

Adaptation to Climate Change and Spatial Planning: The Case-Study of the Region of South Aegean

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Abstract

Since the early 1990s, when climate change issues rose, the EU and its Member-States have introduced ambitious objectives and policies related to climate change adaptation, which directly affected its Member- States' climate policy framework. However, many policies concerning climate change adaptation have either direct spatial reference or significant spatial effects. Therefore, the analysis between the Regional Adaptation Action Plans and other types of regional-scaled plans, such as the Regional Spatial Planning Frameworks, is regarded to be valuable. This paper examines the compatibility and complementarity of objectives, measures and tools between the Regional Adaptation Action Plan and the Regional Spatial Planning Framework of South Aegean. The analysis performed revealed linkages between the RAAP and the RSPF of the South Aegean in terms of objectives, measures and tools.

Keywords: Climate change, Adaptation, Spatial Planning, Regional scale.

1. Introduction

Climate change is acknowledged as the most imminent challenge humanity faces nowadays.

Since the early 1990s, when climate change issues rose, the EU and its Member-States have introduced ambitious objectives and policies related to climate change adaptation and mitigation, which have become a benchmark and a source of inspiration for other international bodies (Oberthür & Dupont, 2021). The EU climate policy framework includes climate change integration in various fields, introducing binding objectives for its Member-States (Timmermans, 2021).

The EU endorsed a strategy concerning climate change adaptation in April 2013 (EC, 2013). This strategy was revised on 24th February 2021 (EC, 2021). The most important priorities of the revised EU strategy on adaptation to climate change are to (EC, 2021): (i) inform

and mobilise society and stakeholders at all levels of governance, (ii) improve knowledge about climate impacts and adaptation solutions, (iii) boost adaptation planning and climate risk assessment by accelerating adaptation actions, (iv) promote the use of robust, solid and effective data and tools.

The Greek National Adaptation Strategy (NAS) was adopted in 2016 (MEEN, 2016), simultaneously establishing a National Council on Climate Change Adaptation. The objectives of the NAS are further analysed through the development of Regional Adaptation Action Plans (RAAPs), which are expected to be endorsed within this year.

This paper examines the compatibility and complementarity of objectives, measures and tools between the RAAP and the Regional Spatial Planning Framework (RSPF) of South Aegean. The analysis of the compatibility and complementarity between the RAAPS and other types of regional-scaled plans, such as the RSPFS, should be examined as many policies concerning climate change adaptation have either direct spatial reference or significant spatial effects. The analysis revealed minor linkages between them in terms of objectives, measures and tools.

2. Adaptation to climate change in Greece

2.1 Greek National Climate Change Adaptation Strategy

The Greek NAS was introduced in 2016 (L. 4414/2016). Its objectives are to (MEEN, 2016): (i) estimate the immediate and long-term expected impacts of climate change at a national scale, (ii) identify the areas where urgent climate change adaptation measures have to be taken, (iii) outline the legal measures required to ensure the adaptation to climate change in an effective way. These objectives are thoroughly analysed through the RAAPs.

2.2 Regional Adaptation Action Plans

The RAAPs propose the final selection and prioritisation of the measures and policies required to promote each Region's adaptation to climate change.

Each RAAP examines the particular regional circumstances, priorities and needs to: (i) perform multi-sectoral climate impact and vulnerability assessments, (ii) identify each Region's climate risks and impacts by sector and geographical area, (iii) support decision-making and climate change adaptation planning at a regional level.

The RAAPs, according to the provisions of the L. 4414/2016, should be aligned with other types of regional-scaled plans. Such as the RSPFs, which guide the spatial organisation model each Region should follow and propose measures concerning the structure of the residential network of each Region.

Until today (May 2021), several RAAP studies have been developed but their institutionalisation is pending. However, they are expected to be endorsed within this year.

3. Local Urban Plans and Special Urban Plans

The recent establishment of the L. 4759/20 shapes a new reality for spatial planning at the local level concerning climate change issues.

This conclusion derives from the fact that within the scope of the Local Urban Plans (LUPs) (L. 4759/20, art. 10) is, among other things, to define climate change adaptation measures, as well as any complementary emergency measures concerning the management of the impacts of natural and technological disasters and other threats.

The same conclusion is valid concerning the Special Urban Plans (SUPs), which have as one of their main objectives to ensure the resilience of urban centers through urban regeneration programs, environmental protection programs or natural disaster relief programs (L. 4759/20, art. 12).

4. Case study-The Region of South Aegean

The Region of South Aegean is one of the thirteen administrative regions of Greece. It is located at the southeastern edge of Greece and the EU, based in Ermoupolis, Syros and consists of the island clusters of the Cyclades and the Dodecanese.

The Region has a total area of 5.286 sq. km and covers 4% of the total area of Greece, with a population of 308.610 inhabitants and numbering more than 50 inhabited islands, each one with its peculiarity, historical background and culture, its unique geophysical environment, gastronomic identity and local products. The Region of the North Aegean and the Region of South Aegean are supervised by the Decentralized Administration of the Aegean based at Piraeus.

The climate across South Aegean is typically the Mediterranean. The summer is hot, dry and intensely

sunny, while the winter is a long, rainy affair that lasts from November to March. The southern and western parts of the Aegean are known for their intense winds.

The Aegean islands do not have zones with significant differences in altitude. There is low vegetation and limited forests. Generally, the Aegean flora consists of species that can endure the arid conditions of the Mediterranean summer and the water shortage. The coasts constitute significant ecosystems as well. The large degree of endemic flora that the Aegean shows is quite impressive.

The Aegean landscapes are mainly rural and have been created after many years of interaction between the built and natural environment with great ecological value.

5. Regional Adaptation Action Plan of the Region of South Aegean

The RAAP of the South Aegean was developed according to the provisions of the L. 4414/2016 and Ministerial Decision 11258/2017.

Its main objective is to strengthen the Region's resilience to climate change concerning all sectoral policies, according to the provisions of the NAS (RAAP of the South Aegean, 2021). This objective aims to ensure the preparedness and capacity of the Region to deal with the effects of climate change and develop a coherent approach to improve policy coordination and implementation at regional and local scales.

The RAAP of the South Aegean proposes short-term, medium-term and long-term climate change adaptation measures and policies after assessing -from environmental and socioeconomic points of view- the immediate and future environmental, economic and social impacts of climate change.

The RAAP of the South Aegean also aims to prioritise, based on appropriate evaluation criteria, the proposed climate change adaptation measures and policies concerning the various sectors. It also presents a set of measures and policies that formulate a comprehensive regional strategy for adaptation to climate change.

An important parameter for the successful implementation of the RAAP of the South Aegean is to ensure the active participation of all stakeholders. This initiative will allow the decision-makers to form the actions appropriate to urge the integration of climate change adaptation at all the sectoral policies.

The main priorities of the RAAP of the South Aegean are to (RAAP of the South Aegean, 2021): (i) systematise and improve the decision-making process (short-term and long-term) concerning adaptation decisions, (ii) promote a sustainable development model through regional/ local action plans, (iii) integrate climate change adaptation measures and policies in all sectors of the economy, (iv) create an effective mechanism to monitor, implement and evaluate climate change adaptation measures and policies, (v) strengthen the adaptive

capacity of the Region through awareness-raising actions.

According to the RAAP of the South Aegean, the activities of the primary sector (agriculture, livestock and fish farming) and water resources sector (especially irrigation) will face moderate to high risks from the impacts of climate change in the short and medium-term (until 2050). The sectors of tourism, public health (mainly in the Dodecanese islands), forests, biodiversity, inland waters and protected areas (especially wetlands) will face moderate risks in the short and medium-term.

In the long term (period 2071-2100), the climate risks increase significantly for most of the sectors above. The water resources sector will face the most severe problems. The livestock, fisheries and fish farming, coastal areas, port infrastructure, road transport, public health and private health, and the aquatic environment sectors will face moderate and high risks. The remaining sectors (i.e. manufacturing, mining, aviation, building infrastructure, tertiary sector) are expected to face low risks in the short and long term.

The measures the RAAP of South Aegean proposes were prioritised based on an overall score that emerged from their correlation with potential impacts, efficiency and benefit ratios and funding sources.

As high priority measures are identified the (RAAP of the South Aegean, 2021): (i) assessment of the vulnerability per individual activity in the primary sector, (ii) adaptation of tourism enterprises and infrastructure to the impacts of climate change, (iii) development of an action plan for the protection of underground aquifers and (iv) development of new infrastructure to protect various areas from floods.

6. Regional Spatial Planning Framework of the Region of South Aegean

The main objectives of the -currently under development- RSPF of the South Aegean are (RSPF of South Aegean, 2021): (i) the development of an updated spatial and development plan, including economic, spatial, environmental and urban directions about the next fifteen years, (ii) the promotion of a sustainable model of development for the Region.

Other secondary objectives are to (RSPF of South Aegean, 2021): (i) strengthen the extroversion and competitiveness of the Region at national, European and international scales, (ii) minimize the dependencies gradually among certain islands of the Region, (iii) promote the development of internal cooperation networks to reduce inefficiencies and save human and other resources, (iv) promote the efficient use of the natural and cultural resources of the Region, (v) protect the Region against climate vulnerability parameters, (vi) upgrade and protect the natural and built environment of the islands of the Region, (vii) reinforce the role of the Region as a leading destination for tourism experience worldwide, through the promotion of a product diversification strategy.

The RSPF has a fifteen-year programming period, with a five-year medium-term implementation horizon and a ten-year long-term implementation horizon.

The RSPF of the South Aegean acknowledges the Region of the South Aegean as one of the most vulnerable areas of Greece concerning the impacts of climate change. Among the expected effects of climate change are extreme weather events, soil erosion phenomena, desertification phenomena, sea-level rise, and water scarcity. These problems require a high degree of preparation.

The RSPF of the South Aegean proposes the immediate development of an 'Integrated Climate Change Adaptation and Response Plan', which should include a set of spatial planning measures to protect natural and cultural resources and economic activities from the expected impacts of climate change.

Another significant proposal of the RSPF of the South Aegean is the development of 'Quality Upgrade Zones of Intensive Tourist Activities'. This proposal aims to establish a minimum building prohibition zone across the coastal front as a measure to minimize the effects of climate change. As such potential zones are identified (RSPF of South Aegean, 2021): (i) all the low-development islands of the Region, as the RSPF classifies them, (ii) the Astypalea, Karpathos, Symi islands, (iii) the semi-mountainous and mountainous zones of Andros, Naxos, Rhodes and Tinos islands, (iv) the inactive mines of Serifos, the Smyrna Mines of Naxos, the Sulfur Mines of Milos, (v) the coastal zones of all the islands.

Specifically, about the coastal zones, the RSPF of the South Aegean proposes the prohibition against any kind of construction at coastal areas in case they are less than 120 m away from the shoreline or in those constructions that take place out-of-the boundaries of any existing and/or proposed LUP. A similar restriction is proposed to be implemented concerning buildings that exist at a distance less than 150 m from the top of the winter wave and also where an LUP does not exist.

According to the provisions of the RSPF, the future LUP should further examine this safety distance as, in some cases, it may be insufficient (e.g. areas of zero or minimal slope). This measure ensures that a minimum possible protection will be preserved in case of a tidal wave, given the area's seismicity. Similar studies are required concerning the coastal areas where zero or minimum slopes exist. These studies will propose and establish measures for existing economic activities and their facilities. The future LUPs and SUPs should include the proposals of these studies.

One of the most critical measures that should be implemented immediately, according to the RSPF of the South Aegean, is a campaign to raise awareness of citizens, politicians and institutions concerning climate change issues and its predicted impacts.

Another important proposal of the RSPF is the improvement of the quality of the urban environment as

well as the adaptation of an integrated approach to increase the attractiveness of urban centers through tackling many of their fundamental problems (e.g. deficits in open spaces-green spaces, minimization of pollution) and promoting green entrepreneurship, social justice, governance and innovation.

7. Conclusions

In 2013 the EU proposed a strategy concerning the adaptation to climate change, trying to urge its Member-States to develop climate change policies at a national scale. The EU revised this strategy in 2021 to propose more up-to-date measures and techniques, to accelerate the adaptation of all economic sectors to the impacts of climate change.

The Greek NAS was adopted in 2016, while the RAAPs are expected to be legislated within this year. The establishment of the NAS was the first important step to address the effects of climate change in Greece and promote adaptation measures. The next -and probably even more important- step is the establishment of the RAAPs.

The RAAPs propose climate change adaptation measures and policies, at a regional scale, to promote each Region's regional strategy for adaptation to climate change.

The provisions of the L. 4414/2016 states that the RAAPs should be aligned with other regional-scaled plans, such as the RSPFs, which among other things, guide the spatial organization model each region should follow and propose measures concerning the structure of the residential network of each region.

This paper examined the compatibility and complementarity between the RAAP and RSPF of South Aegean. The qualitative analysis performed revealed linkages between the RAAP and the RSPF of the South Aegean in terms of objectives, measures and tools. There is a strong possibility that this conclusion will be valid for the rest -under development- RAAPs and the RSPFs, most of which are already developed.

The comparative analysis of the RAAP and the RSPF of the South Aegean revealed the interconnection between spatial planning policies and adaptation to climate change policies.

The recent establishment of the L. 4759/20 reflects the legislator's intention to add to the local-scale spatial planning an adaptive character aligned with the principles and priorities of climate change adaptation. This is a shift of local spatial planning objectives towards climate change adaptation through the future development of LUPs and SUPs.

However, there is an urgent need to create an effective mechanism to coordinate, monitor and evaluate the interconnections between spatial plans and climate change adaptation policies, which is currently missing.

The use of the resources of the Recovery Plan for Europe and the Recovery and Resilience Fund for Greece are

important opportunities for Greece as they can be used to drastically diversify the country's development model and promote the adaptation to the expected impacts of climate change.

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