

Περιφέρεια | Regional Integration: Politics, Economics, Governance

Τόμ. 18 (2024)

Περιφέρεια | Regional Integration: Politics, Economics, Governance: Addressing Climate Change in Turbulent Times

Autumn | Φθινόπωρο 2024 Issue | Τεύχος 18

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REGIONAL
INTEGRATION
politics economics governance

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Όθων Καμινιάρης

doi: [10.12681/ri.40701](https://doi.org/10.12681/ri.40701)

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Βιβλιογραφική αναφορά:

Καμινιάρης Ό. (2025). Αξιολογώντας τις διαδικασίες προσαρμογής στην κλιματική αλλαγή της Ελλάδας: συμμόρφωση με το θεσμικό και νομικό πλαίσιο και αποτελεσματικότητα. *Περιφέρεια | Regional Integration: Politics, Economics, Governance*, 18. <https://doi.org/10.12681/ri.40701>

Taking stock of the Greek climate change adaptation processes: compliance with and efficiency of the institutional and legal framework

Dr. Othon Kaminiaris, Researcher,

Institute of European Integration and Policy, National and Kapodistrian University of Athens, othonkaminiaris@gmail.com

Abstract

Increased natural disasters and the incurred high losses have made climate change adaptation an imperative globally and regionally. Greece too has recently experienced some of the most severe disasters in its modern history. With this in mind and in view of the imminent amendment of its national adaptation strategy, the latter's efficiency and compliance are explored, in conjunction with the respective international and European framework. It is argued that the lenience observed therein has been carried over to the Greek case, leaving room for a potentially incohesive division of competences of questionable efficiency and poor monitoring and compliance procedures.

Keywords: Climate change adaptation; national adaptation strategy; regional adaptation strategy; efficiency; compliance

Αξιολογώντας τις διαδικασίες προσαρμογής στην κλιματική αλλαγή της Ελλάδας: συμμόρφωση με το θεσμικό και νομικό πλαίσιο και αποτελεσματικότητα

Δρ. Όθων Καμινιάρης, Ερευνητής,

Εργαστήριο Ευρωπαϊκής Ενοποίησης και Πολιτικής, Εθνικό και Καποδιστριακό Πανεπιστήμιο Αθηνών

Περίληψη

Οι αυξημένες φυσικές καταστροφές και οι υψηλές απώλειες έχουν καταστήσει την προσαρμογή στην κλιματική αλλαγή επιτακτική σε παγκόσμιο και περιφερειακό επίπεδο. Τα τελευταία χρόνια, η Ελλάδα έχει και αυτή βιώσει μερικές από τις πιο σοβαρές καταστροφές στην πρόσφατη ιστορία της. Λαμβανομένων υπόψιν αυτών και ενόψει της επικείμενης δυνατότητας τροποποίησης της εθνικής στρατηγικής για την προσαρμογή, διερευνάται η συμμόρφωση και η αποτελεσματικότητα αυτής ως προς το διεθνές και ενωσιακό πλαίσιο. Υποστηρίζεται ότι η επιείκεια που παρατηρείται σε αυτό έχει μεταφερθεί και στην ελληνική περίπτωση, αφήνοντας περιθώρια για μια πιθανώς μη συνεκτική κατανομή ευθυνών αμφίβολης αποτελεσματικότητας και ανεπαρκών διαδικασιών παρακολούθησης και συμμόρφωσης.

Λέξεις κλειδιά: Προσαρμογή στην κλιματική αλλαγή, εθνική στρατηγική προσαρμογής, περιφερειακή στρατηγική προσαρμογής, αποτελεσματικότητα, συμμόρφωση

1. Introduction

According to the United Nations Office for Disaster Risk Reduction, during the 2000-2019 period, climate-related disasters globally have risen by more than 45%, compared to the previous twenty years, amounting to around 6700, most of which were floods, followed by storms, heatwaves, droughts and wildfires. And these disasters have affected billions of people worldwide and have caused a multitude of deaths, while also accounting to losses of several \$ trillions. And although the most disaster-prone continents have been Asia, the Americas and Africa, Europe has not remained unharmed (2019).

As per the European Environment Agency estimations, for the period from 1980 to 2023, weather- and climate-related extremes (storms, floods, heatwaves, cold waves, droughts and forest fires) caused estimated economic losses of around €738 billion in the EU (2024). In fact, a little over 20% of the total losses account only for 3 years, from 2021 to 2023. This means that the economic losses for the whole period translate into a rough average of €17.2 billion of yearly losses, while the average for the latest 3 years is around €54 billion. In turn, this shows that adaptation costs have grown significantly in the past years, potentially establishing a new trend of really high yearly losses.

Greece has not remained unharmed either, experiencing damages of around €16.35 in the same period. And although it “scored” well below the EU average in terms of economic losses, other factors like the non-insured economic losses and the fatalities were disproportionately higher in relation to its overall economic losses (ibid). This is not surprising, taking into account that in the past few years it has experienced some of the most calamitous natural disasters of its modern history. Specific disasters stand out, like the 2018 fire in Mati, in the Attica Region, which claimed the lives of more than 100 people and injured hundreds, while directly affecting more than 4,500 people and households (Organisation of Economic Cooperation and Development 2024). Moreover, the 2023 megafire in Dadia, Evros, in the Eastern Macedonia and Thrace Region, cost two people their lives but had an immeasurable environmental toll: it scorched more than 940,000 hectares of forests and wooded land in the Dadia-Lefkimi-Soufli Forest National Park, thus becoming the largest single fire to occur in Europe since the 1980s (Hellenic Fire Brigade 2023; European Commission, EU Science Hub 2024). Yet, maybe the biggest disaster occurred on 5-7 September 2023, in the Region of Thessaly. The latter was struck by Storm Daniel, a once-in-a-1000-year weather event, where extreme rainfall caused extensive floods and loss of livestock, human lives, harvests, land, and assets, with overall damages of more than €2.2 billion (HVA 2023).

In this context, the case of Greece's performance regarding climate adaptation stands out. The questions which reasonably arise are to what extent Greece has developed its adaptation policy framework and whether or not that is effective. To address the former question, the article first presents the international framework for climate adaptation and that of the European Union (EU). This is done because Greece's own framework derives mostly, if not wholly, from them, rather than nation-

al initiatives. In turn, the Greek framework is presented, as it stems from the official documents it has adopted. To address the latter question, emphasis will be given on the European framework and especially specific guidelines for adaptation that the EU has published. Greece's adherence to those will be explored in the discussion, in order to define the efficiency of its national framework based on those standards.

2. A lenient international and European framework?

2.1 The international context

Mentions to adaptation in the international climate treaties were sparse and scarce. The 1992 United Nations Framework Convention on Climate Change (UNFCCC) only recognised adaptation as a key focus area for action. For instance, Article 3 identifies adaptation as one of the ways through which states should take precautionary measures to anticipate, prevent and minimise the causes and impacts of climate change. Thus, as posited in Article 4, states should adopt, implement and regularly update national and regional adaptation programmes and measures. In the same article international and transnational cooperation was also proposed as a means to formulating adequate plans for a series of sectors, like coastal zone management, water resources and agriculture. Finally, the importance of technology transfer, and financial assistance for adaptation measures from the developed towards the developing countries was highlighted in the same article (United Nations 1992: 4-8).

The Kyoto Protocol too included some mentions to climate adaptation, despite its heavy focus on the allocation of mitigation efforts. However, it did not add anything new. Specifically, through Article 10 it reiterated with almost the exact same wording the need for adaptation policies. To this end, it gave emphasis on the cooperation and exchanges between the developed and the developing nations, while also providing for some financial aid for extremely vulnerable states, in order for them to meet the costs of adaptation (Article 12, paragraph 8) (United Nations 1997: 9, 12).

In the Paris Agreement the increased role of adaptation was clear; an upgrade that can be attested by the sheer number of times the word adaptation is mentioned, compared to the two previous treaties (47 compared to 4 in the UNFCCC and 5 in the Kyoto Protocol). As for the substantive aspects, Articles 4 through 6 focused on the co-benefits created for mitigation through integrated adaptation measures which could result in sinks for emissions. The most central-to-adaptation Article, however, was 7, by virtue of paragraph 1 of which states established "the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response...". Moreover, states should engage in adaptation processes and actions, *inter alia*, through formulating and implementing national adaptation plans (NAPs). Subsequent Articles, like number 9, moved in the same direction as those of the previous treaties, namely underlining the need for financial support and resource exchanges (United Nations 2015: 4-11).

2.2 The European context

The first steps of the EU towards a framework of adaptation were made in 2007 with the publication of a relevant Green Paper. The latter attempted to put adaptation action to the forefront by bringing out the importance and necessity of early action, based on climate data, the vulnerability of the European continent and estimations on economic losses. However, it did not contain but recommendations to the member states, such as the need for the involvement of both the private and the public sector (national, regional and local authorities), as well as the need to mainstream adaptation in sectoral policies. Specifically, in the case of the private sector it was highlighted that businesses, industry and services' sectors, as well as individual citizens could play an important role in adaptation measures. Also, as far as the public sector is concerned, specific items were brought out, like spatial and infrastructure planning, disaster management strategies, early flood and forest fire warning systems etc. With regard to the sectoral policies in which adaptation action should be taken, agriculture and rural development, energy, transport, water and health were mentioned among other things. Finally, the Green Paper emphasised the benefits of information-sharing between member states for reducing learning costs (Commission of the European Communities 2007:9-20).

Two years later, in 2009, a relevant White Paper was published with the aim of systematising the EU's adaptation framework by setting two distinct and interrelated phases of work. During the first phase, between 2009 and 2012, a comprehensive adaptation strategy would be prepared; that would start being implemented in the second phase, i.e., from 2013 and onwards. Moreover, the Paper contained proposals covering the actions that needed to be taken in the first phase. These included the building of a knowledge base on the impacts of climate change for the EU, the integration of adaptation into EU key policy areas, and the employment of a multilevel approach with various solutions, like market-based instruments, guidelines, and public-private partnerships. Finally, there was a fourth component on the EU's external action regarding cooperation on adaptation at the international level (Commission of the European Communities 2009).

Following its timeline for implementation, the EU issued in April 2013 its first official Adaptation Strategy. In it, the varying responses of the member states to adaptation that far were described. Specifically, it listed that 15 states had already adopted a relevant national strategy, in some cases while also successfully integrating adaptation measures into sectoral policies, while some of the states that had not yet adopted their national strategies were preparing them. But, overall, adaptation was at a really early stage. To give it an impetus, the Commission listed a set of actions. The most important one was that it encouraged all member states to adopt comprehensive adaptation strategies, for which it provided guidelines. To better achieve that, it would develop an adaptation preparedness scoreboard, with key indicators for measuring the member states' readiness, and in 2017 it would assess the progress made. The other main key action points of the strategy referred to enhancing knowledge, financing adaptation projects, mainstreaming adapta-

tion action in specific EU policies, as well as improving resilience of targeted sectors like energy and transport (European Commission 2013).

No other major milestones regarding adaptation were introduced until the late 2010s, where the first relevant assessment was concluded by the EU in 2018. In the same year, the Governance Regulation of the Energy Union and Climate Action was adopted, which was of high importance for adaptation. The Regulation, *inter alia*, introduced the obligation for member states to formulate integrated national energy and climate plans, the famous NECPs, which have grown to become one of the cornerstones and roadmaps of the states' policy and action against climate change. The NECPs should take into account adaptation considerations overall, while specific adaptation measures should be also incorporated, according to the Regulation. Moreover, specific reporting obligations on adaptation for the EU member states were set by virtue of Article 19 (Official Journal of the European Union 2018).

A year later, in 2019, the EU announced the European Green Deal (EGD), a landmark development strategy with the aim of rendering Europe the first climate-neutral continent by 2050. The EGD predominantly focused on climate mitigation. Yet, in the relevant Communication, the European Commission highlighted that adaptation action should continue and be enhanced; hence, the EU would develop a new relevant strategy for better addressing its new ambitions and goals under the EGD (European Commission 2019:5).

Indeed, in 2021, the second official EU strategy on adaptation was published. Despite titled a "new" EU strategy on adaptation, the latest document did not bring any real innovations. Conversely, it advocated for a smarter, more systemic and faster adaptation, as, by then, all EU member states had a national adaptation strategy in place and implementation should be enhanced. Thus, it firstly reiterated the need for improving knowledge on adaptation, mainly through more and better climate-related risk and losses data. Secondly, it reemphasised the imperative of mainstreaming adaptation in sectoral policies, of involving different levels of governance, of including social justice considerations and, finally, of establishing robust monitoring, reporting and evaluation procedures. Thirdly, as far as the faster adaptation action was concerned, the strategy focused on the need of speeding up action overall, the need of climate-related risks reduction, mainly through the capitalisation of the broader disaster risk prevention and reduction nexus, as well as of the reduction of the climate protection gap. This meant decreasing the share of non-insured economic losses caused by climate-related disasters. The EU's relevant international action was also mentioned as an area of improvement (European Commission 2021).

The latest and probably most prominent development regarding the European framework on adaptation came through the European Climate Law, which was also adopted in 2021 and whose Article 5, paragraph 4 wrote: "Member States shall adopt and implement national adaptation strategies and plans, taking into consideration the Union strategy on adaptation to climate change... and based on robust climate change and vulnerability analyses, progress assessments and

indicators, and guided by the best available and most recent scientific evidence. In their national adaptation strategies, Member States shall take into account the particular vulnerability of the relevant sectors, *inter alia*, agriculture, and of water and food systems, as well as food security, and promote nature-based solutions and ecosystem-based adaptation. Member States shall regularly update the strategies..." (Official Journal of the European Union 2021: 11). Also, by virtue of Article 7, an assessment process for the national measures was established. Overall, through this article a clear shift of the EU towards a stricter adaptation framework can be observed. This is mainly demonstrated by the use of the verbs "shall" and of "adopt and implement", showcasing that the EU not only moved away from sheer recommendations, but also expected concrete results. In other words, it had now set out an obligation to adapt for the member states, which would be measured and monitored.

The article concluded with a promise from the EU's side, in order to assist member states in their newly-introduced obligation: the Commission would adopt guidelines for planning, developing, implementing and monitoring adaptation strategies and projects (*Ibid*). Indeed, in 2023 the guidelines were published. These were structured in 9 distinct but highly interrelated recommendations, 5 of which referred to matters of substance, while the remaining 4 related more to processes and means (European Union 2023:4).

From all the above, it becomes evident that both the international and the European framework on adaptation have been gradually becoming more robust over time, compared to their conception. Yet, they remain lenient, if not soft. The international one has managed to only establish adaptation as a global goal and make the development of NAPs the mainstream way of designing and implementing adaptation policies. The European one had not adequately paved the way to adaptation for years, limiting itself to issuing recommendations over recommendations. It only recently managed to establish adaptation as an obligation for member states, while also establishing, even more recently, comprehensive guidelines on what and how to do, not resembling in the least the strong and binding system it has developed for climate mitigation. Still, the progress made towards an in-depth assessment process for the measures taken at the national level by the member states must be acknowledged. Thus, even if there was a late(r) start, the climate adaptation regime seems to have started working, at least at the regional level. But how is all that applied in Greece?

3. The Greek response to adaptation

Greece's committed engagement and occupation with adaptation began in 2016, when in the aftermath of the Paris Agreement and the then newly-established global goal on adaptation, it adopted the Greek National Adaptation Strategy (GNAS). The latter's overarching goal, as stated in itself, was to contribute to the strengthening of the country's resilience to the impacts of climate change. To this end, it set five targets:

1. To systematise and improve the process of short- and long-term decision-making related to adaptation
2. To connect adaptation with the promotion of a sustainable development model through regional/local action plans
3. To promote adaptation actions and policies in all sectors of the Greek economy with emphasis on the most vulnerable ones
4. To create a mechanism for monitoring, evaluating and updating adaptation actions and policies
5. To strengthen the adaptive capacity of Greek society through information and awareness-raising actions

To best address the above and in one of the few cases of decentralised and bottom-up environmental policy making in Greece, the GNAS was set out to serve as a mere document of strategic orientation, aimed at setting guidelines for the development of 13 Regional Adaptation Strategies (RAS), one per Region of the country. As such, the GNAS did not decide upon the feasibility of specific adaptation actions, nor did it attempt to prioritise indicative solutions at either the sectoral or the regional/local levels. Instead, it included a first presentation of the vulnerability of 9 main sectors of the Greek economy as a whole with indicative measures for each, and of its 13 Regions. In the absence of official national data on the production per sector and Region, the GNAS drew data from a landmark report of the Bank of Greece (EMEKA 2011). Thus, it did only achieve the calculation of a relative vulnerability of the Regions, not categorising them based on their objective vulnerability to climate change, but only by comparison among them, taking also into account their projected economic losses per sector.

Furthermore, the GNAS underlined the necessity of guaranteeing the procedures for the preparation and institutionalisation of the RASs, particularly their content and specifications, as well as the processes of approving, implementing and monitoring them. Yet it once again made clear that the final selection, prioritisation and scheduling of appropriate actions and measures per Region would lie with them (Ministry of the Environment and Energy 2016:12,22). Finally, despite it being one of its 5 main goals, it failed to establish a monitoring and evaluation process and completely omitted it. The only reference made was under the means of implementation of the GNAS, specifically mentioning the usefulness of a potential observatory and a special mechanism for targeted support of adaptation efforts of all governance levels and actions through appropriate indicators and tools (*Ibid:93*).

Some months later, the Greek law 4414/2016 was passed which made official and legally binding the process of adopting the GNAS itself, its contents and process of update (Article 42). Specifically, the GNAS would be designed by the Ministry of the Environment and Energy (MEEN) and would be evaluated and updated at least every ten years, after an assessment analysis and following an opinion issued by the National Council on Climate Change Adaptation. The latter was established by virtue of the same law and was tasked, apart from the above, with advisory re-

sponsibilities, such as the specialisation of national adaptation policies based on international agreements and EU policies and the recommendation of relevant measures, even legislative actions (Article 44). Finally, Article 43 laid down the specifics for the creation of the 13 RASs, namely the process of their adoption by the 13 Greek Regions and minimum standards for public consultation, their minimum contents, as well as the process of their update, which should be done at least once every 7 years (Hellenic Republic 2016:8322).

The contents of the RASs were further elaborated by Ministerial Declaration 11258/2017. Maybe the most useful addition of the latter was that it introduced the obligation for Greek regions when designing their RASs to include the financing mechanisms, the possible additional sources of financing/cost coverage, the method of implementation, their estimated duration, as well as any implementation difficulties (Hellenic Republic 2017:7493).

As already showcased, the GNAS gave a high degree of autonomy to the Greek Regions for adopting their RASs, not laying down a specific timetable or deadline for that, neither for their implementation. This created great delays, leading to the first two RASs being adopted only in the first quarter of 2022. As of December 2024, 10 RASs had been adopted in total, while the remaining 3 have been further delayed with the traces of their impact assessments, whose design is a prerequisite for the adoption of the RAS, having gone missing for at least a year.

Table 1. Greek Regional Adaptation Strategies status of adoption

Region	Status	Information
Attica	Adopted	12/2022
Central Greece	Adopted	5/2023
Central Macedonia	Adopted	10/2022
Crete	Adopted	9/2022
Eastern Macedonia and Thrace	Adopted	11/2024
Epirus	Adopted	4/2022
Ionian Islands	In progress	Impact assessment pending as of 6/2021
North Aegean	Adopted	4/2022
Peloponnese	Adopted	12/2022
South Aegean	In progress	Impact assessment in public consultation as of 10/2023
Thessaly	In progress	Impact assessment in public consultation as of 1/2024
Western Greece	Adopted	12/2022
Western Macedonia	Adopted	5/2023

Source: author's own compilation

Between the adoption of the GNAS in 2016 and the adoption of the first RASs in 2022, some more important developments occurred. Specifically, in December 2019, Greece adopted its first NECP fulfilling its obligation under the EU Governance Regulation (Decision 4/23.12.2019). In 2021, it established a Ministry of Climate Crisis and Civil Protection (MCCCP) (Presidential Decree 70/9.9.2021). Finally, in 2022 it adopted its own National Climate Law (NCL) (4936/2022).

As far as the NECP is concerned, despite it being a document of hundreds of pages, adaptation only occupied a few of them (less than 10). Therein, the necessity of adapting to climate change was reiterated. Also, the steps that the Greek state had already made regarding adaptation were presented, i.e. the adoption of the GNAS, the progress made by then for the adoption of the RASs, as well as some initiatives Greece had taken, like the implementation of a relevant LIFE project, co-funded by the EU, and a project in collaboration with UNESCO and the World Meteorological Organisation for the protection of cultural heritage from climate change. Thus, by again underlining the autonomy of the Greek Regions for designing their RASs, it avoided including any measures on adaptation (Hellenic Republic 2019:55554-55556).

By virtue of the aforementioned Decree, the newly-established MCCCP would oversee all “European matters and policies regarding climate change adaptation” (Hellenic Republic 2021). Subsequently, the Greek NCL explicitly tasked the said Ministry with the design and implementation of the GNAS reiterating a 10-year window before its update, while also setting a 5-year window for its evaluation. Apart from that, it also presented anew the specifications of the both the GNAS and the RASs. With regard to the latter, it specified that they should at least cover a 7-year period and set 5-year window for their evaluation too. Furthermore, it established the National Observatory on Climate Change Adaptation (Article 25). The latter was tasked, among other things, with the following:

1. monitoring and assessing the country's resilience to the impacts of climate change
2. providing data to the administration and training its executives to support the planning, evaluation and updating of policies and actions
3. developing and constantly updating a unified national climate database, building on existing national actions and initiatives, which will be digital and publicly accessible (Hellenic Republic 2022)

Before proceeding to the discussion of the implications of Greece's current response to adaptation, a final document needs to be examined. This is the newer version of the Greek NECP, which was designed for the fulfillment of the state's obligation for a mid-term update of its NECP under the EGD and the EU Governance Regulation. This updated version of the NECP is not yet in force, as it was put into public consultation from August to September 2024 and has not, since then, been officially adopted. This means that amendments may be done, especially taking into account that several of the comments submitted during the consultation referred to adaptation (OpenGov.gr 2024a). In any case, a preliminary note may be

taken: in contrast to the previous version, this one takes adaptation into far more consideration. Specifically, it presents a long list of measures which concern both natural and human systems and are designed based on vulnerability assessments for ecosystems, economic sectors and different population groups. Overall, these measures aim at reducing climate vulnerability for each of the pillars of the updated NECP. To better illustrate that, the measures are connected with specific sectors of climate mitigation and the synergies between and among them are also listed. Thus, an evidently more integrated approach for mitigation and adaptation is employed, which runs through the whole document (OpenGov.gr 2024b).

4. Discussion

From all the above, it became obvious that Greece has began its journey to climate change adaptation. However, some key shortcomings can be observed and a lot of food for thought can be offered. The main shortcomings have to do with delays. These have mainly been passed down by the international and European institutional framework itself, while others are completely of Greece's own fault and negligence. With regard to the food for thought, it has to do more with the governance mechanism that Greece has in place for adaptation. Thus, it might be relevant to policy makers for improving the national and regional adaptation policies, but it is also useful for further research. To delve deeper into all these considerations, it is useful to attempt a first assessment of the efficiency of Greece's adaptation policy. This can be performed by looking into whether or not it follows the relevant guidelines of the EU for adaptation strategies (see European Union 2023:4).

Greece seems to be "ticking the box" of the first two guidelines which write that member states should have "legal frameworks laying down the 'duty to adapt' at national level, including binding, regularly updated (sectoral) adaptation goals to measure overall progress in building resilience to climate change impacts", and that they should also have "regularly updated adaptation strategies and plans in place, framing the overall adaptation policy and its implementation at strategic and operational levels". Having passed its GNAS through law since 2016, Greece indeed seems to have legally established its duty to adapt. Also, by virtue of its latest legal acts, especially its NCL, it has established a system for regularly updating its adaptation goals. It is reminded that the GNAS may be updated every 10 years, while the RASs every 7, with the window of assessment of both having been set to 5 years. These timelines, if observed, ensure a regular update. However, it remains to be seen whether or not this will be indeed done on time. Taking into account, though, that the GNAS was adopted in 2016, it is a great opportunity for Greece to start early its update which would be due in 2026.

The third guideline refers to "adaptation policy priorities identifying sectors or areas to be involved and covered by adaptation planning and impacts or risks that need to be addressed in adaptation planning. The priorities should be set out in order of targets and objectives, followed by clear adaptation pathways

setting up the process of how to achieve them through the sequence of options and actions". Greece suffers in this regard. Although the GNAS set out the policy priorities and most vulnerable sectors for adaptation, it is reminded that it approached vulnerability only in relative terms. This means that a great deal of work needs to be done to identify anew vulnerable sectors and areas and to design adequate indexes and datasets, in order to make more informed and science-based decisions regarding adaptation, especially at the regional level.

Fortunately, circumstances may favour this conundrum. It is true that even when the GNAS was designed, the data on which it drew, coming from the 2011 report of the Bank of Greece, could have already been outdated. Let us not forget here, that the 2010s was a really intense decade in terms of climate policy making globally and especially in the EU. Thus, new data and approaches constantly kept coming. Let us not forget either that the climate data for the past decade have been really revealing and alarming. A new assessment cycle of the Intergovernmental Panel on Climate Change has been concluded; hence Greece could capitalise on all this new knowledge. By the same token, the Bank of Greece has been preparing a new report titled "Climate change vulnerability and impacts in Greece", whose interim results were presented in November 2023 (Bank of Greece 2023). Hopefully, the final report will be published soon, in order for the process of updating the GNAS to feed on it.

The above will also serve for fulfilling the fourth guideline at the national level, namely the existence of "regularly updated and robust climate change impact and vulnerability assessments based on the latest climate science to identify the populations, essential infrastructure and sectors particularly vulnerable to climate change, setting the overall strategic direction of adaptation policy and continuously informing decision-making". For the regional level, this seems to be covered already as impact assessments are a prerequisite for Greek Regions to adopt their RASs. And as portrayed in Table 1 above, the 3 RASs that have not yet been adopted are stuck at the phase of approving those assessments. Yet, caution is needed here: the RASs were practically outside the scope of this study, so their robustness has not been checked.

The same applies to guideline number 5, which concerns "stress testing of (critical) infrastructure and systems as a key input into climate change risk assessments". Again, the RASs were not examined, but with a brief search one may find, for instance, that the Region of Attica has been implementing actions to this direction. It has already installed and tested a pilot system for floods in the Municipality of Peristeri, one of the top-3 most densely populated municipalities in Attica, and another one for early flood warning in the Phylis Municipality. Also, it recently established its own observatory on climate change (Region of Attica, 2024). This is not to say that Greece and its Regions do or do not follow this guideline or not; rather that Regions that do not implement such actions should start doing so and, in a similar vein, the central government itself where appropriate.

The conversation on pilot systems and observatories is a perfect bridge to the sixth guideline, according to which there is need for “sufficient, knowledgeable personnel and financial resources across all related institutions and administrative departments for the coordination of activities and implementation of actions at all levels of governance (national, regional, local)”. In regard with the knowledge aspect, Greece again is lagging behind. The most striking example concerns the National Observatory on Climate Change Adaptation which was established by the Greek NCL in 2022, having been proposed as early as 2016 in the GNAS. It is reminded that the Observatory was, *inter alia*, tasked with providing data to the administration and training its executives to best address adaptation needs and action. Apart from the fact that it took Greece 6 years to establish it, it has been another 2.5 years since the NCL entered into force and the Observatory has not been equipped with staff yet, let alone start functioning. And this creates a huge knowledge gap. The only knowledge-related step that has been made up to today concerns the digital climate database that the Observatory would oversee. In November 2024, the Academy of Athens and the Natural Environment and Climate Change Agency announced their collaboration with the MEEN for a 20-months project on the creation of the said national database (Money Review 2024), which means that, at best, this will be ready by mid-2026.

As far as the financing aspect of the guideline is concerned, further research is needed for both the national and the regional level to argue about that. However, taking into account the fact that the 2017 Decision that elaborated the specifications of the RASs set an obligation of listing therein a financial plan, examining the soundness of the adopted RASs' said plans would be a good start.

Further research would also be needed to argue about guideline 7 as well, regarding the “engagement of all relevant stakeholders (private sector, NGOs, certain communities, etc.) that are particularly exposed / vulnerable and / or have knowledge / resources / capacities to inform and / or implement the adaptation actions”. The RASs should again be looked into, insofar this guideline refers to the implementation aspect, which is practically carried out through the 13 Greek Regions. With regard to the GNAS, this guideline will be relevant for its imminent update.

The penultimate guideline refers to the need of “multi-level coordination and mainstreaming, both horizontal (e.g., across the ministries) and vertical (e.g., with other layers of public administration), when planning and implementing adaptation actions”. Here, it is once again stated that adaptation is practically carried out by the 13 Greek Regions. Also, it is reminded that, up until 2022, adaptation responsibilities were under the MEEN and they were passed on to the newly-established MCCCP with the Greek NCL. Finally, what was not mentioned earlier is that, by virtue of Article 16 of the latter, an obligation for municipalities to design and implement Municipal Plans for Emissions Mitigation was introduced. All these are mentioned because they create a somewhat fragmented governance system, where mitigation is overseen by the MEEN and is implemented at the

local level by Municipalities, whereas adaptation is overseen by the MCCC and is implemented at the regional level by the Regions. This may seem like the perfect embodiment of the guideline with both a horizontal and vertical allocation of competences. Besides, this has been a cornerstone of the EU adaptation framework since its inception. As early as 2007, the EU's Green Paper was mentioning that "division of competence between states and their regions varies significantly across the EU... [and therefore there should be an adjustment] ...to the national situation" (Commission of the European Communities 2007:11).

Nonetheless, some concerns need to be raised regarding the attainment of coordination, in the sense that, with such a governance mechanism, it becomes really challenging. This is especially relevant taking into account the need for an integrated approach and the creation of synergies between mitigation and adaptation in order to deliver co-benefits. This approach requires not only exchanges between the central government, i.e. the two Ministries, and the Regions and Municipalities, but also between the two levels of local authorities. And this might prove to be complex.

Rethinking its approach soon could be a viable solution for Greece, for instance by establishing an obligation for Regional Plans for Emissions Mitigation, also in line with the sectoral carbon budgets recently established at the national level. As of mid-2024, the Greek Municipalities had not yet fulfilled their obligations, despite the extension of the respective deadline they had been granted. Specifically, the Greek Minister of Environment and Energy, answering a relevant parliamentary question, had said that "[a]ccording to the information we have, several Municipalities are in the process of preparing their Plans and are expected to submit them in the Electronic Database by the end of the year" (MEEN 2024). Yet as of early 2025, none of the 332 Municipalities had done so. This means that a huge load of administrative burden would be lifted before Municipalities eventually start submitting their Plans. In any case, decision makers should first examine the efficiency of this mechanism, before examining the possibility of changing this division of competence. In the event that such a possibility is considered, looking into the governance mechanisms of other EU member states by way of best practices would be necessary.

The ninth and final guideline refers to the "continuous monitoring and evaluation of implementation of adaptation actions, covering processes as well as effects and outcomes, and endowed with the necessary instruments. Infrastructure for the monitoring of adaptation outcomes may have important synergies with early warning". And this is where Greece has proven to be the least adept. A first sign for this is the absence of the aforementioned Observatory and the delays surrounding it, as described above, whose function would have contributed a lot in this direction.

Other concerns in this regard are related to the compliance aspect of a monitoring system. Specifically, it can be argued that even as this article is being written, adaptation has remained a dead letter since the GNAS's adoption, as

adaptation is practically carried out by the Regions and only some of them have adopted their RASs. This stands out even more taking also into account the fact that adoption does not necessarily automatically mean implementation. In other words, even the Regions that have adopted an RAS may have not started implementing it yet. All this brings out the need for the establishment of a robust national monitoring system with compliance standards and penalties. Such a need becomes even more dire if one thinks of the recent disasters Greece has experienced. Ironically enough, Thessaly which was hit by Storm Daniel still does not have an RAS in place, whereas Eastern Macedonia and Thrace which withstood the megafires in 2023 adopted its own RAS only in November 2024. Of course, this is not to claim that the adoption or even implementation of RASs would have averted the natural disasters. However, a higher level of preparedness could have mitigated the losses, the economic ones included, for instance, through early warning systems and nature-based solutions.

5. Conclusions

Greece has, in the past few years, experienced some of its most serious natural disasters, a fact that, on the one hand, brings out the imperative for the state to better adapt and prepare and, on the other, the need to engage in relevant research. With this in mind, this article aimed to identify the extent to which Greece has developed its adaptation policy framework and whether or not that is efficient. In other words, to give an overview of the state's compliance with the institutional and legal framework it has set, and to perform an evaluation of the latter.

With regard to the first question, it was found that Greece indeed has developed its policy framework. It has adopted its GNAS and 10 out of its 13 Regions have adopted their RASs. But this development remains to a medium extent. And this is not because Greece has not conceived an adequate strategy, but because it has not made as much progress as expected in the implementation aspect. In other words, a lot of things remain in paper and are absent in practice. The most indicative example in this regard is the fact that there is a complete absence of monitoring bodies and procedures both for the national level and for regional one. The National Observatory on Climate Change Adaptation which was provided for in Greece's NCL and would serve as such, has not yet been launched. And this also leaves a significant knowledge gap for the administration, as well as a potential gap in its obligations towards the EU. Let us not forget at this point that by virtue of the ECL robust reporting processes were set up. And this absence of monitoring may prove to be critical in this case too.

As far as the second question is concerned, the efficiency, this far, can also be characterised as mediocre at best. And this is not necessarily due to Greece's performance, but also because a lot of the parameters that would determine such a performance were, eventually, outside of the scope of this study. Specifically, the biggest shortcoming identified in terms of efficiency is the complete and

utter absence of compliance mechanisms in the state's adaptation scheme. This absence has led to tremendous delays in the adoption of the Region's RASs, which, if in place, maybe could have watered down the losses that the aforementioned disasters incurred. In terms of efficiency, concerns are also raised by the fragmented governance mechanism that Greece has created, following a potentially incohesive division of competences among Ministries and local authorities for climate mitigation and adaptation. A governance mechanism that, in other words, might prove to be complex in practice. Yet, this remains to be seen.

As the period for updating its GNAS is fast approaching, Greece needs to engage in a self-reflecting exercise. It needs to identify which aspects of the implementation to speed up and why, to take stock of the current shortcomings, like the absence of compliance mechanisms and the overall delays, as well as to perform an overall evaluation of its adaptation mechanism and examine alternatives (e.g. with regard to the competences). Also, since the EU has provided the member states with such elaborate guidelines Greece should also make good use of them when designing the next phase of its strategy.

On a final note, it has to be mentioned that Greece seems to be following, at least at a minimum level, the relevant EU's guidelines on adaptation. However, to further determine that, equally further research is needed. Due to the division of competences that it has chosen, leaving the actualisation of adaptation to its Regions, a lot of the "dos and don'ts" of the EU do not refer to the central government and its planning, which was assessed here, but to the Regions themselves. Thus, the next step, research-wise, would now be to study if and how the Greek Regions have started implementing their RAS.

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