of coastal erosion by building countless brushes that have shifted the erosive processes to the west without any significant benefits (Fig. 30).



Fig. 30 - Coastal defense measures against coastal erosion in Margherita di Savoia (western coastline)

As a matter of fact, the area of Margherita di Savoia is covered by 151 coastal erosion defense works, corresponding to almost 80% of the total defense works carried out on the Puglia coasts (Regione Puglia and Politecnico di Bari, 2012).

Currently the coast is characterized by the almost total disappearance of dunes and beaches and from wide stretches periodically subject to flooding.

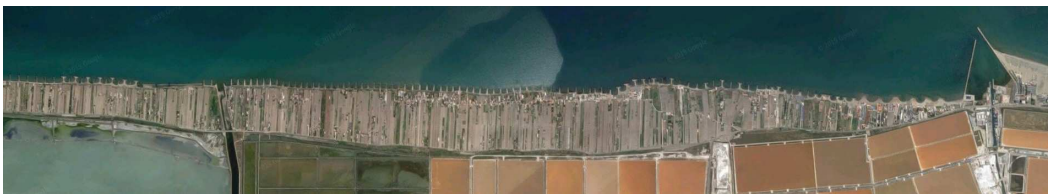


Fig. 31 - Eastern coastal area of Margherita di Savoia with the presence of brushes against coastal erosion

On the other hand, as already mentioned before, in the area east of the port a wide beach has been formed after the construction of the port and in particular after the construction of the eastern pier (Fig. 32). This area is subject to intense tourist exploitation, which has now almost reached the head of the pier, helping to cover up the mouth of the port.



Fig. 32 - Tourist exploitation in southern coastline of Margherita di Savoia (eastern coastline)

The evolutionary trend is still in progress. Fig. 33 highlights that the retreat of the western shoreline of the port from 1952 to 2005 is about 120 m and the advancement to the east of about 210 m (Regione Puglia and Politecnico di Bari, 2012).

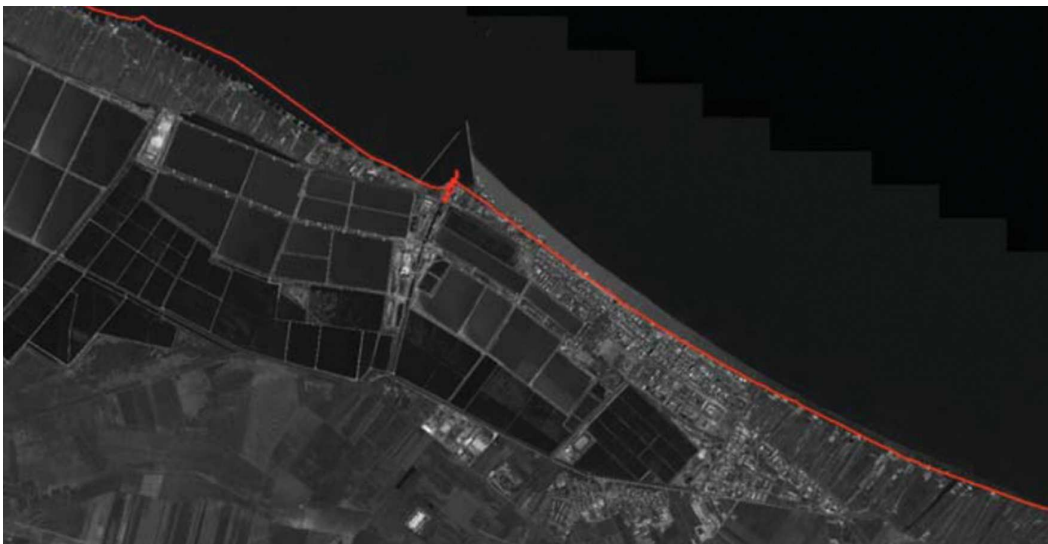


Fig. 33 - Image (May 2005) of the east and west coast of Margherita di Savoia and, in red, the coastline of 1952 (Regione Puglia and Politecnico di Bari, 2012)

In order to manage the maritime public domain and to regulate its uses, the Puglia regional law No. 17/2006 have been enacted, aiming at defining the contents and rules to be followed in the *Regional Coastal Plan* and providing the drawn up of the municipal coastal plans.

Thus, the *Regional Coastal Plan* has been drawn up, in order to achieve three primary policy aims:

- safeguarding the environmental and landscape heritage;
- guaranteeing free access to the shore;
- and promoting the development of sustainable tourism and recreation activities (Falco and Barbanente, in press).

In 2012, the *Regional Coastal Plan* has been approved. It defined three classes of level of critical danger of erosion of sandy beaches, which was conducted by analyzing the coastlines of 1992, 2000 and 2005, and three classes of environmental sensitivity, which was defined according to indicators that represent the physical state of the coastal strip and the protection rules that highlight its environmental value (ibid.). Through the combination of these two classifications, nine coastal zone classes were generated. Finally, to each coastal zone class is given a different allowance of use and development and guidelines for the minimization of coastal activities impacts (ibid.).

Saponieri, Damiani and Bruno (2016), considering the Regional Coastal Plan analysis and the modality proposed by EUROSION Project (already described above), have defined the risk index of coastal erosion and flooding for the Puglia Region at municipal scale (Fig. 34).

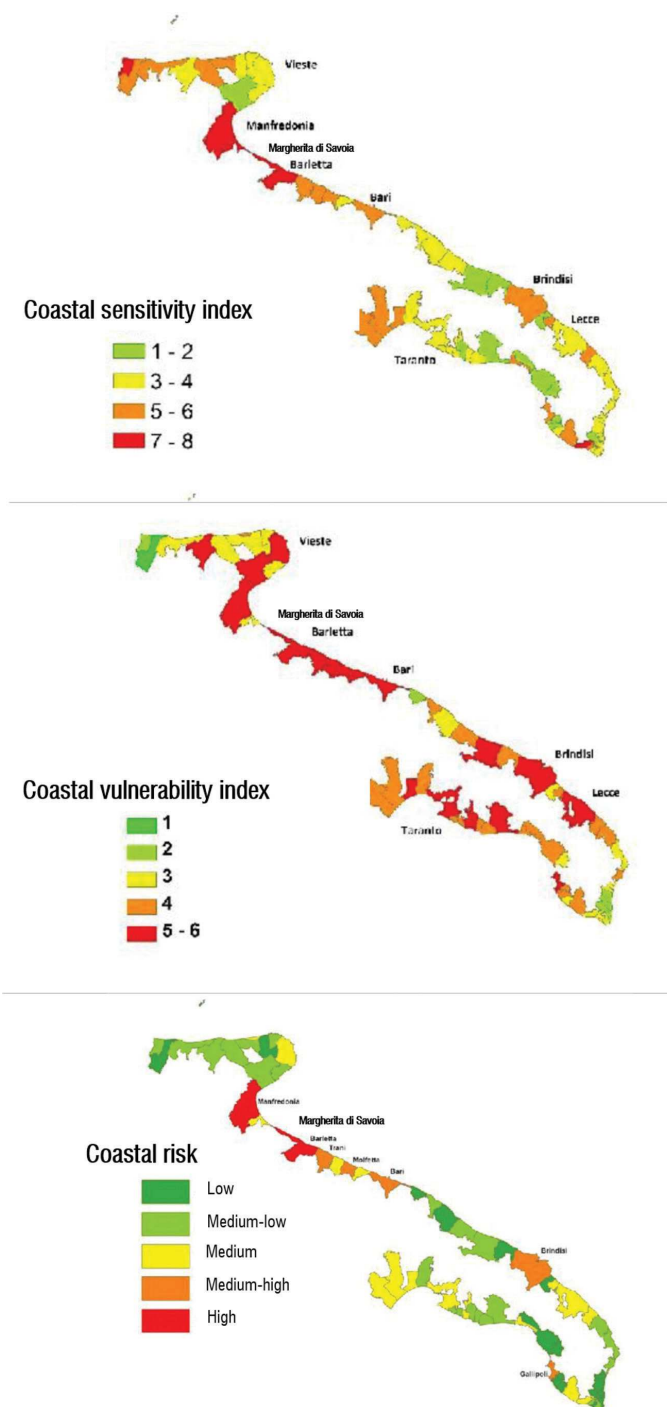


Fig. 34 - Coastal risk mapping for Puglia Region (Saponieri, Damiani and Bruno, 2016)

Also from this study it clearly emerges that Margherita di Savoia is one of the municipalities at greater risk of erosion and flooding. The most important risk factors are essentially the type of coast, characterized by long sandy shores and low altitudes even in the hinterland, and the ever-increasing urbanization.

The Municipal Coastal Plan that the Municipality of Margherita di Savoia should have approved to carry out in-depth studies and enforce the rules for the protection and use of maritime domain in its territory, has not yet been drawn up. As a matter of fact, the gap between the rules introduced by the regional law No. 17/2006, amended in 2015, and the Regional Coastal Plan, and the reason for this is undoubtedly also the complexity of the coastal problems of this territory.

As already stated, the stiffening of the coastal area of Margherita di Savoia is mainly caused by:

- the urbanization and intensive use of the territory,
- the construction of dams and the port that hinder the natural transit of sediments along the coast;
- the elimination of the dune belt.

All these factors limit the adaptability of the beach system and amplify the risk of erosion and flooding.

Although the problems affecting this coastal area are known and many are the coastal defense measures built for its protection, the situation has not improved.

Therefore, Margherita di Savoia has been selected as pilot site for a project called STI-MARE (Innovative strategies, monitoring and analysis of the coastal erosion risk), financed by the Italian Ministry of the Environment and the Sea (MATTM). The project, started in 2018 and already ongoing, carried out by the University of Bologna and the Polytechnic University of Bari, aims at integrating innovative monitoring strategies of coastal dynamics and risk assessment of coastal erosion. It is structured into five Work Packages (WP): Coordination (WP0), Coastal erosion risk analysis (WP1), Impact of innovative works (WP2), Innovative techniques for the monitoring of coastal dynamics (WP3) and Dissemination of the results (WP4).

The thesis is related to this project, therefore everything presented is the result of the work of the Ph.D. candidate.

5.3.1. Analysis of the experiential knowledge in Margherita di Savoia

As already stated in Chapter 1, it is important to include *experiential knowledge* into risk assessment strategies. In this sense, risk perception must be investigated in order to understand the level of awareness that different actors have on coastal erosion processes and associated risks.

As a matter of fact, two methods have been identified and used in order to analyze the experiential knowledge in Margherita di Savoia: the *questionnaires* and the *Scenario workshop*. As literature points out (Harrell, 2009; Miles, Huberman and Saldaña, 2013), they are different methods that allow to achieve different analytical objectives. In this thesis they have been considered complementary methods that, if used in an integrated way, allow to investigate different dimensions of experiential knowledge.

On the one hand, *questionnaires* allow to:

- interview a huge and diversified sample;
- obtain quantitative indicators of respondents to the same set of questions;
- analyze simple and general topics in an easy and quick way.

On the other hand, the *Scenario workshop* allows to:

- involve the participants according to the purpose;
- know in advance the profiles of the participants;
- interact with the participants during all the different phases of the workshop;
- analyze the behaviors of the participants;
- orientate the participants during the workshop to achieve significant results.

5.3.1.1. Questionnaires: method and findings

As stated in the previous paragraph, questionnaire allows to interview huge and diversified samples, to obtain quantitative data and to analyze simple and general topics in an easy and quick way. Questionnaires¹ have been prepared to assess the coastal erosion risk perception of tourists, inhabitants and beach managers on coastal areas. They

1 Questionnaires have been designed and analyzed by the Ph.D. candidate

have been designed and administrated in collaboration with TROISI RICERCHE SRL. The structure of the questionnaire is based on seventeen closed-ended questions divided in five sections (see Annex 1):

- 1) beach attendance
- 2) opinions on the beach frequented
- 3) knowledge about coastal erosion
- 4) respondent socio-demographic profile
- 5) notes and/or comments

The questionnaires have been administered from June to September 2019 through the Computer Assisted Personal Interview method (CAPI).

Their administration has been performed with the help of fourteen volunteer students of the Polytechnic University of Bari. They have been administrated in the whole Puglia Region, so as to allow the comparison between the perception found in Margherita di Savoia and that which emerges in other seaside resorts in the region.

As highlighted before, questionnaires have been administrated not only to residents and tourists, but also to beach managers. For the beach managers questionnaires, some adjustments have been performed, while maintaining the same structure as for the other respondents (Annex 2).

The analysis here focuses on the coastal area of Margherita di Savoia, highlighting the most important aspects that emerged through a comparison with the results emerged for the whole of Puglia.

1164 questionnaires have been submitted in the whole Puglia Region to tourists and residents of which 88 in five equipped beaches of Margherita di Savoia.

Interviewees have been firstly asked “Is this your first time in this area?”. 15% of respondents answered that it was the first time, and for this reason they were excluded from the rest of the questionnaires.

77% that usually goes to that beach and the rest 8% goes there from time to time. Furthermore, 88% of them use to go in that beach from more than five years.

On the one hand, respondents visiting the area from less than five years perceive the breadth of the beach as follows:

- 22% increased

- 78% stable
- 0% decreased

On the other hand, respondents visiting the area from more than five years perceive it as follows:

- 12% increased
- 65 % stable
- 18% decreased

This first data may lead to suppose that coastal areas are subjected to coastal erosion, but the phenomenon is perceivable only by people who have been using that beach for longer.

Afterwards, interviewees have been asked if they have ever heard about the phenomenon of coastal erosion. For this aspect, a comparison between tourists and residents make sense, in order to understand if residents are aware about the phenomenon that likely impact their territory. In fact, all residents answered that they know what coastal erosion is. However, among tourists 46% of tourists do not know what it is and 51% do. Thus, on the one hand, it may be assumed that residents are aware about the current situation characterizing their territory. On the other hand, tourists are almost divided into two parts.

After that, interviewees have been asked to identify the main cause of coastal erosion among the following answers:

- 1) Natural characteristics of the beach;
- 2) Wrong behavior of the people;
- 3) Climate change;
- 4) Anthropic interventions in the coast
- 5) Anthropic interventions in the inland
- 6) I do not know

On the one hand, 60% of residents identify anthropic interventions in the coast as the main cause of coastal erosion. Furthermore, 20% identify wrong behavior of the people and the other 20% the anthropic interventions in the inland.

On the other hand, 43% of tourists identify climate change as the main cause to coastal

erosion. Then, 34% says anthropic intervention in the coast, 12% anthropic interventions in the inland, 4% for wrong behavior of the people, natural characteristics of the beach and do not know.

From these answers it emerges that residents are aware about the causes of coastal erosion in their territory because they perceive them, but they are not aware about climate change impacts and the fact that it will exacerbate the situation in the future. On the contrary, tourists seem generally more informed about the causes of coastal erosion worldwide.

As a matter of fact, almost all interviewees for the whole region and also for Margherita di Savoia recognized that coastal erosion is a phenomenon present worldwide.

Moving forward, the question “what do you think coastal erosion has the greatest impact on?” has been asked giving four alternatives of answers:

- 1) Streets, houses and everything that is close to the sea
- 2) Safety of people
- 3) Economic activities
- 4) Natural environment

It is interesting to report that 60% of residents have indicated streets, houses and everything that is close to the sea as the most impacted aspect; the rest 40% answered natural environment. Tourists have answered differently: 45% believes that natural environment is the most impacted aspect; 16% economic activities; 20% safety of people and 19% streets, houses and everything that is close to the sea.

For this point, it seems clear that residents are more aware about the impacts that coastal erosion have on their own territory, probably because they perceive it constantly.

Going to the end of the questionnaire, interviewees have been asked to identify the most effective coastal erosion defense technique for them. 44% of respondents think that the most effective coastal erosion defense technique depends on the situation, 31% answered reefs and breakwaters, 8% brushes, 7% add sand to the beach and the rest 10% did not know. For this last question, the whole regional sample answered almost in the same way, with only a difference: 1,4% of the total sample answered that nothing should be done for the protection of the coast from erosion, while respondents from Margherita di Savoia did not choose this option.

This view highlights that less than half sample think that the effectiveness of coastal erosion defense techniques depends on the situation. This aspect points out an important element for the analysis: it appears that there is no awareness that engineering works can not only be ineffective but, in certain circumstances, such as in Margherita di Savoia, also harmful, as well shown from the analysis of paragraph 5.3.

Speaking about beach managers, 5 out of 67 have been interviewed in the eastern coastal area of Margherita di Savoia.

They have been firstly asked how they perceive the breadth of the beach. Four up to five answered that it is stable, one answered that it has decreased. The beach manager who has answered that he perceived a decrease in the beach breadth highlights that it is visible from the number of rows of umbrellas.

Afterwards, they have been asked to identify the main cause of coastal erosion among the following answers:

- 1) Natural characteristics of the beach;
- 2) Wrong behavior of the people;
- 3) Climate change;
- 4) Anthropic interventions in the coast
- 5) Anthropic interventions in the inland
- 6) I do not know

Three answered that coastal erosion is mainly caused by anthropic interventions in the coast, one by climate change and the other one does not know.

To the question “According to you, coastal erosion is a phenomenon limited to” they have answered as follows:

- two answered that it is a worldwide phenomenon;
- one answered that it is a phenomenon limited to Italy;
- one answered that it is a phenomenon limited to Puglia region;
- one answered that it is a phenomenon strictly limited to Margherita di Savoia.

These answers detect anomalies because preliminary analysis has shown that beach managers are at least aware that the problem is not limited to Puglia region.

Moving forward, to the question about greater impacts of coastal erosion four alternatives of answers were given:

- 1) Streets, houses and everything that is close to the sea
- 2) Safety of people
- 3) Economic activities
- 4) Natural environment

Two of them answered that greater impacts are on economic activities, two of them on natural environment and one to streets, houses and everything that is close to the sea. Afterwards, they have been asked to identify the most effective coastal erosion defense technique for them. Two identified brushes as the best actions; two identified reefs and breakwaters and one answered that it depends on the situation.

As in the case of residents and tourists, it seems that they are not aware about the ineffectiveness of the engineering works built in their territory and that they've been harmful for the coast. In confirmation of this aspect, two beach managers would like to build brushes in that beach, and one would like to build reefs and breakwaters.

As a matter of fact, some anomalies emerge from the analysis, suggesting that the answers given by some of the beach managers take into account their own direct interests and giving a localized point of view.

Having said that, the questionnaires certainly have some limits. First, respondents may not be completely truthful with their answers. In this sense, some control questions have been prepared in order to have the possibility to compare answers and thus, to have higher level of truthful data. Second, respondents may lose interest and then give random answers. Finally, respondents may not understand all questions, leading to inaccurate responses.

5.3.1.2. The Scenario workshop: method and results

The *Scenario Workshop* is an adapted version of the Future Workshop approach (Jungk and Müllert, 1987). It is an approach aiming at changing or transforming

the actual situation of a system through the following steps:

1. criticize the actual situation;
2. dream about a preferable future situation;
3. find ways to move from the actual situation to a preferable one.

The method is based on the activation of the intuition of individuals, synergy effects in groups and critical potentials that can contribute to the creation of alternative (Vidal, 2005).

In this sense, *Future Workshop* is characterized by three phases:

1) Critique phase

- Generate and collect critique issues (brainstorming);
- Structuring (clustering of ideas using Mind Mapping);
- Evaluation, Focusing, Prioritization.

2) Fantasy phase

- Imaginative warm-up (fantasy plays, storytelling, games, meditation...);
- Turn critique into the opposite (negation of negation);
- Generate ideas (brainwriting);
- Analysis and elaboration of great ideas;
- Register the ideas in a bank of ideas.

3) Implementation phase

- Evaluate the registered ideas;
- Formulate in concrete terms the best ideas;
- Choose the very best ideas (prioritizing).

Thus, starting by a critical understanding of actual problems and following different phases of individual reflection and group interaction, participants point out shared desirable future visions and ways to move from the actual situation to a preferable one.

The *Future Workshop* is a particularly adaptable approach, which can be used in different forms depending on the research context, the issues to be investigated and the results to be obtained (Barbanente, Khakee, Puglisi, 2002; Khakee et al., 2002; Barbanente and Khakee, 2003).

The *Scenario Workshop*² has been designed aiming at building participatory scenarios founded on future visions of Margherita di Savoia and its coast by 2040 and defining shared implementation strategies.

Representatives of policy makers and stakeholders have been invited to participate in the Scenario Workshop. They were selected according to the criteria of the broadest representation of the interests involved.

It was decided to involve different actors, from representatives of policy makers, to technicians of all levels (from local to the national one) as well as representatives of the economic fabric and local environmental association.

The list of participants, shown in Table 14, was previously shared, discussed and integrated with the support of local policy makers, association of beach concessionaires and some experts.

Table 14 - Selected actors for the analysis (source: author's own)

Institution
Municipality of Margherita di Savoia - Mayor
Municipality of Margherita di Savoia – Technical Office (urban planning)
Municipality of Margherita di Savoia – Technical Office (heritage and environment)
Municipality of Margherita di Savoia – Tourism Office
Puglia Aqueduct (AQP)
Port Authority
Basin Authority
Province of Barletta-Andria-Trani – Sector of urban planning
Puglia Region – Maritime public domain
Touristic Information Office (I.A.T.)
Association of beach concessionaires of Margherita di Savoia (A.S.B.A.)
Torre Pietra Association of local farmers
La Nuova Arenaiola Agriculture cooperative
Fare Natura Pro Natura Association
Legambiente Association

The Scenario Workshop took place on the 9th May 2019 in the Municipality of Margherita di Savoia from 10 am to 6 pm.

2 The Scenario Workshop has been designed, organized, guided and analyzed by the Ph.D. candidate

Not all the preselected actors participated in the workshop. Indeed, the Basin Authority, Port Authority and Legambiente Association did not show up. Furthermore, even though the list had been shared among several people, it emerged that it was not complete because there were missing the Harbor Master's Office (Capitaneria di Porto) and the fishermen association and for this reason they have been interviewed afterwards.

The Scenario Workshop, as shown in Fig. 35, has been conceived and structured in three phases:

- 1) identification of problems and resources;
- 2) vision;
- 3) scenario building and implementation.

In line with the method requirements specified in literature, which suggests that groups do not exceed ten participants in order to enable the work to proceed smoothly, participants were divided into two groups, each of which representing as much as possible the heterogeneous structure of decision-makers and stakeholders. The two groups worked in parallel and in some phases of the workshop exchanged ideas on the results achieved. After this second phase, the two groups of participants were united and asked to select the most shared and desirable future visions of the previous phase, to compare them and to build two scenarios.

The first phase of the work aimed to identify the most relevant problems (criticalities) and resources (opportunities) affecting the coastal area of Margherita di Savoia.

Firstly, participants were asked to individually identify the five problems that they considered to be the most significant for the coastal area of Margherita di Savoia and to post them on a panel. Secondly, the posted problems were discussed collectively in order to eliminate redundancies and to group them into thematic areas. Finally, stamps were given to the participants for voting the posted problems by order of importance.

After that, the same procedure was performed for the resources concerning the coastal area of Margherita di Savoia.

Once the problems and resources had been defined, the second phase was moved on, with the aim of creating visions of the future of Margherita di Savoia and its coast by the year 2040.

Participants were asked to individually indicate five future ideas of Margherita di Savoia

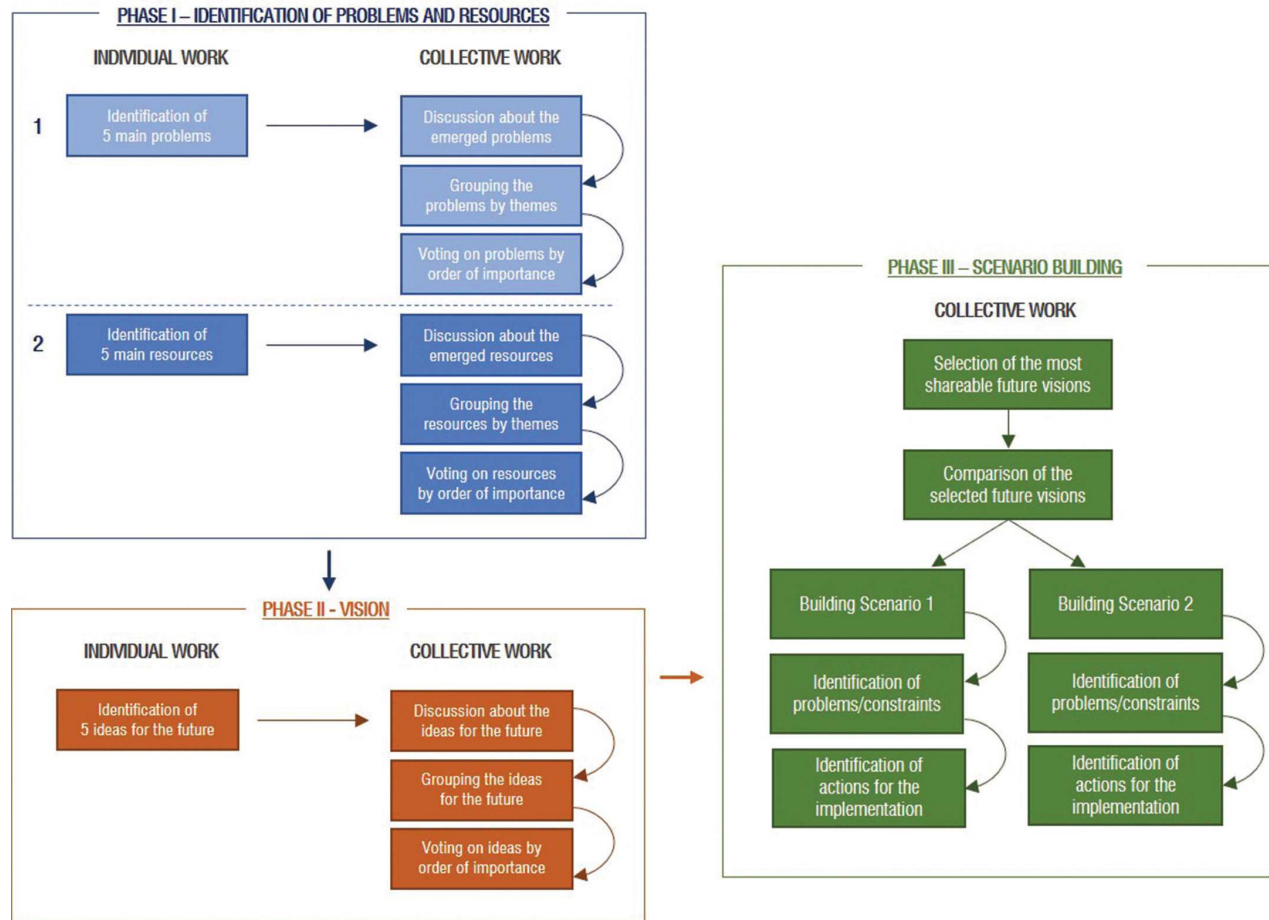


Fig. 35 - Structure of the Scenario workshop (source: author's own)

and its coast by 2040.

As in the first phase, the visions were then posted on a panel and discussed collectively in order to eliminate redundancies and to group them into thematic areas. Finally, they were voted by order of importance with the use of stamps.

After this second phase, the two groups of participants were united and asked to select the most shared and desirable future visions of the previous phase, to compare them and to build two scenarios. Finally, they have identified the problems/constraints for the two scenarios and the implementation strategies necessary to overcome them.

Below, some pictures of the Scenario Workshop are shown, in order to give an idea of the activities that have been performed.



Fig. 36 - The Scenario Workshop of 9. May 2019 (author's own)

This approach allowed to understand the perceptions that policy makers and stakeholders have about problems related to the coastal area of Margherita di Savoia and their points of view about the possibility to overcome such problems and to imagine future scenarios for the area.

Firstly, the perceived problems and the level of importance emerged from the first phase of the Scenario Workshop and the given have been summarized as follows:

Table 15 - Perceived problems for the coastal area of Margherita di Savoia (source: author's own)

PERCEIVED PROBLEMS	LEVEL OF IMPORTANCE *
COASTAL EROSION	4
ILLEGAL BUILDINGS	4
COASTAL EROSION DEFENSE MEASURES HAVE WORSENERED THE SITUATION	3
DIFFICULT PUBLIC ACCESS TO THE BEACH	2
ABSENCE OF SPONTANEOUS VEGETATION	2
LACK OF ENHANCEMENT OF FREE BEACHES	1
ABSENCE OF COASTAL MONITORING	1
EXCESSIVE ANTHROPIC PRESSURE ON THE COAST EXERTED BY TOURIST FACILITIES	1

* level of importance: from 1 (low importance) to 4 (very important)

The analysis of this first part of the workshop allowed to give some first considerations. Participants seems to be very aware about the problem of coastal erosion characterizing Margherita di Savoia. It is interesting to note that actors seems to well understand that the existing coastal erosion defense measures are ineffective and that they are worsening the situation of the coastal area of Margherita di Savoia.

Furthermore, they perceive the presence of illegal buildings as a huge problem as well. As a matter of fact, illegal buildings along Puglia coastal areas is a serious, as demonstrated by different quantitative analysis, e.g. Mare Monstrum of Legambiente (2019). However, for Margherita di Savoia this aspect does not emerged as a huge problem as it is perceived by the participants of the workshop. Actors perceive the presence of illegal buildings as strictly connected with the absence of spontaneous vegetation, typical of the coastal areas, which has been destroyed by overbuilding.

Another perceived problem is the difficulty in reaching the beach because of the many tourist facilities and illegal buildings present in the coastal area. This overexploitation of beaches has led to a general disinterest in free beaches, causing them to become increasingly deteriorated. However, even though participants are aware about the problems of coastal erosion, they do not perceive the problem of flooding, even though is known that it is an existing problem.

After this first part, the summary and analysis of the resources perceived by the actors as important for their territory, was performed. The most important emerged resources are:

Table 16 - Emerged resources for the territory of Margherita di Savoia (source: author's own)

RESOURCES	LEVEL OF IMPORTANCE *
SANDY, EQUIPPED BEACHES	3
SALTWORKS	3
ENVIRONMENT AND BIODIVERSITY OF THE OFANTO RIVER	3
SPA	2
VALUABLE AGRICULTURE PRODUCTION	1
FISHING	1
CLEAN SEA WATER	1

* level of importance: from 1 (low importance) to 4 (very important)

All actors recognize that the presence of sandy and equipped beaches is an important economic resource for Margherita di Savoia. Furthermore, saltworks are recognized as an essential element of the local identity, and the presence of interesting environment and biodiversity of the Ofanto River is an aspect to be considered for the possibility to develop

a more environmental-friendly tourism. As a matter of fact, also SPA is seen as a resource for the touristic point of view but with the necessity to be more valued. Finally, a certain level of importance is given to the valuable agriculture production of the territory and the fishing activities that could be improved also because the sea water is clean.

From the analysis of the resources it emerged that policy makers and stakeholders have a good knowledge of the resources present in their territory and the potentials that these resources may have.

As described before, the third phase of the Scenario Workshop was based on the scenario building. The participants designed two scenarios, based on the most shareable and desirable visions previously identified. Furthermore, they defined problems and constraints for each scenario and finally actions in order to deal with the desirable futures. The participants identified a first scenario called “The city of water” and characterized by the following desirable visions:

Table 17 - Scenario 1 “The city of Water” (source: author’s own)

SCENARIO 1: THE CITY OF WATER
THE CITY OPEN TO THE TERRITORY
MARGHERITA, CITY OF NATURALISTIC TOURISM: CREATION OF CYCLE-PEDESTRIAN ROUTES WITH OFANTO, OFANTINO AND ALOISA MOUTHS
SALTWORKS VILLAGE AND TORRE PIETRA MULTIFUNCTIONAL AND DOCUMENTARY CENTER OF THE LAKE SALPI
SALTWORKS IMPORTANT RESOURCE WITH ADVANCED TECHNOLOGY AND REDUCED UNEMPLOYMENT
SALTWORKS TO SALTWORKERS
SEA LANDING AND STOP OF THE SEA SUBWAY
NATURALISTIC RESTORATION OF THE WESTERN COASTAL DUNE FOR THE COASTAL ECOLOGICAL NETWORK
THE SALTWORKS PUBLIC SPACE OF THE CALM WATERS

CIRCULAR WATER ECONOMY UNDERSTOOD AS THE REUSE OF TREATED WASTEWATER FOR AGRICULTURE AND CIVIC USE
DEVELOPMENT OF WATER RESEARCH LINKED TO CIRCULAR ECONOMY (GREATER KNOWLEDGE OF THE PROPERTIES OF THERMAL WATERS AT NATIONAL LEVEL)
ATTRACTIVE CITY FOR FOREIGNERS (RETURN OF FOREIGN TOURISTS)
SUSTAINABLE MANAGEMENT OF WATER RESOURCES IN THEIR DIVERSITY (FRESH WATER, SALTWATER, BRACKISH WATER, RECOVERY WATER)
UNDER SETTLED SHIPWRECKS AS "SANCTUARIES" OF MARINE BIODIVERSITY

Participants seems to recognize the importance of their local identity, based on the strong connection that their territory has with the water. For this reason, they guess that Margherita di Savoia would need to rethink the ways in which the water could be used as a key element for the area. The city should be open to its territory, because there is the necessity to reestablish a relationship with the saltworks and stop to be linked only to the sea.

In this sense, they recognize the potential that saltworks still have for the development of their area also from a touristic point of view. They imagine Margherita di Savoia based on a naturalistic tourism and not only based on beach tourism.

Furthermore, they recognize that there are many obstacles and constraints that prevent the implementation of the scenario "City of Water", summarized as follows:

Table 18 - Obstacles/Constraints of Scenario 1 (source: author's own)

SCENARIO 1: OBSTACLES/CONSTRAINTS
EUROPEAN POLICIES FOR FISHERIES
PRIVATE MANAGEMENT OF SALTWORKS AND WATER
PRIVATIZATION OF SPA MOTHER WATERS

INABILITY TO FIND A COMMON STRATEGIC VISION
UNSUITABLE PORT FACILITIES
UFFICIO PARCHI (PARKS OFFICE)
COMPLEX AND LONG-LASTING PROCEDURES FOR THE IMPLEMENTATION OF INNOVATIVE INTERVENTIONS
PRIVATE INTERESTS
BUREAUCRACY
THE PORT IS NOT SUITABLE FOR THE NEEDS OF FISHERMEN
“HARD” DEFENSES SYSTEMS TO PROTECT THE COAST FROM EROSION
PRIVATIZATION OF SALTWORKS, WHICH HAS DEPRIVED THE COMMUNITY OF THE "SALTWORK" RESOURCE
LACK OF FACILITIES AND NETWORKS TO CLOSE THE WATER CYCLE

The identified problems and constraints are mainly related to three aspects. The first concerns the privatization of saltworks. This has made saltworks completely inaccessible increasing the distance between this resource and the local community. The second refers to bureaucracy, because it is complex and long-lasting, and it usually prevent the possibility to propose innovative interventions for the development of the area. The third refers to obstacles and constraints for fishermen. On the one hand, the port is not suitable for them because the seabed is not deep enough for allowing the ships to enter. On the other hand, the rules imposed by the European policies are too restrictive regarding the sizes of the nets meshes that are too large for the catches of this territory. Another aspect recognized to be an obstacle is the presence of “hard” defense systems for the protection from coastal erosion.

The participants identify a second scenario called “The city of Health”, characterized by the following desirable visions:

Table 19 - Scenario 2 “The city of Health” (source: author’s own)

SCENARIO 1: THE CITY OF HEALTH
THE CITY OPEN TO THE TERRITORY
MARGHERITA, CITY OF NATURALISTIC TOURISM: CREATION OF CYCLE-PEDESTRIAN ROUTES WITH OFANTO, OFANTINO AND ALOISA MOUTHS
SALTWORKS VILLAGE AND TORRE PIETRA MULTIFUNCTIONAL AND DOCUMENTARY CENTER OF THE LAKE SALPI
ATTRACTOR NODE OF THE ADRIATIC RIDGE FOR THE FUNCTIONS OF "CITY OF HEALTH"
MARGHERITA BECOMES A BARRIER-FREE TOURIST DESTINATION (ACCESSIBLE TO CHILDREN, THE ELDERLY, THE DISABLED)
RECOVERY OF THE RELATIONSHIP OF CONTINUITY BETWEEN THE CITY AND THE SEA WITHOUT MORE PHYSICAL OBSTACLES
MARGHERITA A MARINE FISHING AREA
MARGHERITA DI SAVOIA "CITY OF HEALTH" (SPA, SPORT, LEISURE, WELLNESS)
MARGHERITA, CAPITAL OF WATER SPORTS IN PUGLIA
MARGHERITA, CITY OF SPORT
LOCAL AND NON-LOCAL YOUNG PEOPLE INTERESTED IN AGRICULTURAL WORK
CREATION OF URBAN PARKS ON THE URBAN PERIMETER OF THE SALTWORKS WITH URBAN CYCLE/PEDESTRIAN ROUTES

In this scenario, participants have three same desirable visions as for the scenario 1: Margherita di Savoia to be a city open to the territory, to be a city for a more naturalistic tourism and to have a multifunctional and documentary center of the Lake Salpi.

The City of Health is imagined as a city where SPA, sport, hobbies and wealth are

predominant. Moreover, they imagine a coastal area accessible for everyone with no obstacles for the access to the sea. Finally, a valorization of the typical agriculture resources with more interest from young people is seen as a willingness to maintain alive one part of local identity of this territory.

Furthermore, they recognize that there are many obstacles and constraints that prevent the implementation of the scenario “City of Health”, summarized as follows:

Table 20 - Obstacle/Constraints for Scenario 2 (source: author’s own)

SCENARIO 2: OBSTACLE/CONSTRAINTS
PRIVATIZATION OF MOTHER WATERS AND MONOPOLISTIC MANAGEMENT OF THE THERMAL RESOURCE
SCARCITY OF PORTIONS OF THE TERRITORY IN THE AVAILABILITY OF THE MUNICIPALITY
TOO MUCH BUREAUCRACY IN THE CONSTRUCTION OF SPORTS FACILITIES
ABSENCE OF AN ADEQUATE GENERAL MASTERPLAN (P.R.G.)
SKEPTICISM FOR THE ENTREPRENEURIAL SECTOR ABOUT INNOVATIVE ACTIVITIES
PARKS OFFICE
WETLAND MANAGEMENT PLAN NOT SHARED WITH THE MUNICIPALITY OF MARGHERITA
LACK OF LAND OWNED BY THE MUNICIPALITY
REGIONAL COASTAL PLAN
GLOBALIZATION AND LARGE DISTRIBUTION

Within this Scenario, obstacles and constraints are mainly related to urban planning and to the lack of land owned by the municipality.

Finally, participants identified the following actions necessary to build a strategy to address the desirable futures and to counter the fearsome futures for Margherita di Savoia and its coastal area.

Table 21 - Actions for implementing a desirable future for Margherita di Savoia and its coastal area (author's own)

ACTIONS
ADJUSTMENT OF THE GENERAL MASTERPLAN TO THE REGIONAL LANDSCAPE PLAN
MORE DELEGATES TO MUNICIPALITIES
PARTICIPATORY PLANNING
REQUEST FOR ACTION TO AMEND EUROPEAN POLICIES FOR FISHERIES
INITIATIVES IN FAVOR OF YOUTH ENTREPRENEURSHIP
SIMPLIFICATION OF PROCEDURES RELATING TO SPORTS FACILITIES AND INCENTIVES FOR THE CONSTRUCTION OF SPORTS FACILITIES
WITHDRAWAL OF THE MONOPOLY OF THE MOTHER WATERS TO THE SPA SOCIETY
INCENTIVES FROM CREDIT INSTITUTIONS FOR THE USE OF CLEAN TECHNOLOGIES OR INVESTMENTS IN THE ENVIRONMENTAL SECTOR
PROMOTE THE GROWTH OF THE COMMUNITY COOPERATIVE
CREATION OF THE SINGLE CONTACT POINT FOR PRODUCTIVE ACTIVITY (SUAP)
TRAINING ACTIVITIES AND SUPPORT TO THE DESIGN/MANAGEMENT OF SUSTAINABLE AND LOW-IMPACT BATHING ACTIVITIES
ACCESS TO EUROPEAN FUNDING
CONTINUOUS MONITORING OF THE IMPLEMENTED ACTIVITIES

The analysis of the proposed actions reveals a high level of awareness of the complexity and fragmentation of the multilevel and multisectoral governance that characterizes not only Margherita di Savoia, but - as pointed out above - the management of coastal areas throughout Italy. Furthermore, policy makers and stakeholders think that this problem could be solved through participatory planning strategies and through giving more competencies to municipalities.

The Scenario Workshop allowed to understand if the actors perceive the problems and related risks affecting Margherita di Savoia and its coast and to find out their level of knowledge about possible strategies for action to overcome the critical situation of such territory.

Tourism seems to be a problematic issue, which is linked to various critical points. Actors recognize the huge anthropic pressure on the coastal environment due to the numerous tourist facilities in the coastal area. They also highlight the difficulties of accessibility of free beaches and the lack of investment in services for free beaches. However, they acknowledge that seaside tourism is a huge economic resource, which cannot be considered sufficient to ensure sustainable development of the entire territory.

Coastal erosion is perceived as a major problem for the coastal area of Margherita di Savoia and the existing “hard” defenses measures are recognized to be inefficacious for improving the current situation. However, the same actors do not perceive the risk of flooding and of climate change negative impacts such as sea level rise, even though both are strictly related to the problem of coastal erosion and are already directly impacting economic sectors such as agriculture.

To conclude, it is interesting to notice that actors recognize participatory planning as a strategy to overcome the predefined problems and to build the desirable scenario they have imagined for their territory.

As already underlined in the previous chapters, there is the necessity to improve the interfaces between knowledge creation and decision-making in which stakeholders and local society can interact and participate into the management processes.

The two methods used for investigating the experiential knowledge of different kinds of actors, from residents to tourists and from policy makers to stakeholders, allow to point out some pitfalls and potentials to overcome this gap.

However, these kinds of researches and measures, can give only some insights because the involvement of stakeholders and local society into planning processes requires long time.

PART 2: THE CASE OF PAGASITIKOS GULF, GREECE

5.4. Setting the scene

Greece (Fig. 37), with its 16000 km of coasts, is the country with the longest coast-line in the Mediterranean Basin. Its coast covers almost one third of the total coastline of the Mediterranean basin (Giannakourou and Balla, 2015; Papageorgiou, 2016).



Fig. 37 - Greece within the Mediterranean Basin (source: author's own)

The urbanized coastal area is estimated at 1315 km², representing 1.31% of the total country area (Stavros et al., 2016).

The Greek overall population is 10.9 million and, along the coastline, there are almost 720 people per kilometer. As it is possible to see in Fig. 38, the coastal population density is estimated at 88 inhabitants per km², while the national average is 75 (ibid.). Urban coastal population is expected to rise. From 59.37 % in 1985 it has been growing, expected to reach 86.47 % in 2025 in accordance with the worst scenario of the Blue Plan/UNEP-MAP study (Lalenis, Sylaios and Papatheocharis, 2013).

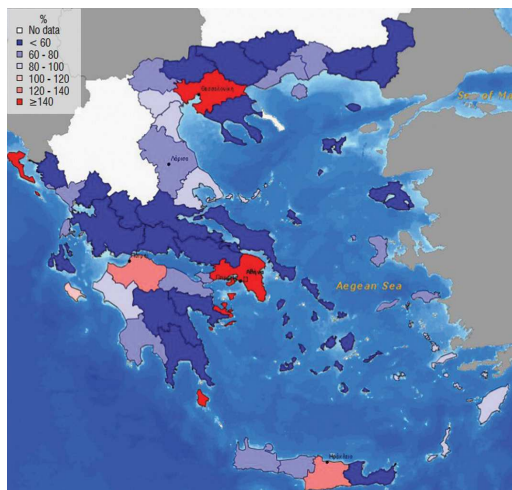


Fig. 38 - Population density in coastal regions in comparison with the national average (Eurostat, 2007)

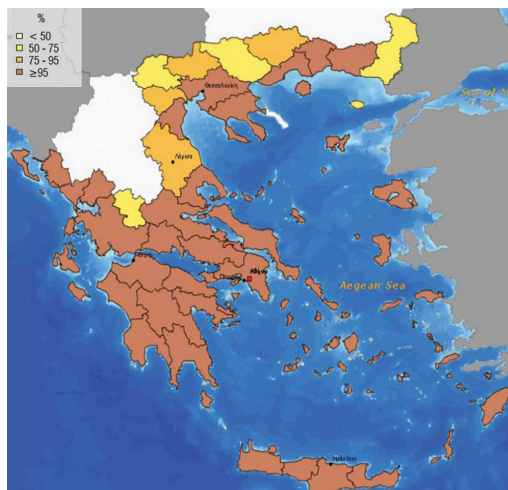


Fig. 39 - Population living within 50 km of the coastline (Eurostat, 2001)

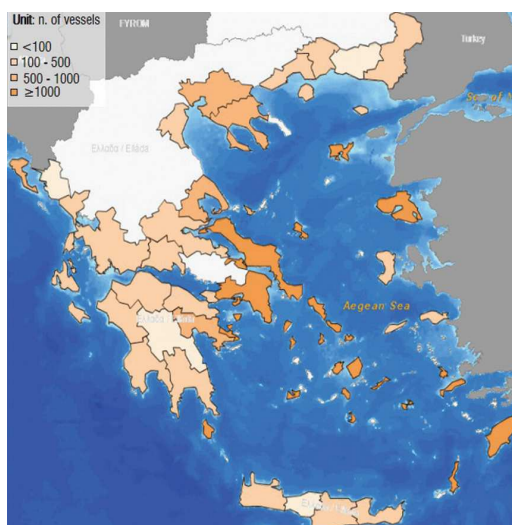


Fig. 40 - Number of fishing fleet in coastal regions (DG MARE, 2010)

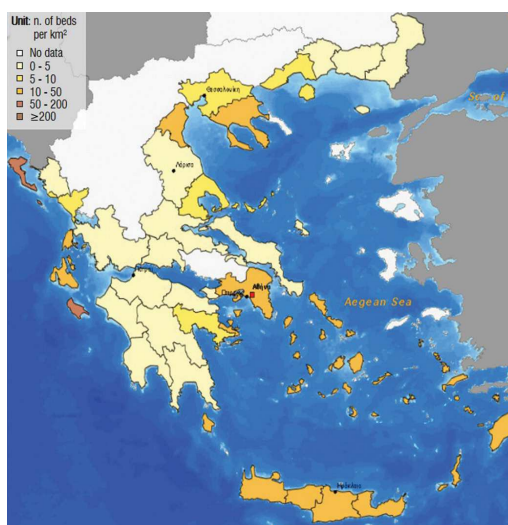


Fig. 41 - Number of beds for square kilometer in hotels, similar establishments, and all other collective accommodation establishments in coastal regions (Eurostat, 2009)

Furthermore, Fig. 39 shows the percentage of population living within 50 kilometers from the coastline.

Not only the population but also about 80% of industrial activities, 90% of tourism and related services, 35% of agriculture and about 95% of fisheries are located in coastal areas (Pavlidou et al., 2015; Stavros et al., 2016), increasing pressures on such territories.

Fishing is an important activity taking place along the costs (Fig. 40) and it is distributed in all the coastal regions. It is estimated that the total catches of fish are around 96000 tons and that the fishing fleet is composed of 19000 vessels.

In addition, tourism is constantly increasing, and as it is visible from Fig. 41, there is a large number of beds per km² along the coastline. The 65% of total beds are allocated in the coastal regions. Furthermore, in 2005 it was calculated a presence of 409 tourists per km² and 13.4 tourist per 1000 inhabitants (Stavros et al., 2016).

5.4.1. Pressures, coastal hazards and climate change impacts in Greece

Greek coastal areas are facing continuous pressures, causing stresses to the coastal environment in multiple and several ways. Coastal deterioration is mainly due to urbanization and tourism. In this sense, after the 1970s, the development of second houses and, generally, a high urbanization trend, together with infrastructures, have worsened the coastal areas conditions (Mare Nostrum, 2013; Papageorgiou, 2016). However, other factors are responsible for the worsening of coastal areas. Agriculture, aquaculture and fisheries, with intense production and catchments, both legal and illegal, deforestation of coastal areas and destruction of *Posidonia* meadows deteriorate these areas (Mare Nostrum, 2013). Furthermore, pollution is another aspect that causes stresses to the coastal environment. It is due to various factors, such as i) the inadequate treatment of sewage and solid waste by industries and households, ii) the agricultural activities with the agrochemicals products leaching (Stavros et al., 2016). The composition of these pressures causes modifications in the natural sediment bal-

ance and erosion trends. However, these repercussions are also exacerbated by anthropogenic interventions such as hard engineering defenses measures (e.g. dredging, groins, breakwaters) and damming, which reduce the supply of sediments (Kontogianni et al., 2012; Mare Nostrum, 2013).

Greece is highly affected by coastal erosion (Fig. 42) and it is recognized as the fourth most vulnerable country among the 22 coastal EU member states with over 20% of its coastline under this phenomenon (Kontogianni et al., 2014).

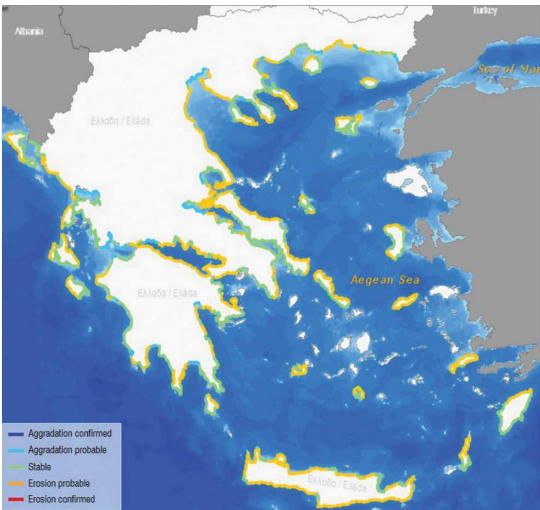


Fig. 42 - Coastal erosion in Greece (EEA, 2005)

Moreover, Table 22 summarizes the state of Greek coastline length affected by coastal erosion in comparison to Europe (Kontogianni et al., 2014).

Table 22 - Coastal erosion in Europe and Greece (EUROSION, 2001)

	Europe coastline		Greece coastline	
	Length (km)	Length (%)	Length (km)	Length (%)
Under erosion	15,111	15	3,945	28,6
Protected from erosion	7,606	7,5	579	4,2
Protected but still eroded	2,927	2,9	156	1,1
Total	100,925	100	13,780	100

As already highlighted in Chapter 3, besides the coastal anthropogenic influences, forecasts foresee that coastal erosion will increase also due to sea level rise (SLR) and due to the increase of extreme events (Kontogianni et al., 2012).

A study reported by Kontogianni et al. (2014: 64) shows “that 960 km (6% of the total shoreline) form deltas of a high vulnerability to SLR; 2400 km (15% of the total shoreline) are associated with non-consolidated sediment deposits (beaches) and the remainder 12810 km (79% of the total shoreline) with rocky coastal areas”. Moreover, it seems that there is a relation between the coastal types and the different levels of vulnerability to SLR illustrated in Fig. 43. Indeed, 3360 km (almost 21% of Greek coasts) are characterized by medium to high vulnerability to SLR (Kontogianni et al., 2014).

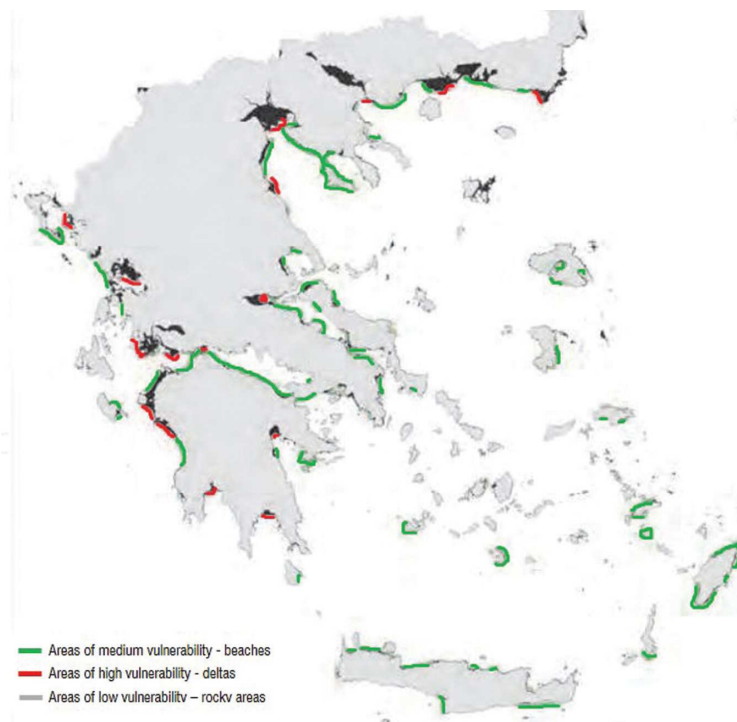


Fig. 43 - Vulnerability to sea level rise (SLR) of Greek coastal areas (Kontogianni et al., 2014)

5.5. Coastal legislation, planning and management in Greece

Even though the Greek State was established in 1837, the first coastal law dates back only to 1940. Until then, the term 'seashore' was defined merely as "the zone which can be reached by the winter waves and identified as public property" (Law on the Greek public domain, 1837).

As summarized in Table 23, after almost 100 years from the Law on the Greek public domain, the first Coastal Law (L. 2344/1940) was enacted aiming at protecting the public domain of the coastal areas. This law has been the Greek main legal framework on coastal protection and development for almost 50 years, marking most of the contemporary history of the country.

In addition to reinforcing the definition of 'seashore', the Coastal Law introduced two new terms: 'old seashore' and 'beach'.

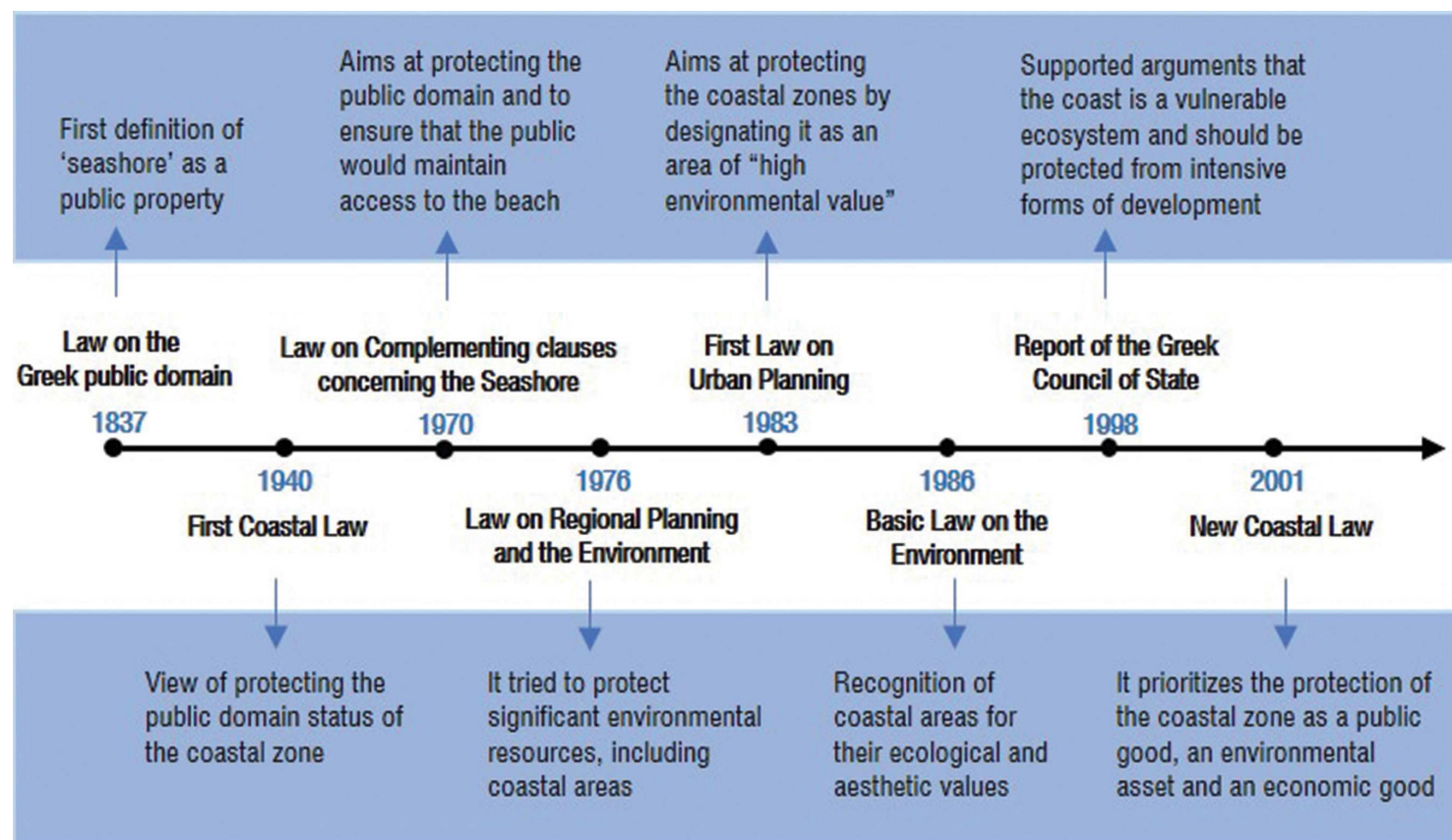
'Old seashore' is defined as "the area of land which derives from the shifting of the seashore towards the sea, due to illuviation or constructions, and is determined by the new seashore limit and the limit of the previously existing seashore" (Giannakourou and Balla, 2015: 4), whereas 'beach' is defined as "the land zone, adjacent to the seashore, which serves the communication of the mainland with the sea and vice versa. It may extend up to 50 meters from the shoreline" (ibid.: 4).

Although this law was supposed to protect coastal areas from development and allow access to the beaches, it has proved to be inadequate (Mare Nostrum, 2016). For this reason, different complementary laws were adopted afterwards.

In 1970, the law Complementing clauses concerning the Seashore (L. 439/1970) was enacted with new specific measures for the coastal protection. In this sense, it defined a 30 meters area from the seashore where new constructions were forbidden outside already existing settlements. Furthermore, in order to provide access to the beaches, it provides expropriation of lands.

In 1976, the first law focusing on environmental protection was adopted, the Law Concerning Regional planning and the Environment (L. 360/1976), aiming at protecting significant environmental resources, including coastal areas. In 1983, for the first time, the Greek urban planning legislation (L. 1337/1983) was introduced. This law identified coastal areas as areas of 'high environmental value'. Also the Basic Law on the envi-

Table 23 - Greek legal framework on coastal areas (source: author's own)



ronment (L. 1650/1986), adopted in 1986, identified coastal areas for their ecological and aesthetic values, however without any specific disposal on their protection.

Although at this point different complementary laws were adopted, the State still did not have the obligation to protect coastal areas (Mare Nostrum, 2016). Moreover, there were no references to planning regulations in such areas (e.g. construction limitations, land use controls, protection from urban sprawl) (ibid.).

In 1998, the Greek Council of the State stated some judicial remedies. It affirmed that coastal areas are sensitive ecosystems and that, as 'public goods' they have to facilitate the relationship between humans and the sea and to allow to enjoy all the sea uses. As a matter of fact, the Council abrogated all the decrees and decisions that were threatening the nature of coastal areas.

In 2001, the new Coastal Law abolished the one of 1940. The New Coastal Law "Seashore, Beach and other provisions" (L. 2971/2001) focuses on the coastal protection as a public good, an environmental asset and as an object of spatial planning regulation (Giannakourou and Balla, 2015; Mare Nostrum, 2016). As summarized in Mare Nostrum (2013: 32), "the main targets of L. 2971/2001 were: a) to define seashores and beaches with priority to coastal areas with intense urban development, and to areas of high productivity where programs of economic and social development were to be carried out and b) to achieve effective protection and management of coastal areas".

Although the new Coastal law may seem innovative and an effective tool for the protection of coastal areas, several criticisms have emerged. The Mare Nostrum Report "Legal-Institutional Frameworks for Coastline Management. The international, EU and national levels" (2003: 34) highlights that "There is no attempt to coordinate its provisions to urban, regional, and environmental planning. The vagueness of provisions concerning use of the coastal zone for commercial etc. purposes endangers its nature as a public good and might alter its characteristics in an irreversible way. There are already samples of "privatization" of seacoasts by hotels, which impose charges to the citizens who use the particular coast without being clients of the hotels. Leasing of seashores and beaches by municipalities to enterprises, which use them inconsiderately for restaurants, taverns, bars, and other uses of recreational purposes, are increasing in frequency. There is no provision for sufficient control mechanisms of coastal zones, and finally, illegal construction and uncontrolled development is even increasing."

Moreover, even though Greece has signed the Mediterranean ICZM Protocol in 2008, this has not been ratified and, as a matter of fact, it does not exist a specific legislative framework for coastal management.

5.5.1. Responsibilities for coastal management in Greece

Greece is governed on four levels: Central Government, Decentralized Administrations, Regions and Municipalities.

On the one hand, the Central Government manages coastal areas through five ministries (Table 24). Moreover, as possible to see in Table 24, Decentralized Administrations, which provide region-based representation of the Central Government, have also considerable powers and responsibilities in such matters (Mare Nostrum, 2016).

Table 24 - Competencies of the State authorities in coastal areas (adapted from Giannakourou and Balla, 2015)

STATE AUTHORITIES	
CENTRAL GOVERNMENT	
Ministry of Finance	Delineate and manage the seashore and the beach; Adopt measures for the protection of public and welfare property
Ministry of Environment & Energy	Strategic functions and decisive competencies on spatial planning and environmental protection
Ministry of Shipping & Insular Policy	Safety and security of shipping, prevention of marine pollution, development of maritime transport, designation of ports, implementation of the EU's Integrated Maritime Policy
Ministries of Economy, Development & Tourism	Granting of licenses for all tourist ports and marinas
Ministry of Culture & Sports	Protection of country's cultural heritage, including coastal and seabed antiquities and monuments

DECENTRALIZED ADMINISTRATIONS	
Decentralized	Ratification of the demarcation of the seashore and beach; Control and supervision of protective works and silts in the seashore; Demolition of arbitrary buildings and construc-
Regional Directorates of Public Property of the Ministry of Finance	Registration, protection and optimal utilization of public property; Inspections, audit and adoption of measures for the protection of the seashore and beach; Administrative demarcation of the seashore and beach; Convocation of sand extraction committees; Convocation of the Committees for the demarcation of the seashore; Measures for the protection of the seashore due to illegal sand extraction

On the other hand, Regions and municipalities have limited roles and responsibilities (Table 25). They design special plans but with the approval from the Decentralized Administrations.

Table 25 - Competencies of the Local authorities in coastal areas (adapted from Giannakourou and Balla, 2015)

LOCAL AUTHORITIES	
Regions	Imposition of fines for environmental protection according to relevant legislation
Municipalities	Initiation of procedures for local spatial planning; Issuance of building permits; Imposition of fines for illegal development according to relevant legislation; Provision of advice and consent on operational licensing, administrative control and enforcement of measures in case of violation of permitting conditions

As a matter of fact, the ‘hard core’ of competencies in coastal areas is holding by the state authorities (either central or decentralized), while local authorities of both levels are the ‘weakest link’ in the vertical distribution of power (Giannakourou and Balla, 2015).

5.6. The example of the Pagasitikos Gulf

The Pagasitikos Gulf (Fig. 44) is a semi-enclosed gulf, located in the western part of the Aegean Sea. It is part of the Magnesia Prefecture in the Thessaly Region. The gulf is characterized by the presence of the Pelion mountain, in the eastern and southern part of the gulf and it is related to the Aegean Sea through the narrow channel of Trikeri in the south, which is only 5.5. km wide (Korres et al., 2012).



Fig. 44 - Pagasitikos Gulf

The capital of Magnesia region is Volos, the biggest city of the whole gulf and situated in the northern part (Fig. 45). It has approximately 150000 inhabitants, corresponding to the 70% of the whole population of the area. It is the third commercial port in Greece after Piraeus and Thessaloniki, and it has a well-developed industrial sector (Korres et al., 2012).



Fig. 45 - The city of Volos

Besides Volos, several villages are located along the coast (e.g. the village of Lefokastro), where locals live permanently but also used as second houses for holidays and rent to tourists (Fig. 46).

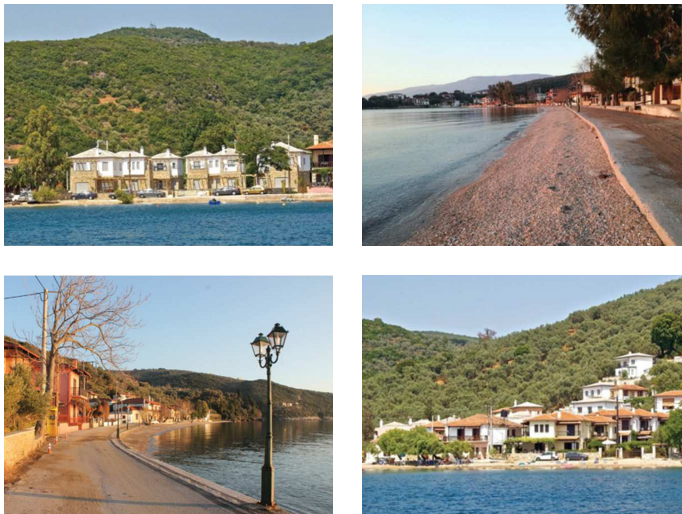


Fig. 46 - Lefokastro village (source: author's own)

Tourism in Pagasitikos gulf is mainly concentrated in the eastern part (so called Pelion), mainly due to its geographical characteristics. The presence of Pelion Mountain allows to choose among different activities, from hiking in the mountains to go to beaches, whether in the side of the Aegean Sea or in the side of the Pagasitikos Gulf (Fig. 47).

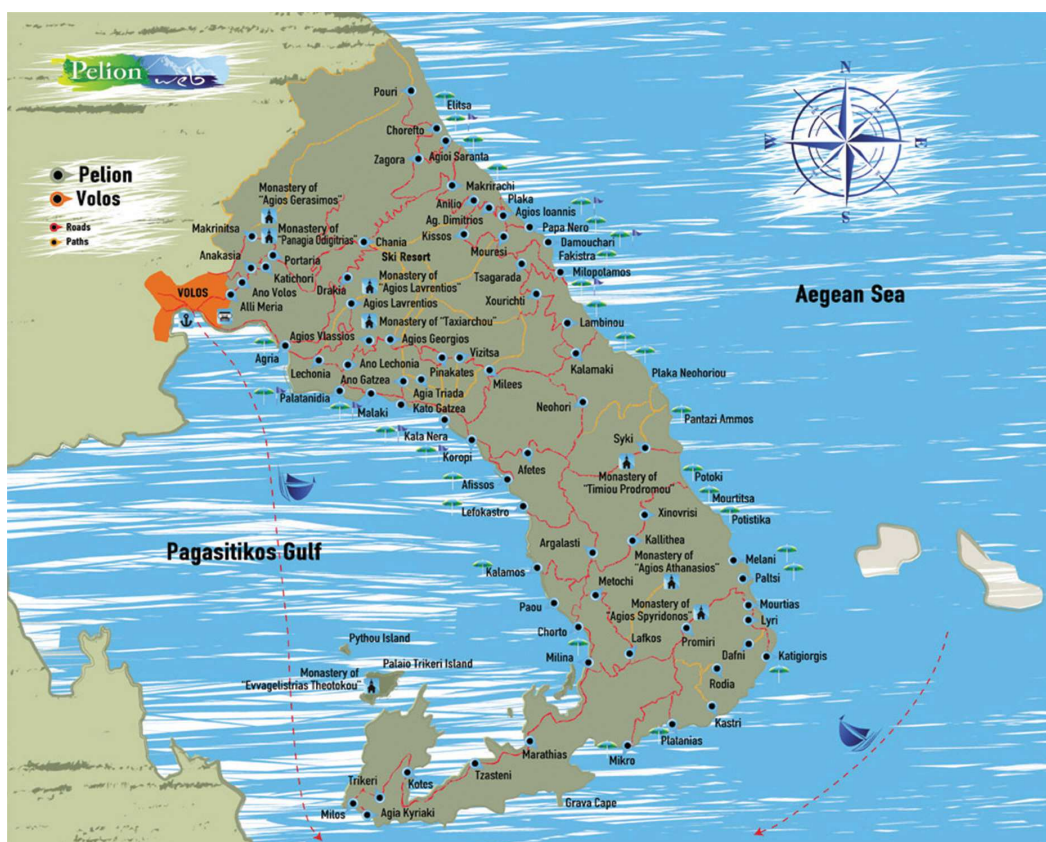


Fig. 47 - Map of Pelion (source: Pelion web)

There are several uses along the coast and in the sea in addition to urbanization, which are related mainly to industries, agriculture and military areas.

Fishing activity is widespread in the gulf and is related to small-scale traditional fisheries. Even if trawling is forbidden by law, illegal fishing is common mainly due to the insufficient methods to detect transgressors (Apostolidis et al., 2009).

Moreover, during the last years agriculture became intensive with the main production of cereal and cotton, using huge amounts of fertilizers rich in nitrogen, phosphate and sulfur (Raitsos et al., 2012).

All these uses and activities are highly influencing the gulf, also due to its semi-en-

closed nature and the shallow depth characteristics (Korres et al., 2012; Raitso et al., 2012). As it is possible to see in Fig. 48, significant are the quantities of polluted water discharged into the gulf waters through a network of periodic small torrents due to industrial, domestic and agricultural activities (Raitso et al., 2012) causing several problems both to tourism and fisheries.



Fig. 48 - Discharges in the Pagasitikos Gulf (Adapted from Raitso et al., 2012)

Moreover, Pavlidou et al. (2015) identified a moderate level of anthropogenic pressures worsening the water quality of the Pagasitikos Gulf, caused by: sewage discharge, industrial discharge and harbor activities.

5.6.1. Analysis of the experiential knowledge in the Pagasitikos Gulf

As it was possible to understand from the analysis performed in the previous paragraphs, the legislative framework on coastal areas is mainly based on coastal protection measures and most of the competencies in such matter are held by the Central Government. Furthermore, a legislative framework specifically for coastal management does not exist. The Mediterranean ICZM Protocol has been signed by Greece in 2008, but it has not been ratified.

As highlighted in Chapter 1, the comprehension of coastal risks requires not only a deep understanding of the main physical phenomena to be addressed, but also acknowledgment about stakeholders' and local communities' knowledge, role, objectives, interdependencies and network of interactions (IRGC, 2017).

To analyze and manage coastal risks in an effective way, firstly there is the necessity to create a diverse, interdisciplinary and scientific knowledge base, due to the inclusion of different actors with different backgrounds (van der Molen et al., 2015).

Afterwards, there is the necessity to improve the interfaces between knowledge creation and decision-making in which stakeholders and local society can interact and participate into the management processes (ibid.).

Thus, the analysis of the *experiential knowledge* was performed in order to understand the following aspects:

- How different actors understand coastal areas as complex systems and constituted by many aspects interrelated affecting each other;
- How different actors perceive problems and related risk factors;
- How actors understand the importance of policy framework and management processes for coastal areas.

5.6.1.1. Method

In order to analyze the experiential knowledge in the Pagasitikos Gulf, an iterative process has been designed by the Ph.D. candidate (Fig. 49).

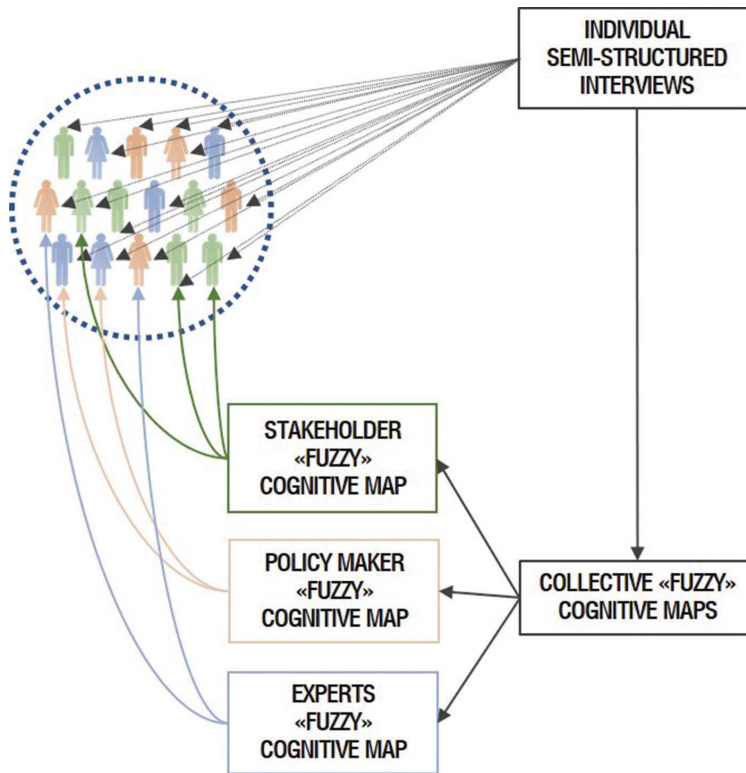


Fig. 49 - Iterative process for the analysis of experiential knowledge in the Pagasitikos Gulf (source: author's own)

The iterative process is based on four main phases and is composed of individual and collective parts:

- 1) Definition of a set of questions for carrying out the semi-structured interviews;
- 2) Selection of actors;

- 3) Conduction of individual semi-structured interviews to the preselected actors of phase 2;
- 4) Building of collective fuzzy cognitive maps, differentiated for the category of actors;
- 5) Individual submission of the “fuzzy” cognitive maps of phase 4 to the preselected actors of phase 2.

Nine questions have been identified and structured in order to analyze the experiential knowledge of local actors (Table 26).

The questions aimed to clarify three aspects:

- 1) understanding if the actors recognize problems, causes and consequences, and eventually possible solutions for the coastal area of the Pagasitikos Gulf;
- 2) understanding if the coastal area of the Pagasitikos Gulf was perceived as well managed and what could be the ways to overcome the problem;
- 3) understanding the individual position on the possibility to actively involve the local society in coastal management and on the ways to perform it.

Table 26 - Questions for semi-structured interviews (source: author’s own)

- What is your relationship with the coastal area of the Pagasitikos Gulf?
- In your opinion, what are the main problems interesting the coastal area of the Pagasitikos Gulf? Indicate them with reference to your activity through some examples
- In your opinion, what are the main causes and related consequences (environmental, economic and social)?
- In your opinion, what could be the solutions?
- In your opinion, is the coastal area of the Pagasitikos Gulf well managed? Why? With reference to specific examples

- In your opinion, what could be a good way to build a coastal management in the Pagasitikos Gulf? How would you implement it? Which competences, kind of people etc. would you involve? Which tools would you use?
- What is in your opinion “integrated coastal management”?
- In your opinion, is it important to actively involve the local society in coastal management? Why? Examples
- What could it be a good way to actively involve the local society in coastal management? Example

Once the topics of the interviews and the questions have been defined, the actors have been determined and chosen (Table 27).

In order to identify the actors, three categories have been identified:

- 1) policy makers;
- 2) stakeholder;
- 3) experts.

Representatives of policy makers have been selected considering all the existing government levels: regional, prefectural and municipal.

Representatives of stakeholders have been selected considering all the realities present in the coastal area of the Pagasitikos Gulf (local associations and economic sector).

Experts have been selected from the world of academia and research institutes.

Table 27 - Selected actors for the analysis (source: author’s own)

Institution	Position	Category
Thessaly Region	Vice Governor	Policy maker
Magnesia Prefecture – Technical Chamber	President of Technical	Policy maker
Municipality of Volos	General Director	Policy maker
Municipality of Almiros	Mayor	Policy maker

Municipality of South Pelion	Mayor	Policy maker
Port Authority	President	Stakeholder
Fishermen Association	Representative	Stakeholder
Hotel's Association of Magnesia	President	Stakeholder
Association of Architects of Magnesia	President	Stakeholder
Environmental Initiative of Magnesia	President	Stakeholder
Zoumbosub Diving Center	Owner	Stakeholder
Nautical tourism and sport association	President	Stakeholder
Institute of Research and Education for Sustainable Management (IRESM)	Chairman	Expert
University of Thessaly – Dpt. of Planning and Regional Development	Chairman	Expert
University of Thessaly- Dpt. of Ichthyology and Aquatic Environment	Post Doc Researcher	Expert

In February 2019, the semi-structured interviews have been conducted individually to the fifteen preselected actors. Since not all of the interviewees spoke English, the presence of a translator has been necessary.

The use of individual semi-structured interviews has been decided because it generally allows to gather information from individuals about their own practices, beliefs or opinions and to gather useful material and data (Harrell and Bradley, 2009).

Semi-structured interviews are characterized by standardized questions used as a guide, which means that the interview is perceived more as a conversation between two individuals, the interviewer and the interviewee. Thus, it is possible to deepen a topic and fully understand the answers provided (ibid.).

Once all interviews have been submitted, they have been processed dividing them in three groups: i) policy makers, ii) stakeholders and iii) experts.

After that, each group of answers has been summarized using collective fuzzy cognitive maps. Fuzzy cognitive maps allow to graphically represent relations between variables previously described by people (van Vliet, Kok and Veldkamp, 2010). The

name “fuzzy” derives from the fuzzy logic, “used to incorporate vague and qualitative knowledge” (ibid.: 6).

Fuzzy cognitive maps are represented as oriented graphs with feedbacks, which consist of nodes (or concepts, C_i), being the variables, and weighted arcs (or connections, W_i) (Fig. 50) (van Vliet, Kok and Veldkamp, 2010; Santoro et al., 2019). Furthermore, each node is related to the other in a positive or a negative way.

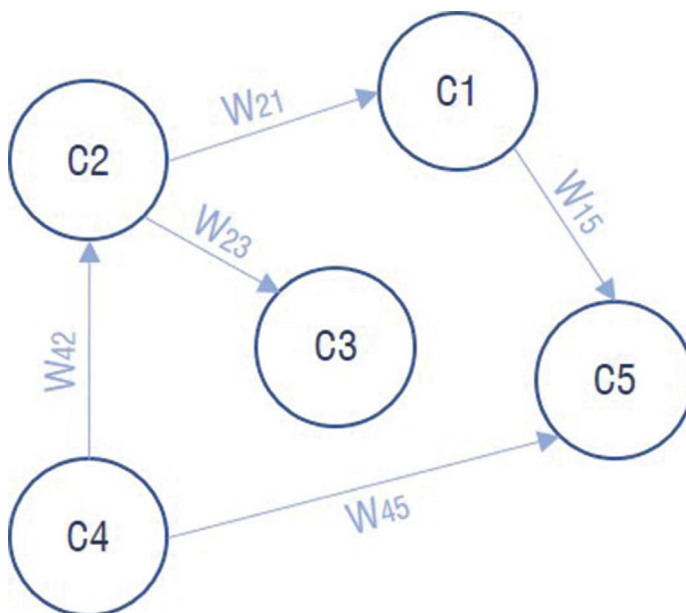


Fig. 50 - Example of fuzzy cognitive map (adapted from Santoro et al., 2019)

As a result of the interviews, three collective fuzzy cognitive maps have been built:

- 1) Policy maker fuzzy cognitive map (Fig. 51);
- 2) Stakeholder fuzzy cognitive map (Fig. 52);
- 3) Expert cognitive map (Fig. 53).

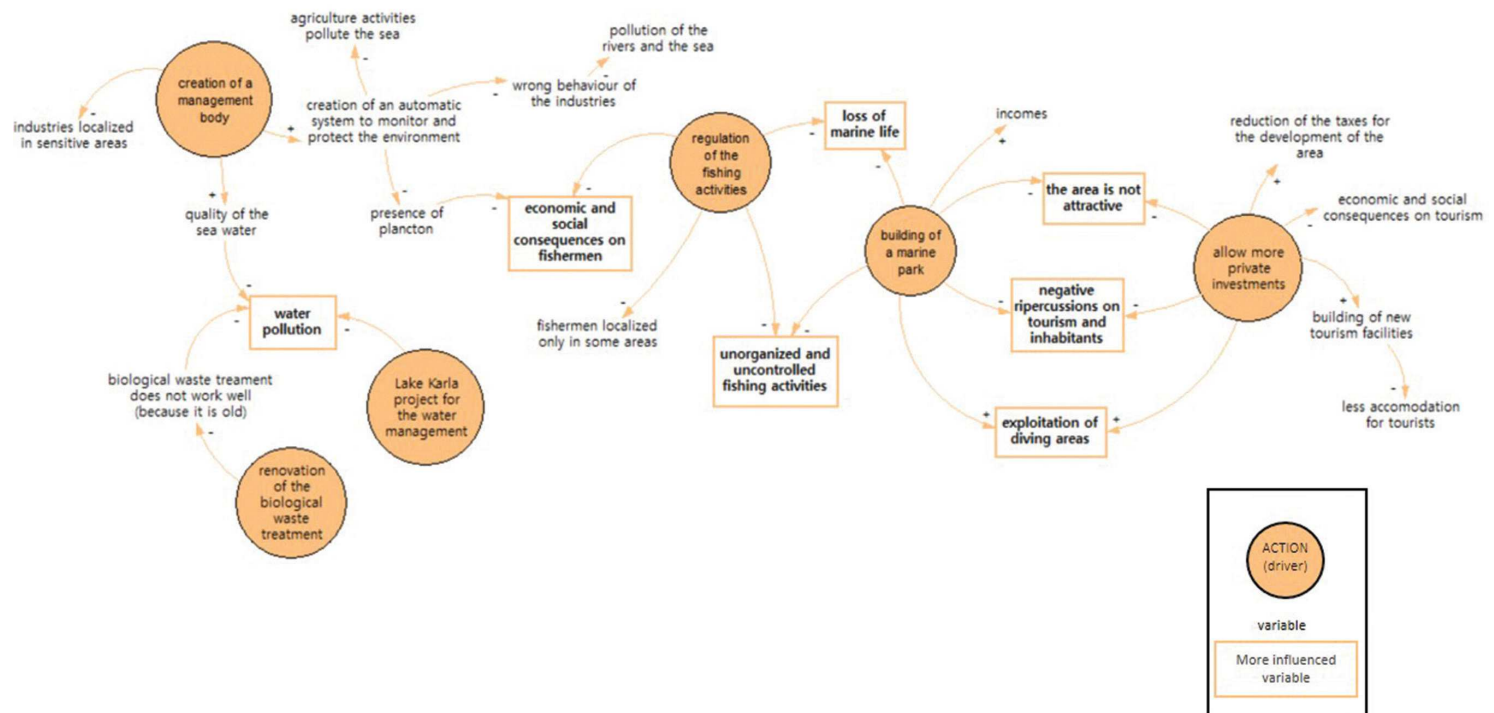
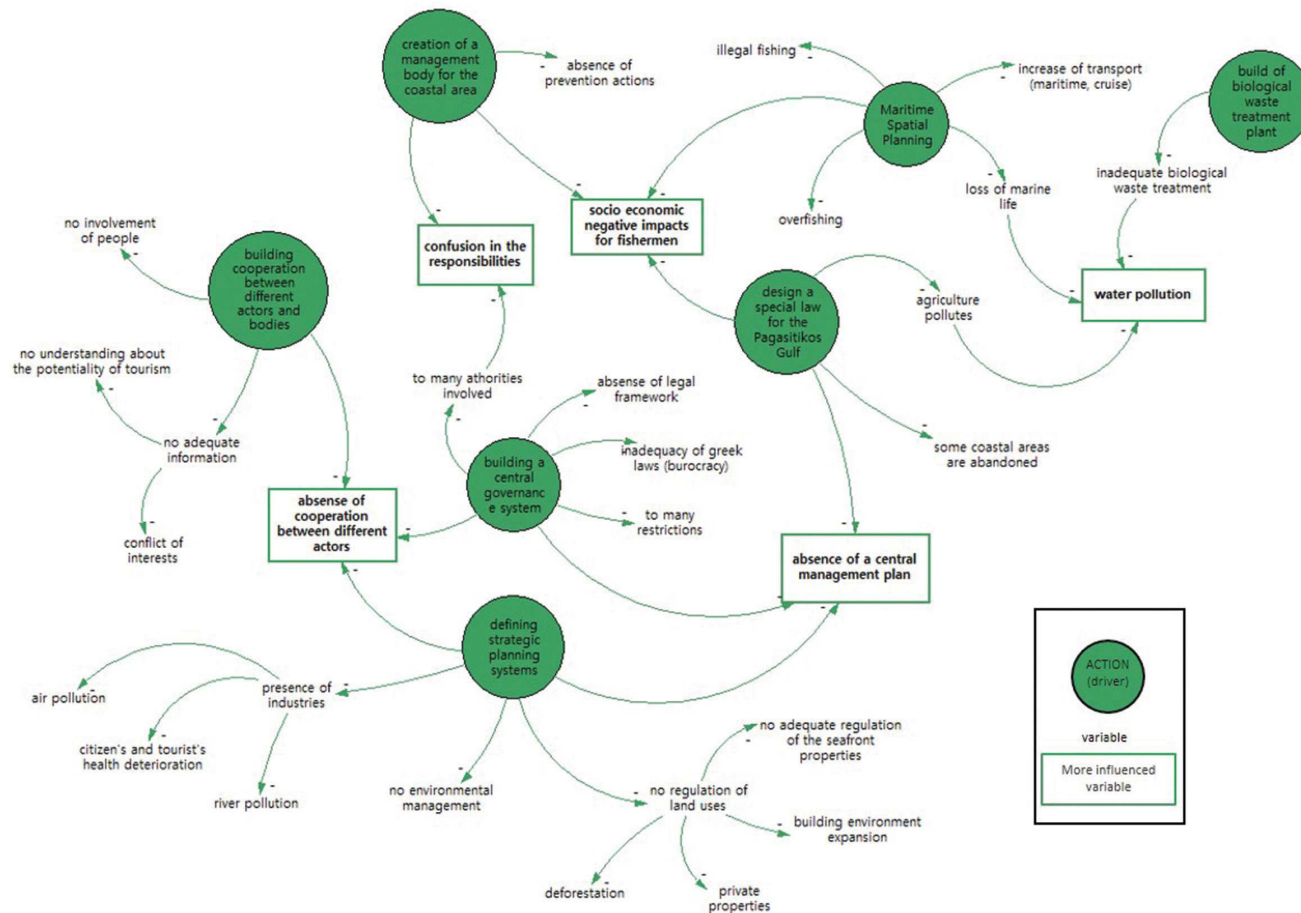


Fig. 51 - Collective policy maker fuzzy cognitive map resulting from the semi-structured interviews (source: author's own)

Fig. 52 - Collective Stakeholder fuzzy cognitive map resulting from the semi-structured interviews (source: author's own)



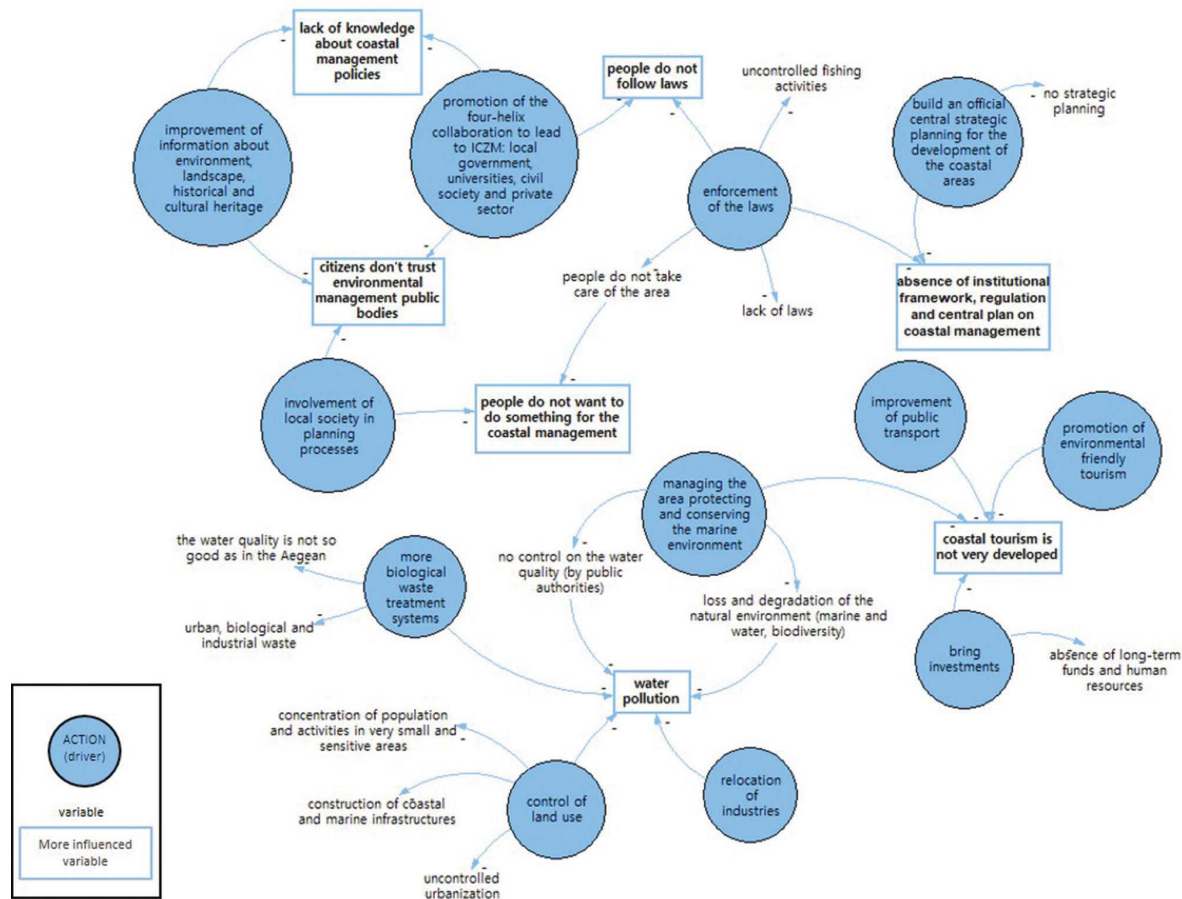


Fig. 53 - Collective experts fuzzy cognitive map resulting from the semi-structured interviews (source: author's own)

As possible to see in the three collective fuzzy cognitive maps, different shapes have been given to different elements. The circles identify the actions (drivers) that should be taken in order to improve the current situation. The black variables have been identified as the effects of the related actions. The variables in boxes are the more influenced variables. Furthermore, each variable is influenced by each action positively (+) or negatively (-).

Once the three collective fuzzy cognitive maps have been completed, the last phase of the iterative process has been carried on.

Thus, in June 2019, the fuzzy cognitive maps have been individually submitted to the same actors previously interviewed. Not all actors answer positively to the request of meeting them a second time. In the case of policy makers, some of them were not in charge anymore.

To each actor has been shown the map that referred to his category. At that point, the actor had to:

- validate the map;
- give weights of importance to the connections (not important, low importance, medium importance, high importance);
- draw new connections between the different elements if necessary.

The resulting fuzzy cognitive maps are shown in appendixes and discussed in the next paragraph.

5.7. Results

As possible to understand from this chapter, Greek coastal areas and the Pagasitikos Gulf are subjected to many pressures, coastal hazards and climate change impacts. Furthermore, as shown in Fig. 43, several are the coastal areas exposed to vulnerability to SLR.

The absence of a legal framework specifically for coastal areas has resulted in an increase of several problems, mostly deriving from anthropogenic factors (e.g. urbanization, pollution, eutrophication).

To help to solve this situation, literature focusing on public perception of risk in Greece as regards to climate change, stresses the importance of understanding people attitudes in order to design effective decision making processes, especially in complex systems such as coastal areas (Voskaki and Tsermenidis, 2015).

Thus, the results deriving from the analysis of the *experiential knowledge* in the Pagasitikos Gulf through the iterative process summarized in Fig. 49, allowed to identify:

- 1) the level of actor's perceptions about the problems of the coastal area of the Pagasitikos Gulf and the related risk factors;
- 2) the actions recognized by the actors as the best to solve the previously emerged problems and risk factors and to allow an effective integrated coastal management of the Pagasitikos Gulf.

The results are described following two main steps:

- 1) comparison of the three collective fuzzy cognitive maps in order to highlight similarities and differences among the different actor's categories perceptions;
- 2) comparison of the individual fuzzy cognitive maps submitted to the actors previously interviewed.

As a first phase, the three collective fuzzy cognitive maps have been compared in order to identify similarities and differences in the perceptions of the three categories of actors. It should be highlighted that policy makers, stakeholders and experts have different knowledge, interests and perception.

Firstly, it is important to understand if local actors perceive the problems of the coastal area of the Pagasitikos Gulf and the related risk factors.

In this sense, the perceived problems emerged from the three collective fuzzy cognitive maps are summarized as follows:

Table 28 - Perceived problems for the coastal area of the Pagasitikos Gulf (source: author's own)

PERCEIVED PROBLEMS	POLICY MAKERS	STAKEHOLDERS	EXPERTS
WATER POLLUTION	X	X	X
UNORGANIZED AND UNCONTROLLED FISHING ACTIVITIES	X	X	X
ABSENCE OF INSTITUTIONAL FRAMEWORK, REGULATION AND PLANS FOR COASTAL MANAGEMENT		X	X
UNCONTROLLED URBANIZATION		X	X
NO ADEQUATE REGULATIONS ON SEA FRONT PRIVATE PROPERTIES		X	X
WRONG LOCALIZATION OF INDUSTRIES	X		X

Two are the main problems perceived by all actors: i) water pollution and ii) unorganized and uncontrolled fishing activities.

Stakeholders seem to be more aware about some of the problems than policy makers. Instead, experts are the ones who have a slightly more complete view.

As evidenced by the graphic synthesis of the conceptual framework shown in Fig. 54, all actors consider the pollution of marine waters as a huge problem for the coastal area of the Gulf of Pagasitikos. However, they perceive this problem as being caused by different factors and processes.

In addition, the analysis clearly highlights that the actors, including experts, are not aware of the risks to particularly densely populated urban areas, where there is greater exposure to climate risks. They identify only the loss of marine life as a risk factor resulting from both uncontrolled fishing activities and water pollution. However, only experts grasp the significance of the impact of uncontrolled coastal urbanization on seawater pollution, and it is a controversial question whether this is related to inadequate land use regulation or to the lack of enforcement of the existing regulation.

Secondly, it is important to understand if the actors recognize some actions as necessary to solve the previously emerged problems and related risks and/or to allow an effective integrated coastal management of the Pagasitikos Gulf.

Two are the main actions recognized by all actors as the best to allow an effective inte-

grated coastal management of the Pagasitikos Gulf: i) strategic planning, laws enforcement & management body for the coastal area and ii) new biological waste treatment (Fig. 54).

Overall categories identified actions related to the necessity to enforce regulations in the uses and activities of the coastal area of the Pagasitikos. These actions concern aspects related to strategic planning, laws enforcement and/or management body building. From the analysis emerged a close relation between the actions and the willingness to overcome the problems perceived for the coastal area. As a matter of fact, as it is possible to notice from the graphic synthesis of the conceptual framework, many are the problems that could be solved through such kind of actions, although they are often understood as separate problems from each other.

The other common action highlighted is the necessity to build new biological waste treatment systems along the gulf because the current ones are old and inadequate. As a matter of fact, as well this action allows to obtain a reduction on water pollution.

As stated in paragraph 5.4, the Pagasitikos Gulf is influenced by the many uses and activities taking place in the area and that the quantities of polluted water discharged into the gulf waters due to industrial, domestic and agricultural activities causes several problems. As a matter of fact, what has emerged from the two joint actions identified by the actors can lead to the conclusion that policy makers, stakeholders and experts have a certain level of knowledge about the current situation of the coastal area of the Pagasitikos Gulf.

The second phase, the analysis in pairs, reveals that there are at least another two common points.

The first relates to the similarities of opinions between policy makers and experts. Both highlight the necessity of bringing more investments in order to better develop the touristic sector. They argue that the coastal area of the Pagasitikos Gulf is not attractive enough from the point of view of the beach tourism.

The second one relates to stakeholders and experts. In this case, they recognize the necessity to build cooperation between actors and bodies to enable people to be better informed about the policies and strategies that are being implemented for coastal area management. This would allow them to increase their level of knowledge of what is

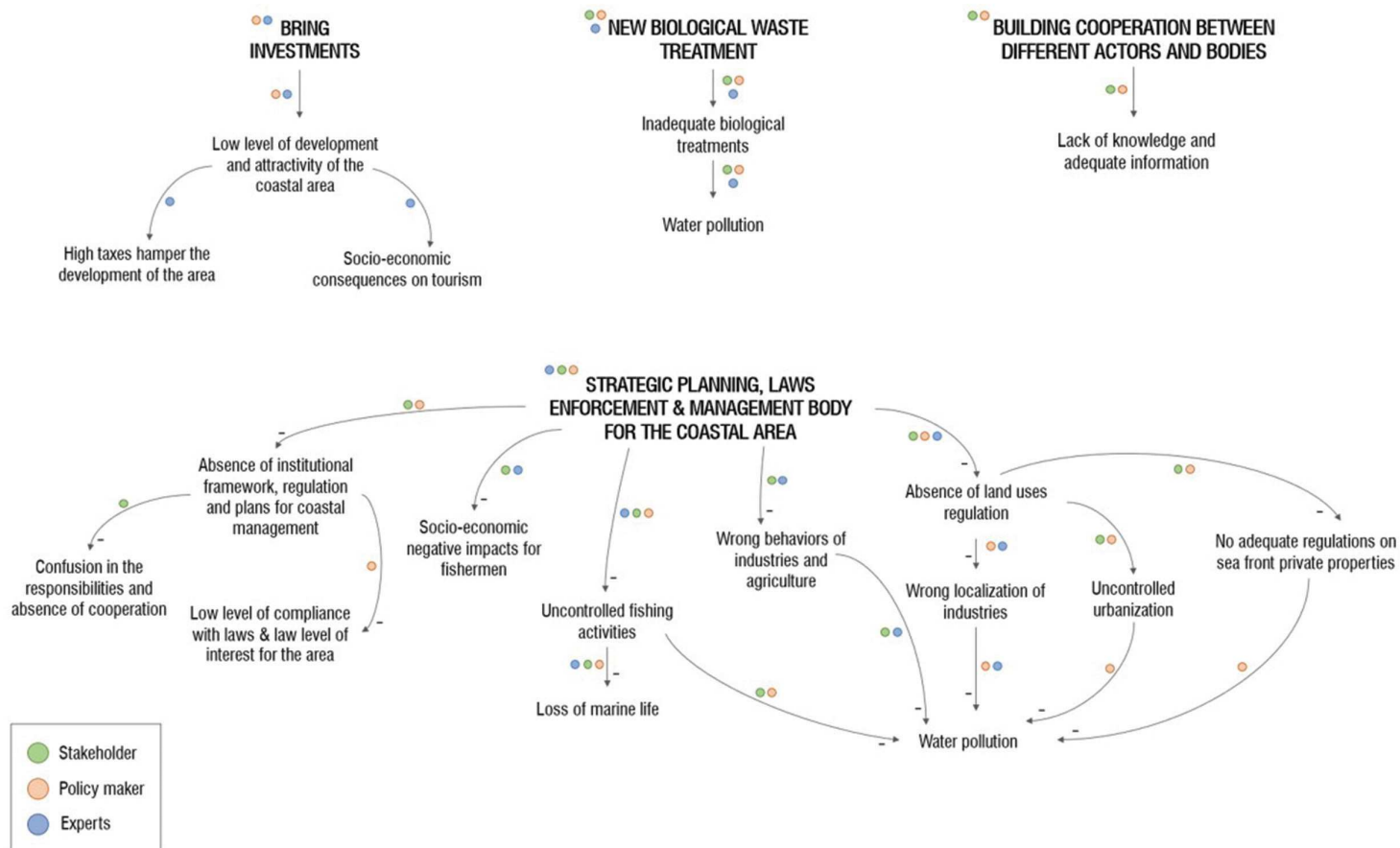


Fig. 54 - Graphic synthesis of the similarities identified from the analysis of the three collective fuzzy cognitive maps (source: author's own).

currently happening in the territory.

To conclude, it is possible to affirm that four are the main actions identified by the actors (Fig. 54) as necessary to reduce the negative effects on the coastal area of the Pagasitikos Gulf:

- 1) actions related to the enforcement of strategic planning, laws and management body;
- 2) the necessity to build a new biological waste treatment system;
- 3) the necessity to bring more investments for the development of beach tourism;
- 4) the necessity to build cooperation between actors and bodies.

Moving on to the differences emerged from the three maps, some aspects come out from policy makers and experts' collective fuzzy cognitive maps.

On the one hand, policy makers put the attention on some actions that relate to projects for which they are responsible (e.g. the Lake Karla project for water management and the Marine Park project).

The project "Recreation of Karla Lake" is considered as one of the largest environmental projects in the Balkans implemented by the Thessaly Region at Lake Karla (located in the Pelion Mountain), but it is not fully functional. It should completely replace the use of groundwater for irrigation with water coming from Lake Karla. It would enable the utilization of part of this groundwater for the supply of water to the city of Volos, which is currently facing a lack of high-quality water. Furthermore, the water coming from the river effluents will be collected in the lake, in order to reduce the pollution of marine waters.

The Marine Park project is a proposal of the Thessaly Region. The creation of this park should, on the one hand, safeguard and protect marine biodiversity and, on the other hand, improve the attractiveness of the area from the point of view of tourism. As it was possible to understand, the project was not implemented because it was blocked due to strong conflicts emerged between different local actors.

In the case of policy makers it emerged the knowledge that these actor's category has regarding some specific aspects.

On the other hand, experts were the only ones who stressed the importance of local society involvement in planning processes in order to help local society to trust more

on public bodies and to start taking care of the coastal area of the Pagasitikos Gulf. As a matter of fact, even if the three categories recognize the coastal area of the Pagasitikos Gulf as a fragile and sensitive territory, they do not perceive any related risk factor. Furthermore, it emerged that the actors are not aware about the complexity of this coastal system.

The next step consists in going deeper into the analysis of individual fuzzy cognitive maps submitted to the actors previously interviewed, considering one category at a time.

As shown in the Annexes, the collective accumulated experiences and knowledge of local actors, with causal relations among factors, characteristics and component constituting the coastal area of Pagasitikos Gulf, have been discussed with the actors. In this sense connections and concept have been confirmed, added or deleted. As previously mentioned, some of the policy makers were not in charge anymore because they were not reelected at the local political elections. It also happened that not all of them resulted available for the submission of the maps. Thus, it was possible to meet only one policy maker out of five. The map resulting from the submission to the policy maker (Annex 3) shows a general agreement on the original map structure. Furthermore, it is notable that there are some current problems that are perceived as more important in relation to others. Water pollution, socio-economic consequences for fishermen and negative repercussion on tourism and inhabitants could be reduced through the building of some specific actions. Moreover, as highlighted in the comparison of the three collective fuzzy cognitive maps, the two identified projects, in charge of policy makers, are perceived as the best actions to solve the perceived problems. However, as mentioned before, these projects are not yet operational.

Four out of seven stakeholders analyzed the collective fuzzy stakeholder map redesigning their own map (Annex 4.1, 4.2 and 4.3). All of them agree on the necessity to do something in order to build an effective coastal management.

Looking at the weights given to the connections, it emerged that all stakeholders generally agree on the problems and the causes represented in the collective map. As a matter of fact, they confirmed the aspects that they had already highlighted previously and agree with aspects they had not thought of before.

There is, however, an interesting aspect. On the one hand, stakeholders disagree on

the actions deemed necessary to solve the perceived problems. In particular, three out of four believe that “design a special law for the Pagasitikos Gulf” and “build a central governance system” are not necessary and that on the contrary they could worsen the current situation. On the other hand, they agree on two actions, “define strategic planning systems” and “create a management body for the coastal area”.

The collective expert fuzzy cognitive map has been submitted to two out of three experts. Both maps (Annex 5.1 and 5.2) show an agreement on the original map structure giving almost the same level of importance on the connections between the different aspects. Moreover, as stated also before, both experts stress the importance of local society involvement in planning processes and the improvement of information and collaboration in order to help local society to trust more on public bodies and to start to take care of the coastal area of the Pagasitikos Gulf.

Submitting the collective fuzzy cognitive maps to the individual actors allowed each actor to get to know the possibilities of action they hadn't thought of, interacting with the emerged knowledge and to open up new possible horizons.

Furthermore, the collective maps try to show the different visions that each actor has. Every actor did not know who had contributed to the collective map. In this sense, their visions can be considered as objective.

Generally, the submission of collective maps allowed to clarify the maps and to highlight and weight the perceived problems and the importance of possible actions.

Brief considerations can be made also on the relations between the roles played by the actors and the results emerged from the maps.

Firstly, stakeholder have demonstrated more disagreement than in the case of the other actor's categories. It should be considered that each stakeholder has his own interest in relation to his activity. In this sense, the evaluation of one action rather than another can be guided by his own interests.

Secondly, policy makers demonstrate a lack in political will because they focus on immediate and tangible actions rather than on Integrated Coastal Zone Management strategies.

Finally, experts show a more neutral and general vision, with high level of knowledge and particular attention on the importance of local society involvement in planning processes.

It is important to underline again that the coastal area of the Pagasitikos Gulf is considered as an area of medium vulnerability to SLR consisting of non-consolidated sediment deposits in areas with low altitude (Fig. 43). As already stated in the previous paragraphs, coastal morphology is an important factor in evaluating vulnerability of coastal areas to SLR because it is directly related to coastal erosion rate (Kontogianni et al., 2012). As a matter of fact, no erosion monitoring was carried out, but only an analysis of vulnerability to erosion based on the geomorphology of the coast.

The Pagasitikos Gulf is characterized by residential development of second homes located along the coastline. Furthermore, especially the eastern part of the Pagasitikos Gulf is characterized by beach tourism because of the presence of small beaches.

As stated in paragraph 5.4.1., the composition of all the pressures increase the stresses to coastal areas. Furthermore, climate change negative impacts, with SLR forecast, could increase even more the vulnerability of such areas.

The analysis of the experiential knowledge in the Pagasitikos gulf highlights that there is no awareness on the level of vulnerability of this territory. Furthermore, no perception of risks related to possible climate change consequences emerged.

Public perception and attitude do not always address climate change as the most important amongst other environmental issues or compared to socio-economic problems that Greece is currently facing. This seems to be consistent with the results from other research work that associates public perception with socio-economic conditions (Voskaki and Tsermenidis, 2015). Furthermore, they highlight that among the environmental issues, it appears that there is greater concern about water pollution and forest degradation, and limited attention to soil erosion and acid rain.

In order to allow to build an effective integrated zone management, social aspects should be taken into account. It is recognized that social aspects and the involvement of local society play a critical role in coastal management strategies (Jones et al., 2014; Halkos and Matsiori, 2017).

PART 3: CROSS-CASE CONSIDERATIONS

As possible to understand from the analysis of the two case studies, Margherita di Savoia and Pagasitikos Gulf are two different realities both experiencing high anthropogenic pressures and high level of coastal risks which increase their vulnerability.

The investigation of the experiential knowledge in both cases allows to point out some relevant aspects. They share a lack of awareness of the complexity of the problems and related risks despite their evidence, apart from the people directly affected by the phenomenon. This is because there is a gap between expert and experiential knowledge, due to inadequate communication between the two levels. From this evidence it emerges that the proximity factor plays a relevant role in the perception of the problems, and that there is a lack of awareness about issues which have been identified at global level as urgent and increasingly important to tackle, first and foremost about the negative impacts of climate change. Furthermore, often the knowledge about coastal areas situation is fragmented and also sectorial. In this sense, in Margherita di Savoia actors recognize coastal erosion as a problem for the territory but they do not recognize flooding as a problem even if it occurs in the coastal area. They are also not aware that engineering works can not only be ineffective but in certain circumstances also harmful, although it seems evident that the acceleration of the erosion (and advancement) of the coastline depends on the above mentioned works.

In the Pagasitikos Gulf actors perceive only marine water pollution as a problem for their territory, ignoring the vulnerability which characterize such coastal areas. This unawareness is most striking to the extent that actors are stakeholders whose economic activities are strongly impacted by such changes or policy makers who should put into practice measures to remedy or at least mitigate the problem.

Some considerations could be raised also analyzing the actions proposed by the actors of both case studies.

The actions can be grouped into four domains: i) planning, ii) technical, iii) economic and iv) policy making. They are summarized in Table 29.

Even though the domains are the same for Margherita di Savoia and Pagasitikos Gulf, the types of actions that the actors identified are different.

Table 29 - Action domains as identified by the actors (source: author's own)

Margherita di Savoia		Pagasitikos Gulf
Participation Adjustment of plans Simplification of procedures	<div data-bbox="833 337 1097 377">domains</div> PLANNING	Enforcement of regulations Enforcement of laws Enforcement of management body
Monitoring of activities Creation of SUAP	TECHNICAL	Waste treatment system Lake Karla Project Marine Park
Withdrawal of monopoly Access to EU funding Incentives for technology	ECONOMIC	Bring more investments
Action to amend EU Policies More delegates to municipalities Promote cooperation among local actors Initiatives for youth entrepreneurship	POLICY MAKING	Building cooperation between actors

The “planning domain” highlights that Margherita di Savoia would need participation within planning processes and adjustment of the existing plans and a general simplification of the procedures. In this sense, the actors have brought out the problem of complexity and fragmentation of the multi-level governance approach typical of the Italian institutional and policy-making system.

In Pagasitikos Gulf, laws and of management bodies as well as enforcement of regulations, would be needed, in order to fill two gaps which characterizes the Greek situation: on the one hand, the lack of some essential legislative and organizational instruments and, on the other, the difficulty of putting even the few existing rules into practice.

The “technical domain” shows that in Margherita di Savoia the actors see the need for monitoring the activities and creating new services in order to help the “planning domain” to work better. In the Pagasitikos Gulf, actors propose to design and build specific projects as the only technical way to solve problems. This suggests that the Italian actors have a wider vision compared with the Greece actors, which seems to have a more sectorial vision.

From the “economic domain” it is possible again to notice that in Pagasitikos Gulf the actors have a sectoral perspective because they only think about investments that should have been brought for touristic activities. Moreover, they find it difficult to imagine an economy other than the tourist monoculture economy. Thus, it reflects the fragility of the Greek economic system, which is largely dependent on tourism (WTTC, 2019). It should not be forgotten that in 2016 the number of people employed in the tourism industry out of the total non-financial business economy, while represented on average 9% among the EU Member States, was much higher in Greece at 23.9% (i.e. almost one in four people employed in the sector) (Eurostat, 2016).

On the contrary, in Margherita di Savoia the actors identify actions related to more general aspects, such as more access to EU funding and incentives for technology.

The “policy making domain” shows that actors of both case studies have identified cooperation among local actors as a good solution to overcome the emerged problems. In Margherita, it emerged also the necessity to enlarging and strengthening the delegation of powers to municipalities, more actions to change EU policies and initiatives for young people. Once again, the complexity and fragmentation of the multi-level governance approach typical of the Italian institutional and policy-making system is highlighted.

These cross-case considerations led to stress the fact that the social perceptions of risks not necessarily correspond to the expert, measured, 'objective' assessment. In this sense, as literature highlights (Kontogianni et al., 2012; van der Molen et al., 2015; IRGC, 2017), risk assessment, to be considered as an essential component for effective decision-making, must also be conducted at two levels, i.e. technical and social level.

CONCLUSIONS

In almost forty years several are the events occurred and the international, European and national agreements signed for the spreading of Integrated Coastal Zone Management. Furthermore, several are the scientific researches and official documents demonstrating that huge are the problems and related risks, exacerbated by climate change, which cause negative impacts on coastal areas and increase their vulnerability.

It is largely recognized that the production of shared knowledge on phenomena, processes and related risks would help to define appropriate forms of coastal zone management. As a matter of fact, this thesis investigated different dimensions of experiential knowledge using different methods, in order to try to understand some reasons behind the difficulties of implementing Integrated Coastal Zone Management in coastal areas.

The analysis shows a general lack of awareness of the complexity of the problems and related risks despite their evidence. This may be associated to the presence of a gap between expert and experiential knowledge, due to inadequate communication between these two levels.

Certainly, the involvement of different actors allows to enhance the level of knowledge under certain conditions, which sometimes seem to be overlooked by literature, which neglects some important aspects. In this sense, there is the need to break down the existing wall between science and society, through non episodic interactions, joint work, and therefore a lot of time. A continuous interaction among different actors is also needed to build and increase shared knowledge because it would allow to create the basis for a management of coastal areas more sensitive to the protection of the complex marine-coastal ecological system, and thus to avoid the onset of conflicts.

This situation emerged both from the use of cognitive maps as a tool for soliciting reflection on the beliefs of actors in the Pagasitikos Gulf case study, and from the interactions solicited by the Scenario Workshop in Margherita di Savoia.

However, it should be noted that the proposed approach has limits for an effective analysis of experiential knowledge and even more for the use of experiential knowledge in the integrated management of coastal areas. Even though the actors involved in the analysis are supposed to be representatives of specific whole categories, often they bring into play knowledge that essentially reflects their specific visions if not their own

interests. In this sense, the knowledge that emerges from this involvement, which many official documents on ICZM and even part of the scientific literature on this issue imagine can account - if properly selected and sufficiently representative – for the universe of interests of categories ‘that have a stake in the problem’, cannot be taken for granted because stakeholders may be not naive and neutral. For this reason, carefulness is necessary in the treatment of stakeholders knowledge. Furthermore, only some insights could be given because the involvement of stakeholders and local society into planning processes requires long time.

The objectives supported by international bodies to raise social awareness about the risks affecting coastal areas, and the participation of stakeholders in Integrated Coastal Zone Management, do not only involve the knowledge dimension, on which the thesis is focused. They also bring into play other relevant dimensions, as singles out by Puente-Rodríguez (2014): the power dimension, defined as the control or influence capacities of actors within the decision-making process and the nature dimension, which concerns the different understandings or visions held by human actors about nature, which deserve to be thoroughly investigated in future research.

Furthermore, there may be other insights for future research perspectives.

Firstly, the results of the empirical analysis should be examined to highlight the key issues on which to focus in order to increase collective knowledge and awareness of the risks of coastal erosion. Then, the investigation on the perception of risk should be deepened, in order to grasp substantial differences among social, economic and institutional actors (local inhabitants, beach managers, decision makers, etc.). These results should be submitted to the actors involved to promote self-reflection on what they have brought to the fore. Furthermore, they should be also used as a starting point to promote initiatives aiming at increasing actors’ level of knowledge and awareness.

The organization of focus groups with specific categories of actors, such as beach managers, would help to make them think about some aspects related to coastal risks that might affect them in the near future, and become more aware of the risks arising to their own activities from behaviors focused essentially on their own short-term interests and also to prevent a representative from speaking for the whole category. Moreover, organizing visits to the coastal areas for the public with the presence of experts would allow to increase the collective knowledge and awareness of the risks of coastal ero-

sion. Considering the involvement of experts is crucial in order to raise social awareness about problems of coastal risk. This research highlighted their awareness of the perverse effects caused by engineering methods based on public works traditionally used to protect coastal areas from risk of erosion and flooding, and thus has made it clear that their knowledge can be essential to induce policy makers to radically change the well-established approach based on the public works practices. This change, however, is not easy because public works implementation mobilizes financial resources and creates jobs in the building sector, and therefore brings benefits in terms of political consensus in a fairly short time.

As highlighted, experiential knowledge plays a key role in the proper model of governance of risk, which is able to frame, assess, evaluate, manage and communicate risk issues. Therefore a relevant aspect concerns the importance of the cross-cutting aspects, in particular communication and stakeholder engagement, which brings back to the importance to integrate experiential knowledge into risk governance approaches, both in risk assessment and risk management (IRGC, 2017).

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ANNEXES

ANNEX 1

QUESTIONNAIRE ON THE PERCEPTION OF THE RISK OF COASTAL EROSION

Data dell'intervista*: _____

Località di realizzazione dell'intervista*: _____

Stabilimento balneare*: _____

***le domande con asterisco sono obbligatorie**

Sezione 1 - Abitudini dell'intervistato e frequenza della spiaggia

1. Preferisce la spiaggia:

1. In sabbia 2. In ciottoli

2. E' la prima volta/ il primo anno che viene in questa zona? *

1. Sì (*andare a domanda 4*)
2. No, la frequento di tanto in tanto (*andare a domanda 3*)
3. No, la frequento abitualmente (*andare a domanda 3*)

3. Da quanti anni frequenta questa zona?

1. Meno di 5 anni 2. Più di 5 anni

Sezione 2 – Aspettative e giudizio sulla spiaggia

4. Pensando a livello generale ad una spiaggia, quanto sono importanti per Lei i seguenti aspetti?

Li ordini da 1 a 5, dove 1= più importante e 5=meno importante

A. Pulizia del mare e della spiaggia
B. Bellezza del panorama / del paesaggio
C. Ampiezza della spiaggia
D. Grado di affollamento della spiaggia
E. Presenza di servizi (e.g. ombrelloni, musica, bar, bagnino, ecc.)

5. Pensi a questa zona. Rispetto agli scorsi anni, come ritiene siano cambiati i seguenti aspetti?

(NB: domanda da NON porre a chi nella domanda 2 ha dichiarato di frequentare la zona per il primo anno)

A. Pulizia del mare e della spiaggia
B. Bellezza del panorama / del paesaggio
C. Ampiezza della spiaggia
D. Grado di affollamento della spiaggia
E. Presenza di servizi (e.g. ombrelloni, musica, bar, bagnino, ecc.)

Sezione 3 – CONOSCENZA DEL FENOMENO DELL'EROSIONE COSTIERA

6. Guardi quest'immagine. Mi saprebbe dire da dove inizia a dove finisce la spiaggia? *

- | | | |
|--------------------|--------------------|--------------------|
| 1. Solo il punto A | 2. Solo il punto B | 3. Solo il punto C |
| 4. Solo il punto D | | |
| 5. Da A a B | 6. Da A a C | 7. Da A a D |
| 8. Da B a C | 9. Da B a D | |
| 10. Da C a D | | |

7. Ha mai sentito parlare del fenomeno dell' "erosione costiera"?

1. No (*spiegare che è la riduzione dell'ampiezza della spiaggia*)
2. Sì

8. Secondo Lei, l'erosione costiera è un fenomeno che riguarda: *

(domanda con possibilità di risposta multipla)

- | | | |
|-------------------|------------|------------------------------|
| 1. Il bagnasciuga | 2. Le dune | 3. La profondità del fondale |
|-------------------|------------|------------------------------|

9. Secondo Lei l'erosione costiera è determinata prevalentemente da: *

- | | |
|---|----------------------------|
| 1. Le caratteristiche naturali della spiaggia | 2. I cambiamenti climatici |
| 3. Gli interventi dell'uomo sull'entroterra dell'uomo sulla costa | 4. Gli interventi |
| 5. Il comportamento scorretto delle persone | 6. Non so |

10. Secondo Lei, l'erosione costiera è un fenomeno circoscritto a: *

1. La località in cui ci troviamo 2. La Puglia 3. L'Italia
4. Il pianeta

11. Secondo Lei su cosa impatta maggiormente il fenomeno dell'erosione costiera? *

1. Ambiente naturale 2. Attività economiche (e.g. turismo, pesca, commercio, ecc.)
3. Sicurezza delle persone 4. Strade, case e tutto ciò che è vicino al mare

12. Quale delle seguenti tecniche di difesa dall'erosione costiera ritiene più efficace?

1. Non fare niente 2. Pennelli 3. Sco-
gliere e frangiflutti
4. Aggiungere sabbia alla spiaggia 5. Dipende dalla situazione 6. Non so

13. Secondo Lei i sistemi di difesa dall'erosione costiera impattano: *
(domanda con possibilità di risposta multipla)

1. Solo sulla spiaggia 2. Sulla qualità dell'acqua 3. Sul paesaggio
4. Su flora e fauna

Sezione 4 – Profilo socio-demografico dell'intervistato

14. Genere (non chiedere) *

1. Uomo 2. Donna

15. Anno di nascita: _____

16. In quale Comune vive? _____

17. Titolo di studio: *

1. Nessuno 2. Licenza elementare 3. Licenza media
4. Diploma
5. Laurea (specificare se: ☐ in discipline scientifico/tecniche
☐ in discipline umanistiche
☐ in discipline economico-giuridiche

18. Eventuali note e/o commenti

ANNEX 2

QUESTIONNAIRE ON THE PERCEPTION OF THE RISK OF COASTAL EROSION - FOR BEACH MANAGERS

Data dell'intervista*:

Luogo di realizzazione dell'intervista*:

Sezione 1 – IL GIUDIZIO SULLA SPIAGGIA

19. Pensi a questa spiaggia. Rispetto agli scorsi anni, come ritiene siano cambiati i seguenti aspetti?

	Ce n'è di meno (Peggiorata)	E' Stabile	Ce n'è di più (Migliorata)
F. Pulizia del mare e della spiaggia	°	°	°
G. Bellezza del panorama / del paesaggio	°	°	°
H. Ampiezza della spiaggia	°	°	°
I. Grado di affollamento della spiaggia	°	°	°

20. Ha detto che l'ampiezza della spiaggia è [dire "peggiorata" – "rimasta stabile" o "migliorata" sulla base della risposta data alla domanda precedente]. Da cosa lo deduce? *

1. Numero di file di ombrelloni
2. Comparsa di scogliere frangiflutti e altre opere di difesa
3. E' evidente a vista d'occhio

Sezione 2 – CONOSCENZA DEL FENOMENO DELL'EROSIONE COSTIERA

21. Secondo Lei, l'erosione costiera è un fenomeno che riguarda*:

(domanda con possibilità di risposta multipla)

2. Il bagnasciuga del fondale
2. Le dune
3. La profondità

22. Secondo Lei l'erosione costiera è determinata prevalentemente da*:

1. Le caratteristiche naturali della spiaggia
2. I cambiamenti climatici
3. Gli interventi dell'uomo sull'entroterra dell'uomo sulla costa
4. Gli interventi
5. Il comportamento scorretto delle persone
6. Non so

23. Secondo Lei, l'erosione costiera è un fenomeno circoscritto a*:

- | | | |
|-----------------------------------|--------------|-------------|
| 1. La località in cui ci troviamo | 2. La Puglia | 3. L'Italia |
| 4. Il pianeta | | |

24. Secondo Lei su cosa impatta maggiormente il fenomeno dell'erosione costiera?*

- | | |
|----------------------------|---|
| 1. Ambiente naturale | 2. Attività economiche (e.g. turismo, pesca, commercio, ecc.) |
| 3. Sicurezza delle persone | 4. Strade, case e tutto ciò che è vicino al mare |

25. Quale delle seguenti tecniche di difesa dall'erosione costiera ritiene più efficace?

- | | | |
|------------------------------------|-----------------------------|-----------------------------|
| 1. Non fare niente | 2. Pennelli | 3. Scogliere e frangiflutti |
| 4. Aggiungere sabbia alla spiaggia | 5. Dipende dalla situazione | 6. Non so |

26. Secondo Lei i sistemi di difesa dall'erosione costiera impattano: *

(NB: domanda con possibilità di risposta multipla)

- | | | |
|------------------------|-----------------------------|------------------|
| 1. Solo sulla spiaggia | 2. Sulla qualità dell'acqua | 3. Sul paesaggio |
| 4. Su flora e fauna | | |

27. Su questa spiaggia eseguirebbe interventi di difesa dall'erosione costiera? *

- | | |
|--------------------------------------|--------------------------------------|
| 1. No (<i>andare a domanda 11</i>) | 2. Sì (<i>andare a domanda 10</i>) |
|--------------------------------------|--------------------------------------|

28. Quale/i adotterebbe? (domanda con possibilità di risposta multipla)

- | | | |
|-------------|-----------------------------|------------------------------------|
| 1. Pennelli | 2. Scogliere e frangiflutti | 3. Aggiungere sabbia alla spiaggia |
|-------------|-----------------------------|------------------------------------|

29. Parliamo a livello generale. Secondo Lei la tutela e la cura di una spiaggia dipendono prevalentemente dal comportamento di: (*massimo due risposte*) *

- | | | |
|--|---------------|-------------------------|
| 1. Il Comune | 2. La Regione | 3. La guardia forestale |
| 4. I titolari di stabilimenti balneari | | |
| 5. Gli operatori economici in generale (e.g. titolari strutture ricettive, attività commerciali, ecc.) | | |
| 6. Gli utilizzatori della spiaggia | | |

30. Sarebbe interessato a partecipare ad un incontro, che si terrà dopo la chiusura della stagione estiva, con altri operatori balneari e tecnici per discutere la questione dell'erosione costiera? *

1. No
2. Sì (farsi lasciare, in modo che possiamo avvisarlo/a su quando e dove sarà organizzato l'incontro:
- Nome e cognome _____
- Numero di telefono _____
- Email _____

Sezione 4 – PROFILO SOCIO-DEMOGRAFICO DELL'INTERVISTATO

31. Genere (*non chiedere*)

- 1.Uomo 2.Donna

32. Età:

1. 18-24 anni 2. 25-34anni 3. 35-44 anni 4. 45-54
anni
5. 55 – 64 anni 6. 65 anni e oltre

33. Da quanti anni gestisce lo stabilimento su questa spiaggia? *

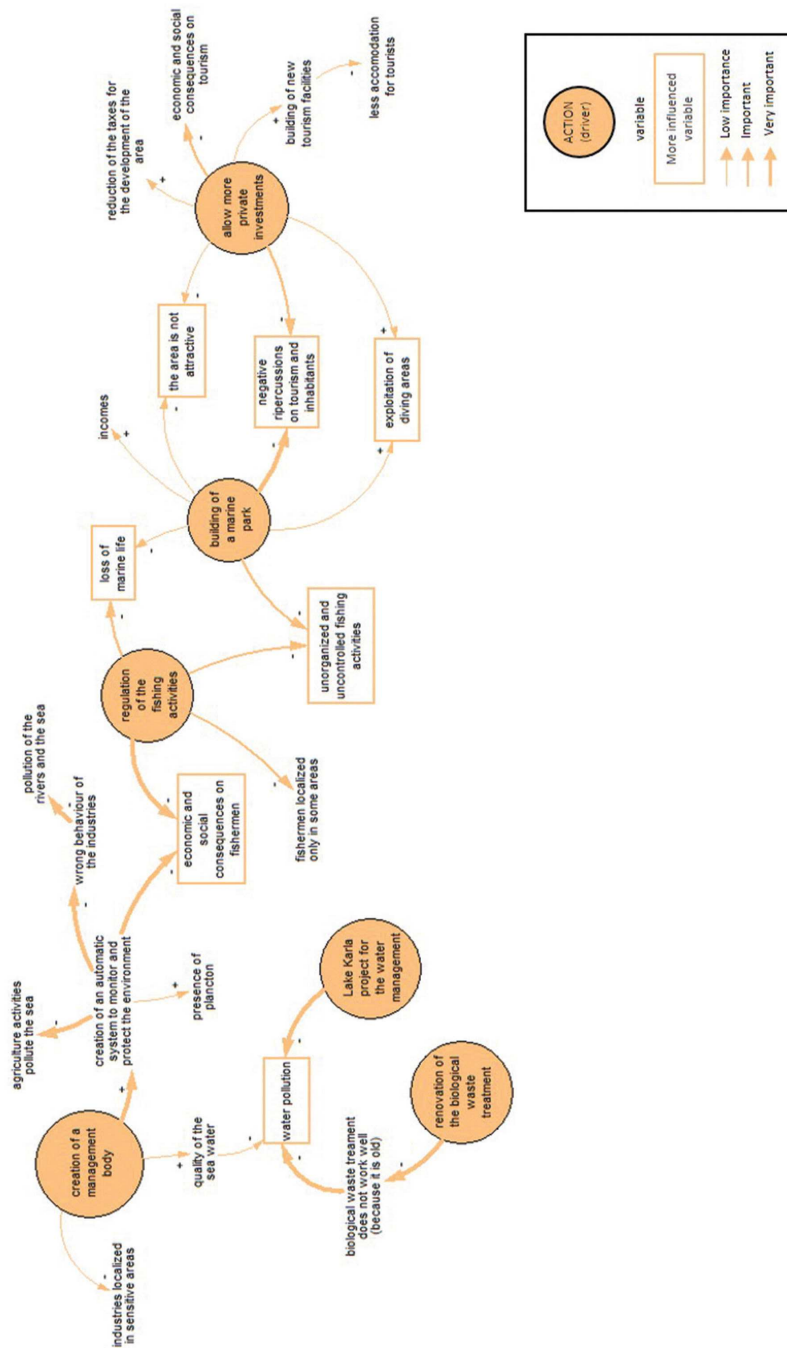
- 1.Meno di 5 anni 2. Più di 5 anni

34. Titolo di studio: *

1. Nessuno 2. Licenza elementare 3. Licenza media
4. Diploma 5. Laurea (specificare se: in discipline scientifico/tecniche
in discipline umanistiche
in discipline economico-giuridiche)

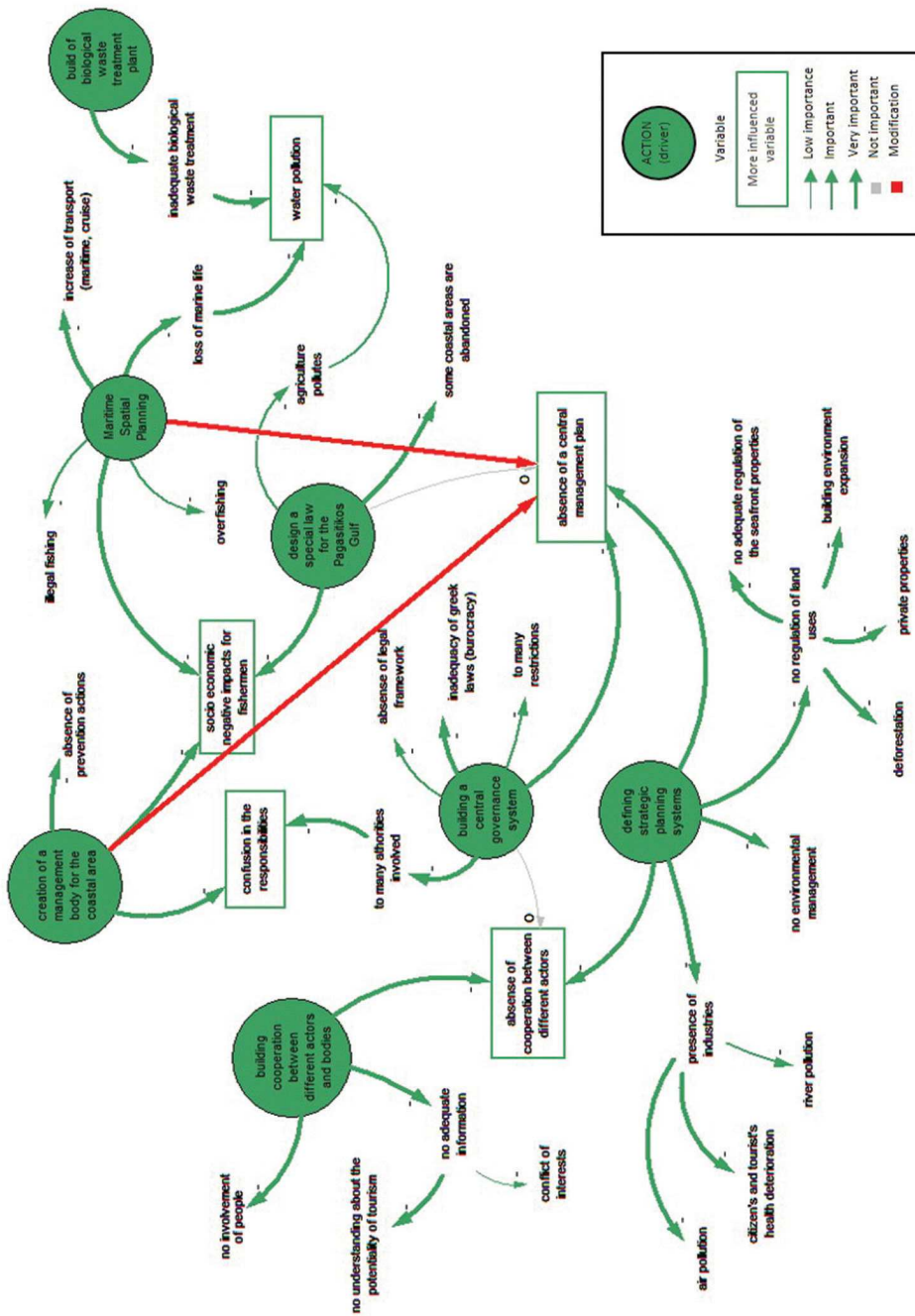
35. Eventuali note e/o commenti

ANNEX 3 **INDIVIDUAL POLICY MAKER FUZZY COGNITIVE MAP**

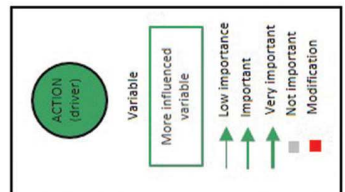


ANNEX 4.1

INDIVIDUAL STAKEHOLDER FUZZY COGNITIVE MAP

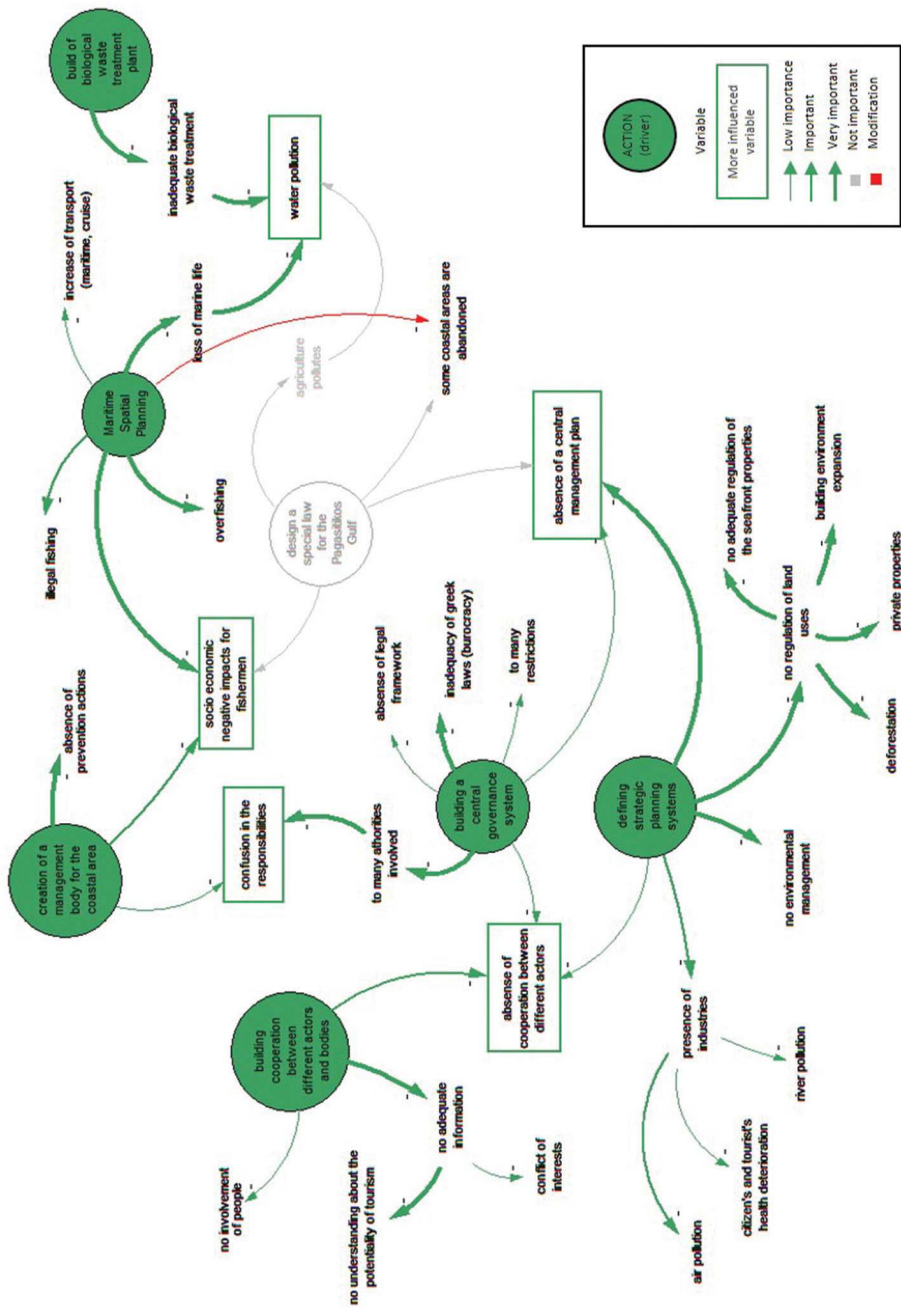


ANNEX 4.2



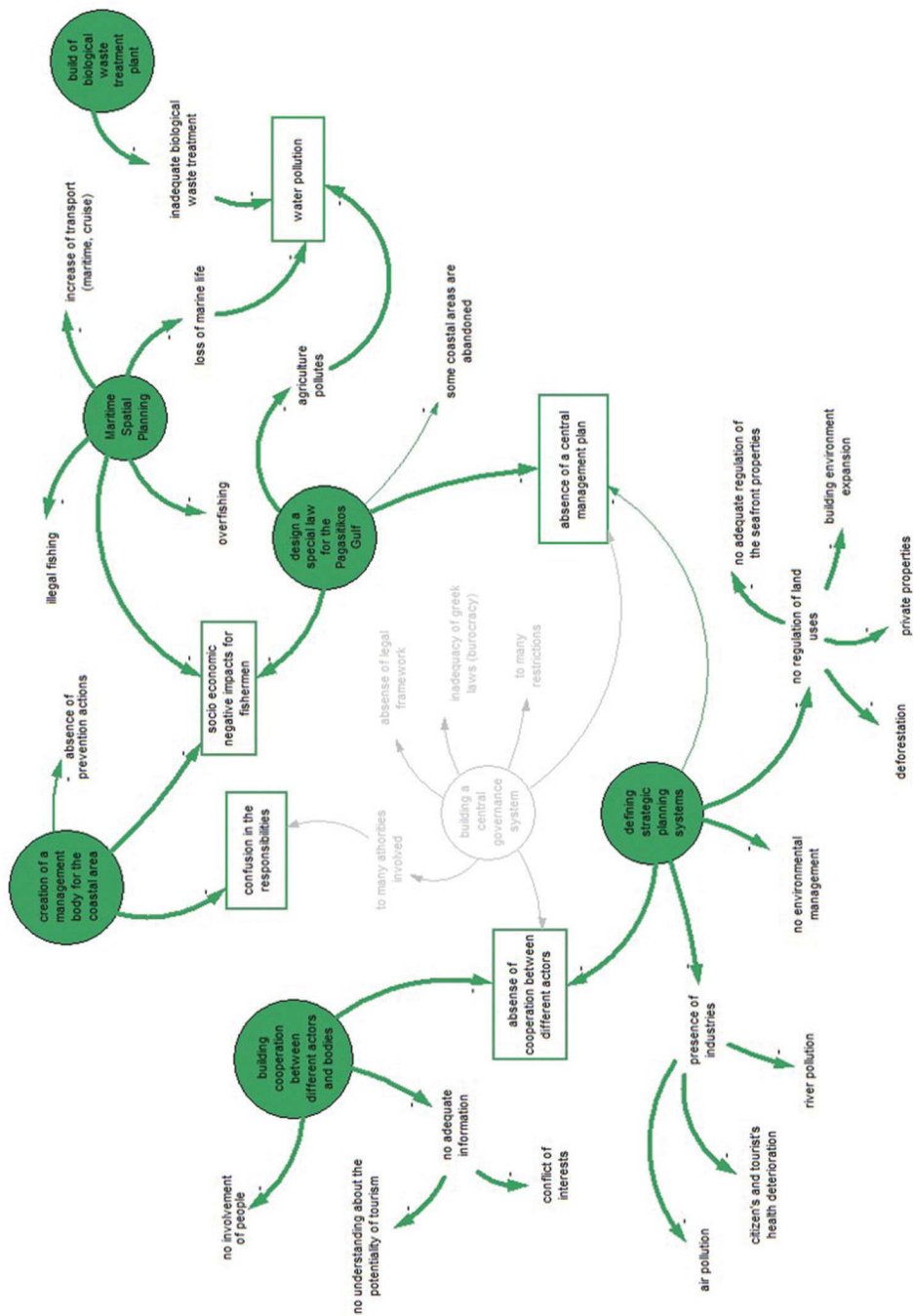
ANNEX 4.3

INDIVIDUAL STAKEHOLDER FUZZY COGNITIVE MAP



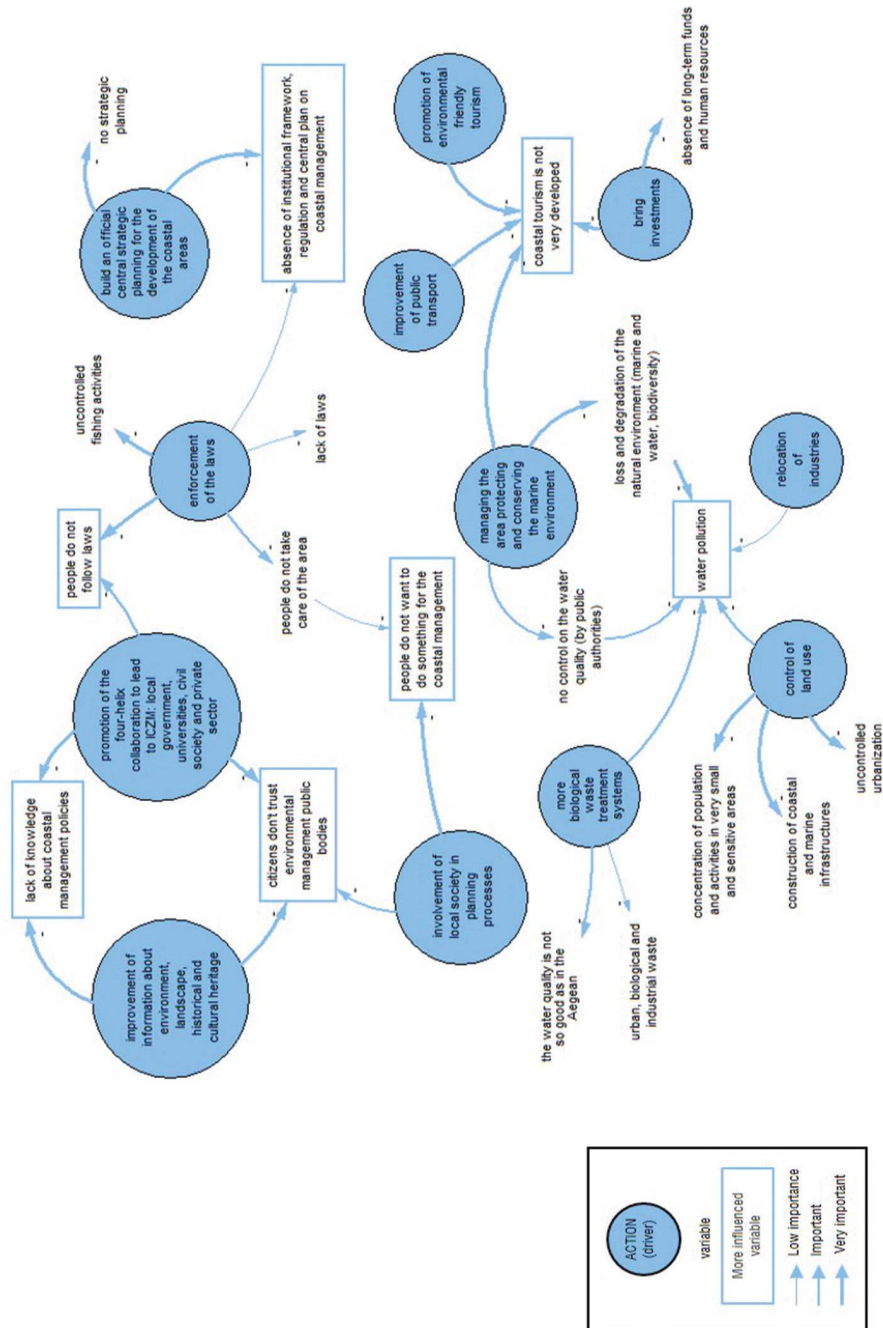
ANNEX 4.4

INDIVIDUAL STAKEHOLDER FUZZY COGNITIVE MAP



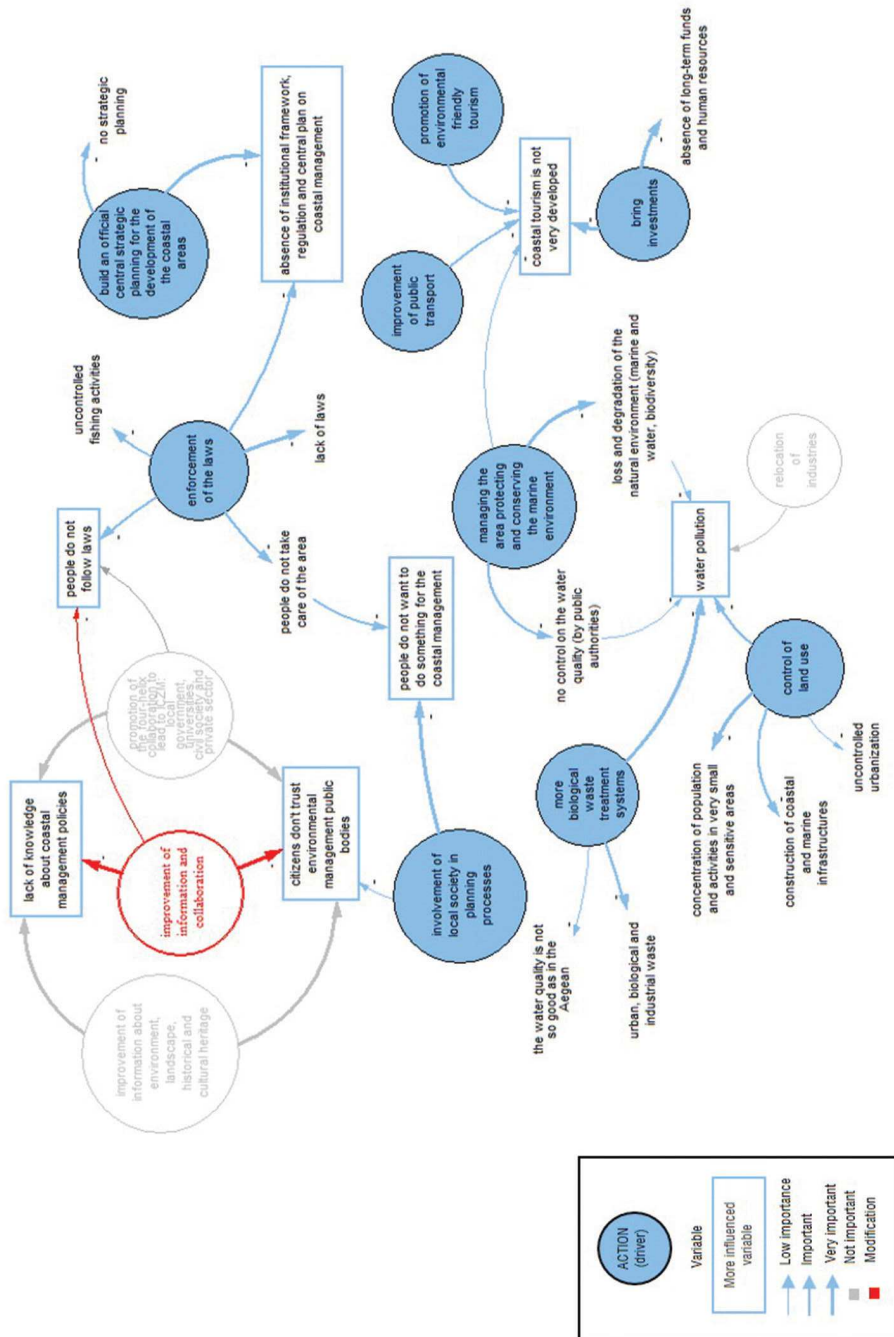
ANNEX 5.1

INDIVIDUAL EXPERT FUZZY COGNITIVE MAP



ANNEX 5.2

INDIVIDUAL EXPERT FUZZY COGNITIVE MAP



SHORT CURRICULUM VITAE

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SKILLS

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Italian: mother tongue
English: very good
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Team working

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Data analysis

Microsoft Office: very good
ArcGis: good
QGis: good
Photoshop: very good
InDesign: good
Mental Modeler: good
Vensim: basic

EDUCATION

Università luav di Venezia

2012 - 2015

MSc in Planning and Policies for cities, environment and landscape

Thesis "The cultures of living with water, from historical heritage towards climate change adaptation. A comparative analysis between Hamburg and the Venetian Lagoon", Supervisors: Elena Gissi, PhD; Federica Appiotti, PhD

Università luav di Venezia

2009 - 2012

BSc in Urban and Regional Planning

Thesis "The city and the historical-cultural route Via Francigena: the case study of Vercelli", Supervisor: Prof. Virginio Bettini

PROFESSIONAL EXPERIENCES

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Title: The perception of risk in the coastal environment - STIMARE project

Scientific fields: ICAR/02 – Hydraulic and marine constructions and hydrology; ICAR/20 – Urban Planning

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Scientific field: ICAR/20 – Urban Planning

Scientific responsible: Elena Gissi, PhD

SCIENTIFIC PUBLICATIONS

Fedele V., **Motta Zanin G.**, Parisi A., Totaro V., (2019) The complexity of risk in urban environment and the role of technological innovation. IEEE SMC2019, DOI: 10.1109/SMC.2019.8914640

Motta Zanin G., Santoro S., (2018) Integrating Participatory Modelling in Risk management. Tema. Journal of Land Use, Mobility and Environment. ISBN: 978-88-6887-048-5, DOI: 10.6093/978-88-6887-048-5

Motta Zanin G. (2017) Adaptive tourism management in coastal systems: how to integrate risk management in adaptive planning processes. In Michele Talia (ed.), Un futuro affidabile per la città. Apertura al cambiamento e rischio accettabile nel governo del territorio. p. 122-124, Roma/Milano: Planum publisher, ISBN: 9788899237097

	<p>Abstract</p> <p>Coastal systems are subject to the complexity of socio-economic and environmental problems included in the general concept of “coastal risks”, intensified by the negative impacts of climate change, and often also by incorrect engineering works and management practices. Furthermore, these systems are prone to tensions and conflicts between different actors with contrasting interests in such territories. For this reason, there is the necessity to give articulated answers to deal with the complexity of coastal systems. It is widely recognized that the traditional coastal management policies, based on hard approaches, are unsuccessful. The failure of these methods in dealing with coastal risks requires not only a deep understanding of the main physical phenomena to be addressed, but also acknowledgment about stakeholders’ and local communities’ knowledge, role, objectives, interdependencies and network of interactions. In line with this, the international scientific as well as policy debate has developed on the design and the implementation of a new approach to the use and management of coastal areas, the Integrated Coastal Zone Management (ICZM). In this sense, the Mediterranean Countries have begun to collaborate and take measures to better manage their coastal areas. However, the fragmented mosaic of legal and regulatory regimes, land rights, institutional structures and administrative cultures has created a legal-institutional gap in Mediterranean coastline management, reflect delays in the ratification of the Protocol on ICZM in the Mediterranean. Thus, this thesis tried to understand, with reference to two selected Mediterranean case-studies, in Italy and in Greece, some reasons behind the difficulties of implementing ICZM. Each case-study was investigated using different approaches according to the different contexts, with the common aim of understanding to what extent and how the risks affecting coastal areas were perceived by the different stakeholders and the public at large. The analysis highlights a general lack of awareness of the complexity of the problems and related risks despite their evidence. This limit can be overcome through the involvement of different actors and through a continuous interaction between them to build and increase shared knowledge. However, it should be aware of the intrinsic limits of the so-called ‘participatory approaches’ for an effective analysis of experiential knowledge and even more for the use of experiential knowledge in the integrated management of coastal areas.</p>		
		Cover by Chiara Costantini	