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The Structural Plan's sustainability in coastal areas. A case study in the Tyrrhenian coast of Calabria

Lucia Chieffallo ^{a*}, Annunziata Palermo ^b, Maria Francesca Viapiana ^c

^a Department of Civil Engineering
University of Calabria, Arcavacata di Rende (CS), Italy
e-mail: lucia.chieffallo@unical.it
ORCID: <https://orcid.org/0000-0001-5283-0469>

* Corresponding author

^b Department of Civil Engineering
University of Calabria, Arcavacata di Rende (CS), Italy
e-mail: annunziata.palermo@unical.it
ORCID: <https://orcid.org/0000-0003-2879-0174>

^c Department of Civil Engineering
University of Calabria, Arcavacata di Rende (CS), Italy
e-mail: mf.viapiana@unical.it
ORCID: <https://orcid.org/0000-0003-4012-8052>

Abstract

Sustainable planning in coastal areas must integrate environmental protection actions and development actions addressing settlement policies and the location of functional and tourist infrastructure and services that are particularly relevant from a socio-economic point of view. In Italy, coastal planning is fragmented between state, regional and municipal competences. All Italian municipalities have the task of drafting the plan that outlines the strategic scenarios and the structural choices for the governance of the territory under their jurisdiction. We therefore wonder how this general plan can incorporate the specificities of coastal territories starting from the elaboration of the knowledge framework to define a sustainable plan project. To answer this question, we focus on the Calabrian regional territory, which hosts 10% of the national coastal heritage. The paper presents and discusses the procedural and content aspects related to the elaboration of the Preliminary Document of the Structural Plan of a municipality located on the coast of the Tyrrhenian Sea to draw general conclusions from the local experience useful for planners.

Keywords

Structural plan; Coastal areas; ICZM protocol.

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1. Introduction

Anthropogenic urbanisation processes and natural climate-related erosion dynamics impoverish natural ecosystems and the ecosystem services that they provide and generate highly vulnerable conditions in coastal territories. Consequently, in the context of territorial governance in coastal areas, there is a strong need to combine environmental protection actions with infrastructures realization to achieve truly sustainable planning. In Italy, the coastal zone planning framework is fragmented between state, regional and local competences. Regional laws compensate for the absence of a single national legislation by defining spatial planning tools at the different level of government, through the regional and down to the municipal.

This paper focuses on the role of the Italian general urban planning tool at the municipal scale to understand how it is able to incorporate the specificities of coastal territories starting from the elaboration of the knowledge framework to define a sustainable plan project. To carry out this assessment, the reference will be the general principles of the Mediterranean ICZM Protocol (Addis, 2013). The geographical area of interest, and in which the case study is located, is the Calabria Region and, specifically, the Municipality of Sangineto located on the Tyrrhenian coast in the province of Cosenza. The coastal system represents for the Region one of the macro-identity and structuring systems of the territory. The coast of Calabria is about 800 km long, equal to 10% of the national coastal heritage. It is characterized by the diversity of landscapes and the alternation of sandy bays and rocky ridges. This is the expression of the morphological and ecological complexity and the different relationship between naturalness and urbanization of the places. In Calabria the Regional Law 19/2002 and subsequent amendments "Norme per la tutela, il governo e l'uso del territorio – Legge Urbanistica della Calabria" defines the discipline of planning, protection and recovery of the regional territory and the exercise of the relevant administrative powers and functions. The Law recognises the European Landscape Convention by joining the European Network of Territorial Bodies for its implementation. The Law identifies the Structural Plan at the municipal level as the general planning tool and the Implementation Plans as the detailed planning tools of the Municipal Structural Plan. Among the Implementation Plan the Law identifies the Beach Plans to promote the protection of the areas falling within the maritime state property.

The paper therefore addresses the issue of sustainability of coastal planning starting from the case of the Preliminary Document of the Structural Plan of Sangineto¹. The case study is interesting because in recent decades the stretch of coast on which it rises has undergone profound structural changes with negative influences on local landscape resources. The paper is organized in three parts. The first summarises the contents of the ICZM Protocol to underline the need for integrated and adequate tools both in the analysis phase and in the design phase to consider the parameters and problems characterizing the planning of coastal areas. In the second, the case study is presented, distinguishing the phase of elaboration of the knowledge framework and that of defining the lines of project intervention of the Preliminary Document of the Plan. The third part discusses the results of local experience in the light of the principles of the ICZM Protocol in order to evaluate their sustainability and draw general conclusions.

2. Towards an integrated management of coastal zones

From an urban point of view, the coastal environment represents a complex geographical area (Pasquali & Marucci, 2021). Coastal zones are particularly critical areas. They are characterized by articulated use matrices, high environmental risk, frequent conflicts for resources management. On the one hand, despite the radical

¹ The drafting of the Municipal Structural Plan (and related Preliminary Document) represents a professional experience for the authors in the context of a research agreement between the Department of Civil Engineering of the University of Calabria and the Municipality of Sangineto aimed at providing technical and scientific advice to municipal structures.

transformations suffered in the last century, they continue to host a set of irreplaceable and fragile ecosystems, on the other they represent the privileged environment for activities of fundamental socio-economic importance such as tourism, ports and coastal industries, fisheries and aquaculture, energy production and transport infrastructures (Soriani et al., 2015). Therefore, in addition to addressing the "classical" planning issues (Palermo, 2011; Erriu & Pirlone, 2016; Busayo & Kalumba, 2020; Duarte et al., 2020; Gargiulo et al., 2020; Kalinka et al., 2020; de Souza Araujo et al., 2021; Martin et al., 2021; McEvoy et al., 2021), the literature on coastal areas includes issues relating mainly to two aspects. On the one hand, the aim of protection, preservation and restoration of coastal and marine habitats (eg Almpandou et al., 2021; Armitage, 2021; Butler et al., 2021; Curiel et al., 2021; Ellepola et al., 2021; Peng et al., 2021; O'Meara et al., 2021). On the other hand, the aim of guaranteeing the sustainability of socio-economic pressures on coastal territories (Landuci et al., 2021; Sarker et al., 2021; Taylor & Suthers, 2021; Cavallaro et al., 2021; Pereira et al., 2020). Considering the first one, as stated by Yan et al. (2020), since the beginning of the 21st century, the spatial pattern of urban expansion and the mechanism of urbanization in coastal areas have undergone significant changes. So, restoration of coastal and marine ecosystems is essential to meet both national and global conservation targets and to counteract declines in coastal marine ecosystems (Shumway et al., 2021). In this regard, Boulton et al. (2016) underline the classification proposed by Liqueste et al. (2013) that focus on marine and coastal ecosystem services that need to be protected. They propose three broad groups of services: provisioning, regulating and maintenance, and cultural. Another relevant classification is that of Brauman et al. (2007) that focuses on terrestrial freshwater ecosystem services, grouping them into five 'hydrologic services': improvement of extractive water supply, improvement of in-stream water supply, water damage mitigation, provision of water-related cultural services, and water-associated supporting services. The integration of ecosystem service knowledge into decision-making processes is increasingly endorsed by various policies and initiatives, with spatial planning targeted as one of the most relevant fields (Longato et al., 2021). The aforementioned authors state that windows of opportunity offered by regulatory frameworks and innovative processes and instruments, such as marine spatial plans and strategic environmental assessments, are key factors triggering the integration. According to Lester et al. (2020), strategic spatial planning for marine ecosystem restoration can help support more successful, cost-effective restoration that maximizes desired ecosystem service outcomes.

Considering the second one, Cormier & Kannen (2019) underline as marine spatial planning is ultimately the allocation of spatial and temporal measures to ensure that human activities or, more specifically, sector and socio-economic development in the sea can take place in a sustainable manner (Cormier et al., 2015). The success of the regulatory plan is the implementation of its spatial allocation in the daily operations of the industry sectors and other human activities. Indeed, it is the implementation of the marine spatial plan in the regulatory approval processes of the sectors that will carry into effects the development goals set by the political system (Cormier et al. 2017). Considering the study of García-Ayllón, S. (2018), coastal regions are usually territories of high economic activity. Tourism is the main factor of demand in this area. As stated by Nitivattananon & Srinonil (2019), tourism growth in coastal areas has become the fastest-growing industry and reached its peak in recent decades, also becoming one of the biggest industries in the world. Sustainable planning of coastal and marine tourism needs support from several stakeholders to strike a balance between economic, environmental, and social issues (Wang et al., 2016; Aivaz et al., 2021). Agriculture is another interesting economic activity linked to territorial development in these coastal regions. Intensive agricultural activities, such as the excessive use of fertilizers and pesticides, also add toxic pollutants to the water that ultimately decrease the fish yield (Stuart, 2010). Given the key role that agriculture plays in the livelihood of coastal communities, it is important to investigate the sustainability of coastal agriculture in the face of

changing climate (Gopalakrishnan et al., 2019). In fact, coastal areas are particularly exposed to a range of climate-related hazards such as rising sea levels, higher flood levels and storm surges, accelerated coastal erosion, seawater intrusion and increasing ocean acidity and surface temperatures. So, tourism and agriculture can cause significant problems because of anthropic pressures to add to a variety of economic activities such as mining, industry, fishing, risks from floods erosion or construction work in rivers. For this reason, it is necessary to assess the ecological risk caused by human activities to determine key areas of terrestrial-oceanic ecosystems preservation and restoration to ensure sustainable ecological management in the coastal zone (Zhai et al., 2020).

To consider all aspects relating to the coastal strip and to achieve the sustainable development goal applied to spatial and urban planning, a coastal management decision-making process has been defined called "Integrated Coastal Zone Management". Although this concept can be traced back to the 1970s, when the Coastal Zone Management Act was developed in the United States of America, it was formally introduced in the European context with the "Recommendation on the implementation of Integrated Coastal Zone Management in Europe (2002/413 / EC)" of 30 May 2002. In 2009 the "Protocol on the Integrated Management of Coastal Areas of the Mediterranean" (ICZM Protocol) was defined, which is an implementation document of the "Convention on the Protection of the Marine Environment and the Mediterranean Coast", the so-called "Barcelona Convention" of 1976 (Scovazzi, 2006). Alterman and Pellach (2020) stress that few countries have taken significant steps in changing their coastal regulatory framework and in initiating practices consistent with the principles of ICZM Protocol. The same authors hypothesize that this may be due to the fact that the European legislative framework of ICZM Protocol takes the form of a non-binding recommendation and that the functions of the ICZM Mediterranean Protocol are more similar to those of a political document than to those of a binding international standard. In fact, it does not have the formal rank of a directive. The ICZM Protocol defines some general principles (Tab.1) which are offered as "behavioural indications" for Public Administrations, economic entities, companies, stakeholders, citizens in order to achieve a good degree of sustainability in the development of coastal areas through an integrated participation process (Armenio & Mossa, 2020).

ID	Principle of ICZM Protocol
a.	The biological wealth and the natural dynamics and functioning of the intertidal area and the complementary and interdependent nature of the marine part and the land part forming a single entity shall be taken particularly into account
b.	All elements relating to hydrological, geomorphological, climatic, ecological, socioeconomic and cultural systems shall be taken into account in an integrated manner, so as not to exceed the carrying capacity of the coastal zone and to prevent the negative effects of natural disasters and of development
c.	The ecosystems approach to coastal planning and management shall be applied so as to ensure the sustainable development of coastal zones
d.	Appropriate governance allowing adequate and timely participation in a transparent decision-making process by local populations and stakeholders in civil society concerned with coastal zones shall be ensure
e.	Cross-sectorally organised institutional coordination of the various administrative services and regional and local authorities competent in coastal zones shall be required
f.	The formulation of land use strategies, plans and programmes covering urban development and socioeconomic activities, as well as other relevant sectoral policies, shall be required
g.	The multiplicity and diversity of activities in coastal zones shall be taken into account, and priority shall be given, where necessary, to public services and activities requiring, in terms of use and location, the immediate proximity of the sea
h.	The allocation of uses throughout the entire coastal zone should be balanced, and unnecessary concentration and urban sprawl should be avoided
i.	Preliminary assessments shall be made of the risks associated with the various human activities and infrastructure so as to prevent and reduce their negative impact on coastal zones
j.	Damage to the coastal environment shall be prevented and, where it occurs, appropriate restoration shall be affected

Tab.1 General principles of ICZM Protocol

D'Orsogna (2006) identifies ICZM as a "planning and coordination process related to development management and resources, focusing on the land-sea interface". In fact, the principles foresee to operate with a unitary and integrated vision of the various anthropogenic and natural elements that interact on the coast, facing also the problem of erosion and the adaptation of coasts to climate change (Armenio & Mossa, 2020), combining an ecosystem-based approach to the precautionary principle, aimed at preventing the occurrence of damage to the coastal environment and to the source of the damage caused to the environment. However, as stated by Boscolo (2011), the Protocol does not lead to the predetermination of a specific administrative model corresponding in paradigmatic terms to ICZM, but integrated management is configured as an overall result that presupposes a process of realignment of the heterogeneous administrative tools of the various national traditions to the objective status of the coastal zone. As urban planning measures are of decisive importance in Italy, in the discussion section the authors will use the ICZM principles as coherence parameters applied to the contents of the Preliminary Document of the Municipal Structural Plan of Sangineto to indirectly evaluate its ability to combine economic and social development with the protection and conservation of natural and cultural resources (Pérez-Cayeiro & Chica-Ruiz, 2015) as a prerequisite of sustainability for the future Structural Plan.

3. The Preliminary Document of the Municipal Structural Plan of Sangineto

The territory of the Municipality of Sangineto covers an area of 2,750 hectares. It is located about 30 km from the Municipality of Cosenza, along the Tyrrhenian coast and on the western slopes of the Calabrian coast.

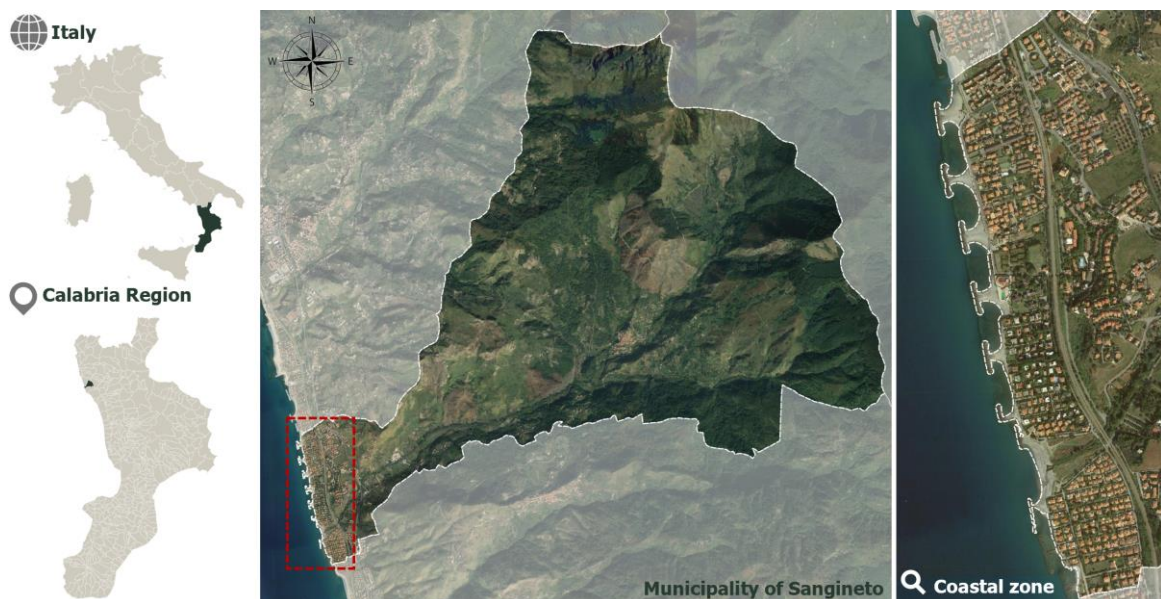


Fig.1 Case study

The general problems of the coastal region examined were:

- unplanned development leading to wastage of investment, lost opportunities for lasting employment, and environmental and social degradation;
- the decline of the traditional and eco-compatible sectors that generates unemployment, mass migratory flows and social instability;
- coastal erosion that damages natural habitats and human settlements, destroys the economy and threatens human life;

- the absence of adequate transport and communication networks leading to increasing marginalization from the rest of Europe.

The procedural aspects and the main application results related to the construction of the Knowledge framework for the definition of the Preliminary Plan Document are described below, as well as the clarification of the strategic scenarios for the governance of the municipal area that must be assumed by the subsequent Municipal Structural Plan².

3.1 The Knowledge framework

The Knowledge Framework represents the integrated and systematic set of data and information necessary to represent and evaluate the state of the territory and the evolutionary processes that distinguish it. Consistently with the documents indicated by the Regional Urban Planning Law 19/2002, Sangineto's Knowledge framework was constructed by distinguishing the Regulatory and planning framework, the Environmental framework, the Economic and social structural framework and the Structural and morphological framework. The contents are summarised below.

The Regulatory and planning framework includes the analysis of supra-municipal planning tools and the constraints and tools of municipal planning in force.

With reference to supra-municipal planning and constraints, reference was made to the following tools:

- at the regional scale, to the Regional Territorial Framework with landscape value (called Q.T.R.P.);
- at the provincial scale, at the Provincial Territorial Coordination Plan (called P.T.C.P.).

Considering the regional tool, Sangineto is part of the Regional Territorial Landscape Area 1 "Tirreno Cosentino" and of the Territorial Landscape Unit "Alto Tirreno Cosentino". This landscape unit has an average degree of urbanization, with the presence of small and medium-sized centers of high tourist value. The territory is characterized by an agricultural landscape sea-hills, with a variable slope between the highest point, located about 1800 meters, and the coast, mainly low and sandy, only sometimes high and rocky with cliffs and coastal caves. The steep cliffs open to narrow and deep sandy shores, which are strongly characterizing elements. The hydrographic network is characterized by numerous streams of mainly torrential nature and of modest length. The constraints and requirements defined by the Q.T.R.P. for Sangineto are the following:

- seismic risk, Sangineto is classified in category 2. According to the analysis of the vulnerability of the building stock (elaborated by the GNDT study on the seismic risk of 2001 with reference to Istat data of 1991), a percentage of highly vulnerable buildings of 14.9% of the total of 2138 buildings;
- urban planning standards, the generic endowment of standards per inhabitant is quantified as a minimum of 20 sqm/inhabitant, in relation to the new additional urban functions of civil protection, for social assistance, for social aggregation, for market areas and exhibition areas, for environmental green and natural parks;
- identity and monumental heritage, the Castle has been identified, in a condition of ruin, for which a protection action is also envisaged extended to a protection band of 10 meters from the perimeter of the adjacent area, and the medieval tower;
- landscape activities, for which the rules of inhibitory constraint to transformation apply (i.e. rivers, streams, waterways, for which absolute construction is not allowed for a depth of 10 meters from the shores; wooded and forest-covered areas; fire-restricted areas; non-anthropized coastal areas, i.e. areas free from constructions placed between inhabited centers, up to a depth of 300 meters from the state property line) and the rules for the protection of the transformation (in particular the areas belonging to

² Currently, the Preliminary Document of the Plan is adopted, and the Municipal Structural Plan is in an advanced stage of drafting.

the Pollino National Park, to the Natura 2000 network, Sites of National Interest, including a buffer zone of 200 meters from the border, waterways of landscape interest for a depth of 150 meters from the shores, areas subject to landscape restrictions);

- coastal and fluvial belts, in the coastal strip of Sangineto within 300 meters from the border of the maritime state property is prescribed the absolute prohibition of construct in the inner strip to 300 meters from the boundary line of the maritime property, and up to a maximum of 500 meters from the shoreline, also for the elevated territories on the sea, pending the adoption of the Landscape Plans of the Area, limited to the non-anthropized and non-urbanized sections and located outside the inhabited center. To create sea fronts not particularly impacting in coastal-marine areas, in urbanized stretches of coast, the new construction interventions subject to the Implementation Plan must have a relationship between the distance from the maritime state-owned border line and the possible height of the new buildings never less than 5/1. Within the maritime state border, for building voids it is permissible to build with a height not higher than that of the nearby buildings, and in the case of different heights, not higher than the average of the heights of the adjacent buildings. Furthermore, adequate access corridors and visual cones of permeability to the beach must be guaranteed in number and size.

Considering the provincial tool, Sangineto falls within the Co-planning Area 6 "Medio Tirreno", which is completely included in the coastal strip between San Lucido and Belvedere Marittimo. The anthropization present is distinguished between the historical one upstream and the more recent one developed along the coast. The area is characterized by the presence of historic centers, almost all in a good state of conservation and sufficiently related to the centers developed downstream along the coast. From the relational aspect, Paola is present in the area, one of the strategic hubs of the connection system between the province of Cosenza and the entire national territory.

With reference to municipal planning, the previous tool in the Municipality of Sangineto was a General Town Plan approved in 1986, to which a variant was added in 2000. The implementation of the General Town Plan was planned through the Beach Plan, the Civil Protection Plan, the Municipal Emergency Plan for Forest Fire Risk, the Trade Plan, the Localization Plan for the fuel distribution network, the Integrated Territorial Project. Specifically, the Beach Plan, approved on 30.10.2008, has the value of a Detailed Plan regarding the use of the areas falling within the maritime domain, with the aim of promoting the best functionality and productivity of the tourist-recreational activities taking place there. The need for this instrument, as well as a consequence of the prescriptions and regulatory provisions, was born from the peculiarities and high naturalistic values that determine a strong demographic increase every year during the summer period. This situation has determined, therefore, the requirement of a rational reorganization of the maritime state property and a correct programming to regulate and to plan the specific activity, mainly seaside, taking into account the different needs in terms of accessibility and services and free use, in in such a way as to guarantee tourists and residents all those services useful for a better use of the beach.

The Environmental Framework contains the overall system of constraints that exist on the territory and that affect the transformability of the areas and their identification, involving partial or total limit to the construction. In summary, Sangineto is characterized by the following system of constraints: landscape assets (inhibiting and guardian constraints), identity and monumental assets (Castle, Area adjacent to the Castle, Medieval Saracen Tower, Churches), geomorphological constraints (Areas subject to coastal erosion; Areas with serious limitations for the feasibility of anthropogenic interventions), agro-pedological constraints (Forests and wooded areas, Restricted areas due to fires, Landfill in Timpa di Civita), constraints relating to buffer zones (public services, power lines, methane pipelines, fast-flowing roads, railways, maritime domain). In particular, the map in Fig.2 shows how the area closest to the coastline is subject to significant limitations.

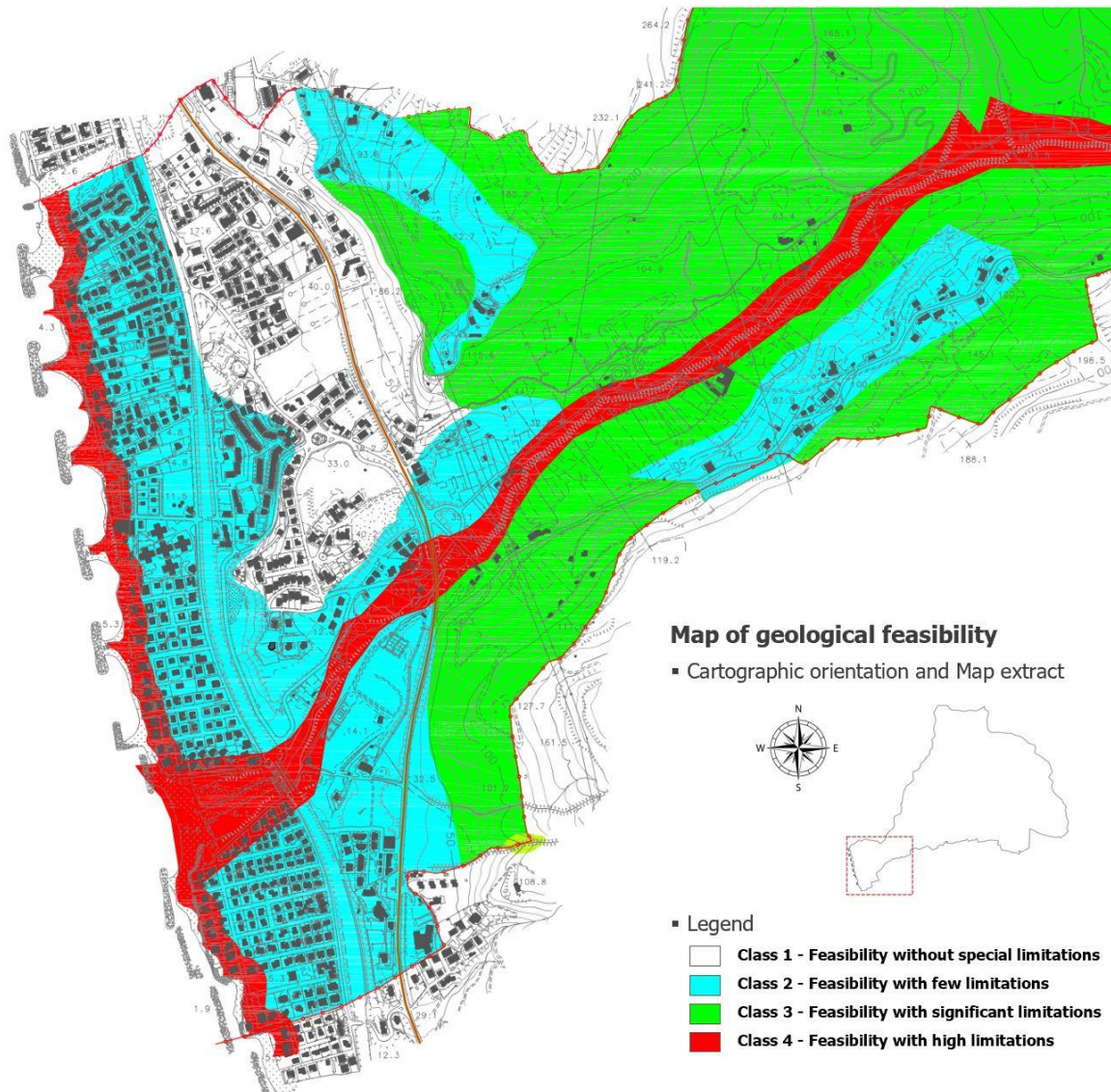


Fig.2 Map of geological feasibility

The Economic and social structural framework derives from the socio-economic study, which focused on the quantified description of the main aspects of the municipal socio-economic structure. This description was made on the basis of the most recent statistical data available at municipal level at the time of the drafting of the urban planning instrument and with reference to two fields, namely population and work and the extra-agricultural and tertiary system.

With reference to the first area, according to the most recent available Istat data, the Municipality recorded a decrease in the resident population equal to -5.44%, a decrease slightly higher than that recorded at the provincial level (equal to -2.32%), due to a significant migratory movement. Despite the trend compared to previous decades showed a slight reduction in the contraction, the Municipality continued to characterize itself as "at risk of depopulation". Also, about the composition of the population, there was a lower incidence of the very young between 0-14 years (11.9% compared to 13.6% provincial) and of the population of working age between 15-64 years (62, 3% compared to the provincial 67.4%), in favor of the "elderly" population over 65 years of age, which was 25.8% compared to 19% of the provincial figure. On the other hand, the percentage of the population over 65 years of age grew by 10.2 points, compared to 6 points in the provincial figure. In addition, the unemployment rate was 26.9%, which was higher than the provincial and regional average unemployment values (23.1% and 24.5% respectively). Women and young people are the most

disadvantaged, with an unemployment rate of 35.4% and 64.3% respectively.

With regard to the second area, the reading of the available data highlighted the following characterizations:

- growth of companies, local units and employees;
- fragmentation of the extra-agricultural system;
- presence of craft specializations;
- relevance of the economic branches "Other services" and "Hotels and public services";
- very little importance of the manufacturing sector.

The tertiary sector, in its components of commercial activities and services, represented the sector most present in the local economy. The hotel and public service sector was the driving force of the local economy. This specialization is a consequence of the development of the tourist flow that the sea resource has managed to capture over the years, making Sangineto one of the favorite destinations on the Tyrrhenian coast of Cosenza.

The Structural and morphological framework investigated the settlement and relational system.

The analyzes on the settlement system have integrated what was indicated in the studies relating to the programming and planning tools and have specifically referred to the provision of services and the settlement heritage. About the services, in the municipal area there were school activities, public parks, sports equipment, public health and social welfare services with support facilities, as well as recreational/cultural services. With regard to the settlement heritage, the analyses have quantified the buildings present in the residential areas, for a total of 1,244 buildings, as well as residential buildings, for a total of 1,120 buildings. The same thing happened for residences in residential buildings, for a total value of 2,297 houses, which appeared to be occupied by residents for a total value of just 560, of which 444 under ownership, with an average area of 80 sqm and an average endowment of about 4 rooms. Settlement dispersion was minimal, as 89% of total homes were located in the center (compared to 83.6% at the provincial level), while the percentage of homes falling among the "scattered houses" was 5.3% (8.7% the provincial average). The empty houses, in all 1,728 units, were located almost entirely (exactly 93%) in the inhabited center.

About the analysis of the relational system, the road system is characterized by the presence of the SS18 state road, which runs parallel to the coastline, and therefore affects only the coastal area. This is flanked by the provincial road 263 (former state road 105), which crosses the entire northern part of the Sangineto territory, but without having an easy connection to the urban center, and the provincial road 16, which directly connects the historic center and the marine area, even if it is characterized by a tortuous course and with the bottom sometimes disconnected.

As it happens in numerous other centers on the coast, also Sangineto represents an example of organization of the territory-transport system that is deficient from a functional point of view, due to the lack of connections able to satisfy the mobility demand. The historic core is poorly connected to the marine zone, and therefore to the main axes of connection with the surrounding territory. Moreover, the connection from the marine zone to the historic center takes place, exclusively, with the use of private vehicles, in the face of a demand for mobility along this route of no small amount and continuously increasing. All this, combined with the conformation of the Sangineto's territory and the characteristics of internal mobility, has made evident a series of problems connected to each other and mainly due to the following aspects:

- lack of direct connections between the SS18 road and the historic core;
- difficulty of pedestrian movements due to the orographic conformation of the territory;
- low level of service of the road infrastructures in the urban core;
- significant traffic crossing extra-urban public transport lines in the marine area;

- insufficient urban public transport service to serve the demand for mobility existing between the marine area and the historic core;
- poor accessibility of the coast due to the presence of the railway embankment.

3.2 The definition of the objectives and the prefiguration of the choices of the Plan

The Preliminary Document of the Structural Plan of Sangineto has set itself as a general objective the centrality of the territory as a "common good", considered essential for the well-being of the communities settled on it. This objective was founded on the assumption that the territory constitutes the essential environment for the material reproduction of human life and the realization of social relations and public life. It was intended, therefore, to pursue a qualitative dimension, and not only quantitative, of the individual assets that support it, whose identity must constitute the founding nucleus, collectively recognized, of the "statute" of each place and the rights of citizens. To this end, the Preliminary Document defined a series of specific objectives, organized by theme, with respect to which it has prefigured strategic scenarios useful for define the general policies to rebalance the territorial context that the Plan will have to implement on the different systems.

In particular, the themes and the related strategic scenarios identified are as following:

- the reduction of the anthropization of the coast, mainly linked to the tourism of second houses, which has generated a very consisting building expansion with consequent effect of congestion in the summer months. With regard to this theme, the Plan should propose not to commit additional land for tourist residences, limiting residential intervention only to the improvement of the quality of urban existing building and the construction of first houses. The choice must therefore be to not place on the market additional building areas for residential tourist use, thus safeguarding the only satisfaction of the need of first houses. Other expansive forecasts, however, always in reasoned quantities, will have to be taken into account above all on condition that they are reserved for new functions, directional and commercial and, however, linking them to a strong regenerative hypothesis of the fabric able to give rise to a new urban scene and to foresee an objective impact on demographic data;
- the environmental recovery of the degraded urban fabric and the re-naturalization of non-anthropized areas. In this regard, the Plan must set a green limit to the expansion of the building by connecting the various parts of the city through a path equipped with green areas that, starting from the limits of the historic center, descends to the coast along the path of the Sangineto Torrent. In this case, the natural element is not only an element of connection, physical and symbolic path of connection with the hinterland, but also a strategic element for the redevelopment of the urbanized. The proximity of valuable natural elements, together with the possibility of studying alternative routes for the road, must in fact be an element of stimulus towards the recovery and redevelopment of other resources of the territory;
- the protection of forest. The municipal area is home to a considerable silvo-pastoral heritage whose abandonment requires the Plan to identify and implement a series of measures aimed at the conservation of forests, in order not only to benefit in terms of health and well-being of citizens, but also advantages in economic terms for those involved in the maintenance and conservation of places by encouraging economic-forestry activities (wood supply chain, undergrowth products, chestnuts, etc.) through the improvement of the active, sustainable and conscious management of woods and natural heritage, in order to improve the quality of life, usability, forestry and environmental culture, integration and local supply chains;
- relaunch the tourist activity. It is previously based only on the sea resource and without any synergy with other local resources. In this case, the Structural Plan will have to characterize more the offer of the territory, currently unable to meet the needs of the new demand for tourism, and identify actions aimed at building new and different systems for the tourist offer. The starting point should be the local resources

still with high potential, able to attract other "types of tourism" and to change the stereotyped image of low-quality tourist destination, destined to an irreversible process of degradation, to experiment with new models of tourism development. To this end, the aim should be to network the current tourist offer with the entire territorial system, its resources and its traditions, encouraging intra-territorial and inter-territorial synergies, also in the direction of diversification of the offer. The contextual presence, in the communal territory, of marine, hilly and mountain areas has constituted the central aspect in order to think to undertake politics in this sense through actions of integration of the system sea-mountains, also in synergy with the enlarged district system (Pollino Park, Coastal Chain, etc.);

- strengthen the production system. The Structural Plan will have to define the measures to safeguard and protect the local identity patrimony (typical productions), in order to put to system all the resources and the areas of the territory, to guarantee the local demand. The particular microclimates and soil conditions are, in fact, optimal habitats for some traditional crops of high quality and for alternative niche productions. In this context, in order to encourage the typing of the production system, various measures will have to be undertaken, including: the establishment of micro-business and local supply chains, starting from niche and high value-added organic products, for which the territory is naturally suited; the creation of networks and the development of the manufacturing business system functional to the local system (use of local raw materials and products, satisfaction of local demand, preservation of heritage, etc.), with particular attention to the agri-food and crafts sectors, the latter as part of a more comprehensive exploitation of the entire wood supply chain;
- improve accessibility. The Structural Plan will have to provide for a preliminary redefinition of part of the existing road system, with the aim of reorganizing the municipal road network to solve priority problems of travel that occur, especially in the coastal area, in summer. To this end, through a functional reorganization and the strengthening of some of the internal arteries, in the summer period the existing stretch of promenade can be used only for walking allowing, at the same time, the redevelopment of the central core of the coastal area through the activation, on the seafront, of tourist services and urban furniture works of significant environmental impact, thus significantly increasing the use of this urban area not only by residents, but also by the inhabitants of neighboring municipalities, seasonal tourists and occasional visitors. In addition, the cross-border links between the two parts of the coastal area previously separated from the railway route should be strengthened. In line with this objective, a series of pedestrian and cycling routes will have to be created along the wider road axes of the town, which will have to encourage residents and tourists to set aside cars for internal travel. As for the conditions of mobility along the coast-inland route, however, the improvement will have to go through the safety of the current route;
- recover and enhance the historic center, also with the aim of reversing the progressive demographic ageing. In this regard, the Plan should provide for measures to strengthen social structures and services to support the population and improve the quality of life, in order to prevent the younger generation from moving to other areas that offer employment prospects and better living conditions.

The structural choices have been made with the primary objective of sustainability that specifically affects not only ecological or economic-environmental aspects but is also understood as the ability to attribute collective values and meanings, to build hierarchies that guide choices towards values of equity, quality of life, solidarity and social security. Applying these concepts to planning means, therefore, introducing in the Plan actions new development modes that are compatible with the state of equilibrium of environmental resources and with the objectives of quality and sanitation to be assumed by the Plan, in so far as the availability of non-renewable resources and quality of life is guaranteed in the future.

For this purpose, the Preliminary Document defined the limits of the development of the municipal territory of Sangineto according to its geomorphological, hydrogeological, pedological, hydraulic-forest and environmental characteristics, classifying it in urbanized, urbanizable, agricultural and forestry territory (Fig.3).

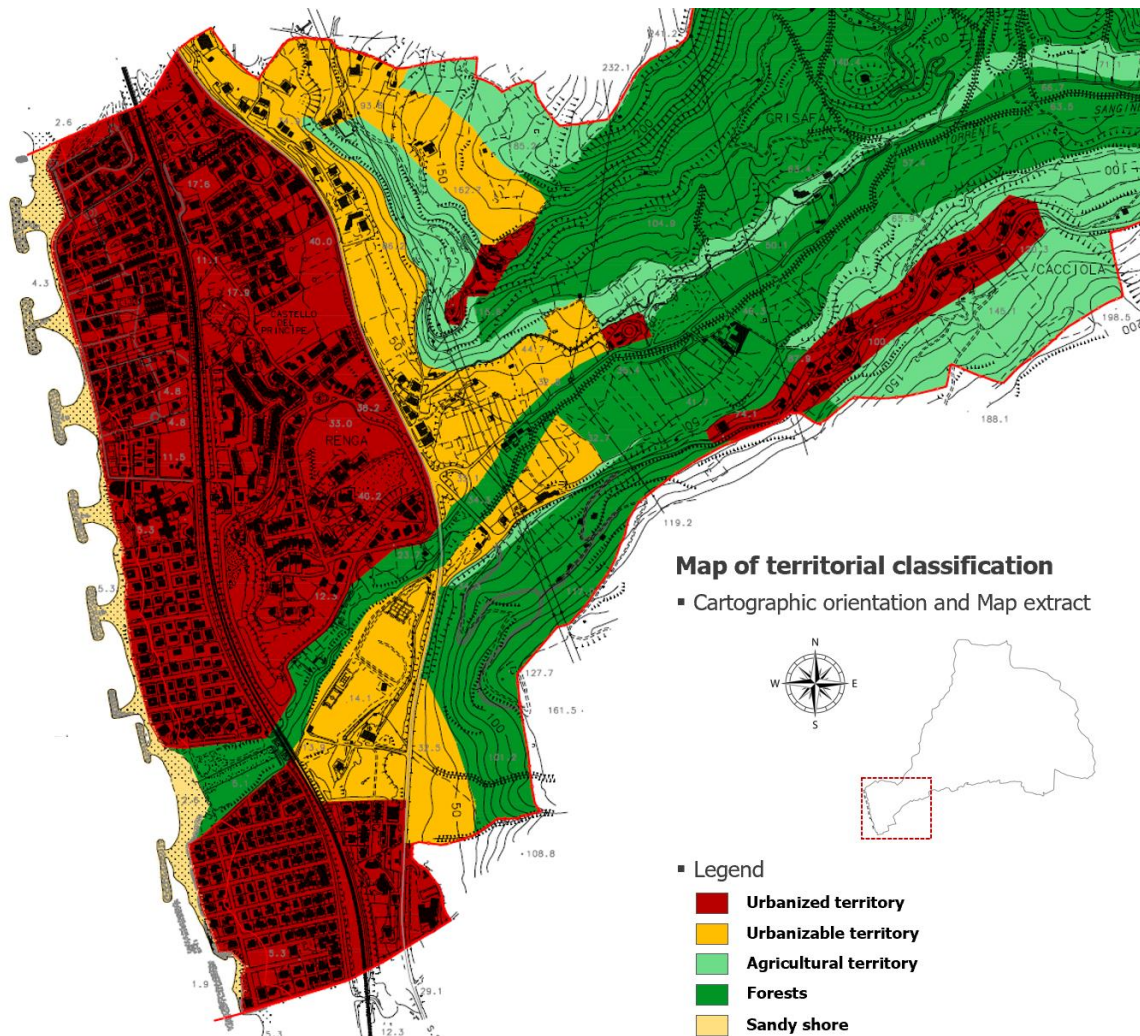


Fig.3 Map of territorial classification

It also identified the natural and anthropogenic resources of the territory and its critical issues, as well as areas for the construction of equipment and public infrastructure of greater importance and areas to be allocated to settlement functions and production facilities.

In particular, the parts of the territory subject to new urbanization have been identified, locating them in areas adjacent to the already urbanized fabrics.

For these areas, the Plan must propose a detailed regulation, specific for each area, in order to ensure an organic and sustainable urban transformation, integrated with the surrounding fabric and respecting the existing economic and physical resources.

To promote sustainable and quality development, therefore, the Preliminary Document defined the bases for the development of Sangineto in the coming years through the urban, environmental and landscape redevelopment of the municipal area, determining the conditions of sustainability of the interventions and transformations plannable.

4. Discussion and conclusion

As anticipated, the research proposed concerns the role of the general urban planning tool on a municipal scale to understand how it is able to incorporate the specificities of coastal territories starting from the case of the Municipality of Sangineto and, in particular, from the elaboration of the relative Document Preliminary of the Structural Plan. To assess the sustainability of the choices prefigured by the Document, the reference is made to the general principles set out in the ICZM Protocol. They represent the tool for the verification of the consistency of the knowledge framework and the lines of action defined in the Preliminary Document of the Plan with respect to the Protocol to indirectly assess the sustainability of the future Plan.

With reference to the first three principles of the Protocol ("a", "b" and "c" in Tab.1), the Preliminary Document took into account, both in the knowledge and in the design phase, the complementarity and interdependence of the marine and terrestrial. In particular, it has integrated all elements related to hydrological, geomorphological, climate, ecological, socio-economic and cultural systems, applying an eco-systematic approach to coastal zone planning and management, to ensure their sustainable development.

The Document is also consistent in relation to the three principles on governance ("d", "e" and "f" in Tab.1). It states that the concretization of the strategic scenarios described will allow the formation of new urban contexts and images, that is parts of a new city, whose values lie in the offer of services of excellence, urban efficiency and the promotion of identity features. security, improved housing conditions, increased opportunities for social relations, economic development, professional and business promotion, from which satisfactory architectural qualities, expressions of cultural content should also emerge, local social and economic.

In addition, a political, administrative and technical government of a procedural nature will have to be linked to this approach for strategic scenarios, taking reasonably into account that the municipal structural plan of Sangineto will be innovative. Ultimately, it will be an open plan, on which political, administrative, entrepreneurial, social and professional subjects will be called to confront and build relationships between interests, initiatives, programs, projects. Indeed, the strategic approach involves aspects of co-responsibility and decision involvement with other areas and subjects of the project. A strategic content that, in the Structural Plan, is accompanied by shared values, expressed in constraints and limits of use, which constitute the public reference (the invariants) the spatial planning and regulation of the spatial planning pertaining to the Urban Plan.

With reference to the principles relating to the services and uses of the coastal area ("g" and "h" in Tab.1), for the urbanized and urbanizable territory, the Preliminary Document intervened by proposing strategic choices that took into account the intrinsic potential of the territory, as well as the degree of saturation and impairment of the urbanized areas near the coastal strip, with the aim of improving urban quality through redevelopment, reorganization, increase in functional and technological standards. In particular, the Structural Plan will have to be aimed at consolidating existing settlements, for which conservation, redevelopment and replacement interventions will have to be established, and new residential building interventions will have to be planned only to meet the needs of first homes, as well as new construction. as a receptive, productive and complementary destination to the tourist residence.

The fundamental characteristics of these choices also aim to differentiate the tourist offer of the area, encouraging its use compatible with its peculiarities. The places are already partially equipped with hotels, restaurants and bathing facilities, and therefore the proposal maintains the layout and vocation of the existing settlement, enhancing and upgrading the building stock, the urban fabric and public facilities. The redevelopment of the newly formed urban system therefore becomes a resource for the entire Municipality,

which, by investing in a renewed use linked to tourism, may have significant induced effects on the entire territorial system.

With regard to the last two principles ("i" and "j" in Tab.1), the cognitive framework includes the preliminary assessment of risks of various kinds, referring to supra-municipal planning tools and sector studies. Consequently, the structural choices have been defined in order to prevent damage to the environment, including coastal ones. Furthermore, in accordance with the aforementioned Regional Law, the Municipality must provide for the preventive assessment of environmental and territorial sustainability in accordance with national and regional legislation, as well as with the regulations in force. The Strategic Environmental Assessment is a mandatory process aimed at guaranteeing a high level of environmental protection, as well as contributing to the integration of environmental considerations in the process of drafting and approving the Plan, also ensuring consistency between the different planning levels in the perspective of sustainable development.

As stated by Riitano et al. (2020), Italian coastal urban development is a problem that requires measures to contain land consumption and a continuous monitoring action on the phenomenon, especially in those areas where the tendency to consume land is high. This problem is also widespread in the coasts of other European countries. In this regard, it is interesting to underline the scalability of the proposed research to other Italian and European coastal areas, highlighting which features can be assumed as common to other cities while other are study-tailored.

The feature that can be assumed as common is the sustainability assessment approach by comparing the general urban planning tool and the principles of the ICZM Protocol. Therefore, considering the Italian context, replicating the approach adopted in this study would make it possible to compare the results in terms of sustainability obtained by the other Plans with respect to general principles set out in the ICZM Protocol. In this case, replicating the study would make it possible to highlight the different characteristics of the coasts in the various Italian regions, as well as to identify any similarities and differences with urban planning tools that vary according to regional laws.

Similarly, with reference to the European area of the Mediterranean, it may be interesting to replicate the approach of evaluating adherence to the ICZM Protocol with respect to specific local urban planning tools, deepening the state of the art on the topic (Satta, 2004; Douvere & Ehler, 2009; Queffelec et al., 2009; Billé & Rochette, 2015; Knežević & Petović, 2016; Rumson et al., 2017; Trop, 2017; Teschner, 2019; Albotoush & Shau-Hwai, 2021). The feature that is study-tailored is obviously the methodology adopted to conduct the assessment. It made specific reference to the Italian case of the Structural Plan and to the contents of the Preliminary Document of the Municipality of Sangineto.

In conclusion, in accordance with the ICZM Protocol, the case study presented demonstrated the need for integrated tools in the analysis and design phases of the Plan for sustainable planning of coastal areas. The reference was limited to the case of the Municipal Structural Plan, which represents the most appropriate example of a Plan having as its object the coastal space and which expresses a regulation of the activities that discharge externalities on this area.

The case of the Municipality of Sangineto, for which the contents of the Preliminary Document have been described, appears to be a virtuous example demonstrated by its adherence to the ICZM Protocol. From the consistency check of a general nature conducted, and the results of which have been briefly described in this section, the choices outlined in the Preliminary Document appear aimed at governing the transformations of the territory without making economic interests prevail over environmental protection, looking at coastal resources as an element of value right from the planning stage and proposing a model that seems to ensure full sustainability. In this regard, it is still worth reflecting on the literature study conducted in section 2 in

which two relevant research lines on the topic have been identified. The study demonstrates that the Preliminary Document aims both to protect the territory and the coastal ecosystem services and also to improve local socio-economic development by promoting tourism and agriculture.

However, in Italy there are many cases of Municipal Plans in which the logic is diametrically opposite. In this sense, the strategic significance of the ICZM Protocol (Boscolo, 2011) emerges for planning tools, especially at the municipal level.

In fact, the Protocol, configuring itself as a necessarily transcalar policy tool, providing for decisions taken at an administrative level adequate for the drafting of a cognitive model consistent with the complexity of environmental and settlement phenomena and the adoption of planning choices extended to significant units, could certainly contribute to define, at the municipal level, effectively feasible application actions, even at a micro-local scale, to ensure overall adequate levels of sustainability.

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Image Sources

Fig.1: Authors' elaboration;

Fig.2: Authors' elaboration on data available at: <http://www.comune.sanginetto.cs.it/index.php?action=index&p=335>;

Fig.3: Authors' elaboration on data available at: <http://www.comune.sanginetto.cs.it/index.php?action=index&p=335>.

Author's profile

Lucia Chieffallo

Ph.D. student in Civil and Industrial Engineering at the University of Calabria. Her research concerns physical, environmental, social, and economic actions in order to define models for sustainable territorial regeneration.

Annunziata Palermo

Associate professor of Urban and Territorial Planning at the University of Calabria. She is interested in the strategic planning of integrated territorial systems, sustainable regeneration of "marginal" and disused areas, multirisk analysis methodologies for the prevention and safety of urban resilience, multilevel governance in cohesion policies.

Maria Francesca Viapiana

Associate Professor of Urban Engineering at the University of Calabria. She is interested in urban design and planning with particular attention to the role of sustainability in regeneration processes.