



REPUBLIC OF CROATIA
STATE AUDIT OFFICE

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Performance Audit Report

Climate Change Adaptation in the Republic of Croatia



This version of the Report on Climate Change Adaptation in the Republic of Croatia is a translation from the original, which was prepared in the Croatian language. All possible care has been taken to ensure that the translation is an accurate representation of the original. However, in all matters of interpretation of information, views or opinions, the original language version of Auditors' report takes precedence over translation.

CLIMATE CHANGE ADAPTATION IN THE REPUBLIC OF CROATIA

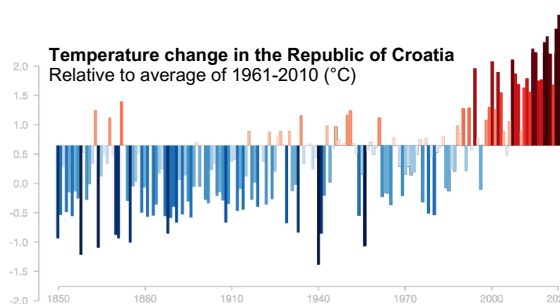
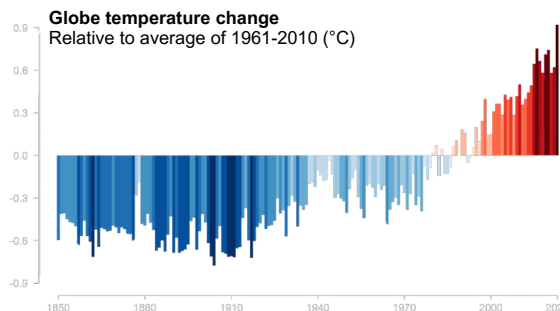
Climate Change

Climate change refers to long-term changes in the Earth's climate that warm the atmosphere, ocean, and land.

It is estimated that, if it continues to increase at the current rate, global warming will likely reach 1.5°C by mid-century.

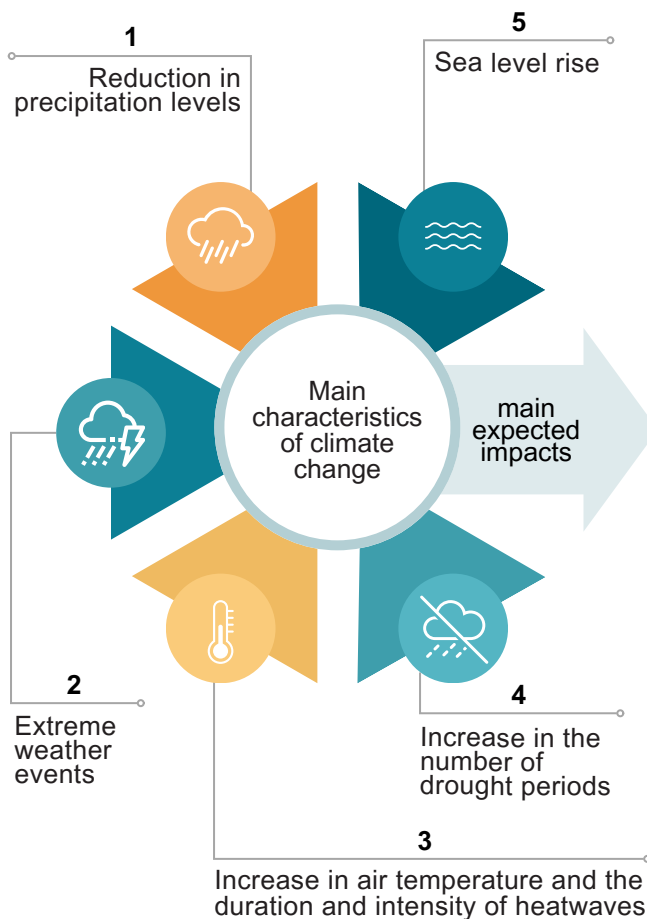
CLIMATE STRIPES

Climate stripes show changes in global temperature and temperature changes in the Republic of Croatia from 1850 to 2023, relative to the average temperature from 1961 to 2010.



Source: <https://showyourstripes.info/s/europe/croatia/all>

Main characteristics of climate change in the Republic of Croatia and expected impacts



Negative health impacts
increased mortality due to heatwaves, vector-borne diseases



Negative impacts on agriculture
reduced yields, changes in growing seasons



Negative impacts on energy sector
reduced electricity generation, infrastructure damage

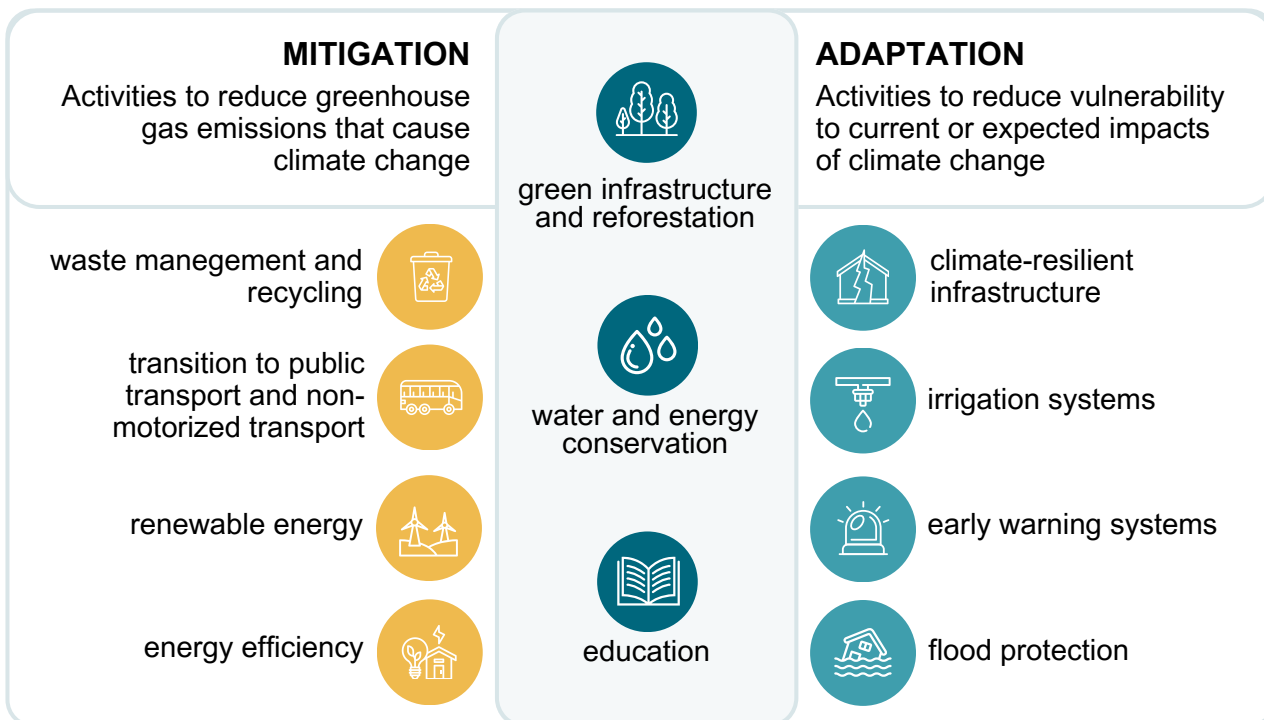


Negative impacts on tourism
reduced demand during the summer months, loss of archaeological heritage, infrastructure damage



Reduced water resources

Examples of climate change mitigation and adaptation activities and activities that contribute to both mitigation and adaptation



Audit

AUDIT SUBJECT

The Ministry's activities related to planning and implementing climate change adaptation activities.

AUDITEE

The audit subject was the Ministry of Environmental Protection and Green Transition.

MAIN AUDIT OBJECTIVE

The main objective of the audit was to assess the effectiveness of the implementation of the Ministry's activities related to planning and implementing climate change adaptation activities after the signing of the Paris Agreement, i.e. the activities it undertakes to ensure that the Republic of Croatia is prepared to respond to the negative effects of climate change and to minimize the negative effects of climate change on the environment, society and economy and to take advantage of the potential positive effects of climate change.



Criteria

LEGISLATIVE FRAMEWORK



● INTERNATIONAL AGREEMENTS

- United Nations Framework Convention on Climate Change (UNFCCC)
- Paris Agreement
- Agenda 2030

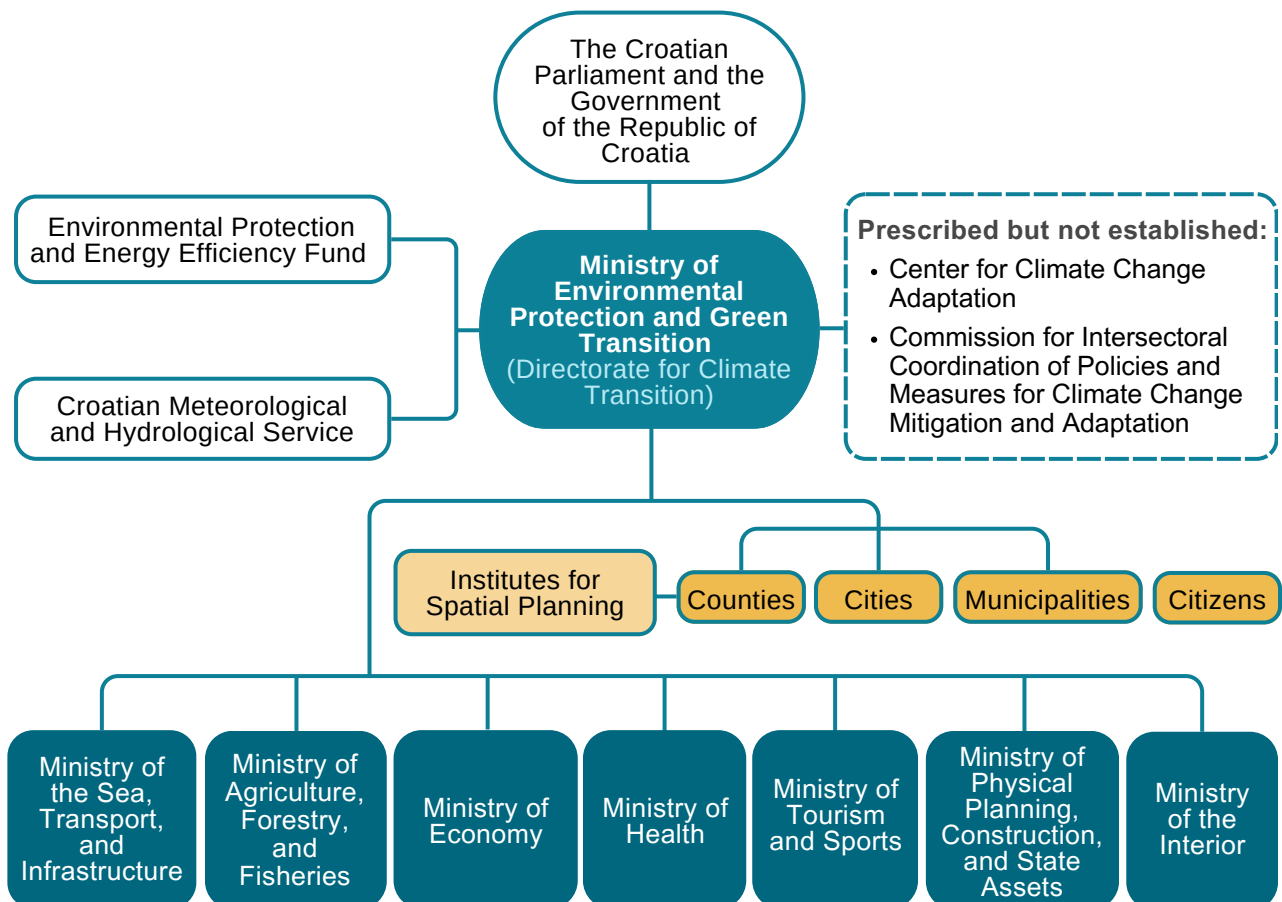
● LEGISLATION OF THE EUROPEAN UNION

- European Green Deal
- European Climate Law
- Creating a Climate-Resilient Europe – New EU Strategy on Climate Change Adaptation
- Guidelines on Member States' Adaptation Strategies and Plans
- Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action

● LEGISLATION OF THE REPUBLIC OF CROATIA

- Law on Climate Change and Ozone Layer Protection
- Climate Change Adaptation Strategy of the Republic of Croatia for the period up to 2040, with a view to 2070

INSTITUTIONAL FRAMEWORK



Climate Change Adaptation Planning

The adaptation planning process is established by the UNFCCC, the Paris Agreement, the European Climate Law, and the Law on Climate Change, according to which the adaptation strategy and the action plan for its implementation are the core documents for climate change adaptation.

PHASES OF DEVELOPING THE CLIMATE CHANGE ADAPTATION STRATEGY

1 Development of the scientific foundation for the creation of the Strategy

- Analysis of previous research
- Climate modeling
- Impact and vulnerability assessment of climate change

2 Planning of climate change adaptation measures

- Assessment of adaptation measures in vulnerable sectors
- Cost-effectiveness analysis of measures

3 Development of the Adaptation Strategy

- Working version of the Strategy (Green Paper)
- Draft Strategy (White Paper)
- Strategic environmental impact assessment

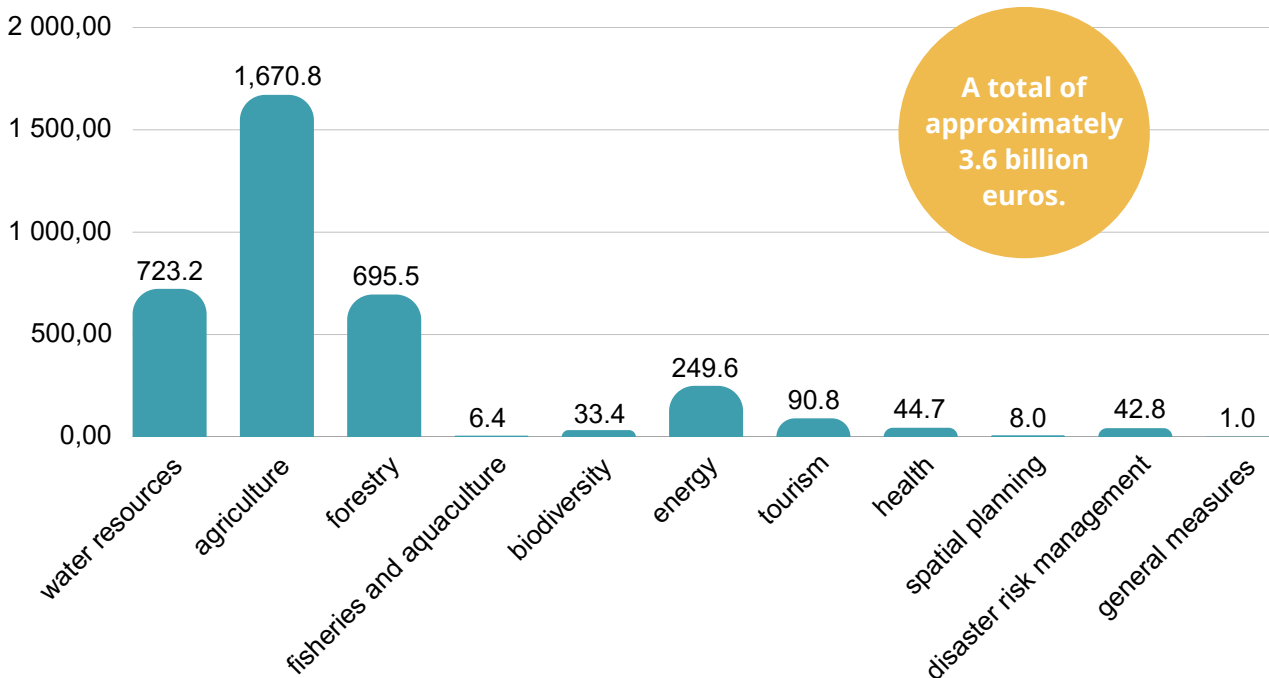
In **April 2020**, the Croatian Parliament adopted the Climate Change Adaptation Strategy in the Republic of Croatia for the period until 2040, with a view to 2070.

Climate Change Adaptation Strategy

THE TOTAL INVESTMENTS ACCORDING TO THE STRATEGY

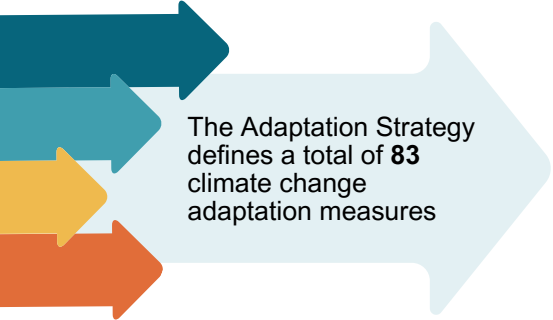
The Adaptation Strategy identifies **eight** vulnerable sectors and **two** cross-sectoral thematic areas, and estimates the necessary investments for the implementation of the adaptation measures from the Strategy by 2040, according to sectors.

million euros



THE MAIN IMPACTS OF CLIMATE CHANGE ACCORDING TO THE STRATEGY

The Adaptation Strategy identifies the main impacts of climate change across sectors and cross-sectoral thematic areas that could lead to a high degree of vulnerability, as well as adaptation measures to address the identified risks.



The Adaptation Strategy defines a total of **83** climate change adaptation measures



Water resources

Reduction of flow
Salinization of coastal aquifers and aquatic systems
Increase in water temperature
Increase in the frequency and intensity of floods

10 measures



Agriculture

Change in the vegetation period of agricultural crops
Lower yields of all crops and increased water demand
Reduction or destruction of yields due to floods and surface water stagnation

8 measures



Forestry

Increased frequency and longer season of forest fires
Migration of harmful organisms
Reduction in the value of timber assortments and loss of the general beneficial functions of forests

12 measures



Fisheries and aquaculture

Increase in the number of invasive species and their impact on native species
Reduced growth and higher mortality of shellfish due to increased ocean acidity
Disrupted socio-economic stability of the fishing sector

10 measures



Biodiversity

Reduction in habitat size, changes in their share and disappearance of some habitats
Emergence and spread of invasive alien species
Changes in migration period

9 measures



Energy

Reduced electricity production in hydroelectric and thermal power plants
Increase in the consumption of electricity for cooling purposes
Damage to energy facilities and infrastructure

7 measures



Tourism

Misalignment between the tourist offer and projected climate change
Reduced water availability
Damage and/or reduced functionality of various infrastructure systems

5 measures



Health

Increased mortality of the population
Changes in the epidemiology of chronic non-communicable diseases and acute infectious diseases
Decreased air quality, and safety of water and food

9 measures



Spatial planning

Urban heat islands in settlements
Coastal flooding
Flooding in settlements

5 measures



Disaster risk management

Earthquakes and landslides
Epidemics and pandemics
Wildfires
Extreme temperatures

5 measures



General measures

3 measures



Effectiveness Assessment

The State Audit Office assesses that the activities carried out by the Ministry related to climate change adaptation are **partially effective**.

Number of recommendations by audit areas:



AUDIT FINDINGS:

- Insufficient number of qualified personnel in jobs related to climate change adaptation.
- The Commission for Intersectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change, which, among other things, should ensure the rapid and efficient integration of adaptation into sectoral policies, was not established within the deadline prescribed by the provisions of the Law on Climate Change and Ozone Layer Protection.
- Procedures that would determine the manner of coordination of competent bodies for adaptation at the national, regional and local levels in order to exchange specific knowledge of all levels for adopting adaptation policies and support competent bodies at the regional/local level in implementing activities related to the alignment of local policies with the national adaptation policy have not been established.
- In the adaptation planning process, the groups most vulnerable to the impacts of climate change were not identified and were not included in the decision-making process on the design and implementation of adaptation measures.
- Vulnerable groups have not been comprehensively included in the risk assessment, nor have adequate measures been developed to mitigate the risks of climate change for vulnerable groups.
- The risk and vulnerability assessment has been partially updated, but it does not cover or assess all risks, impacts of climate change and vulnerabilities of all sectors implementing adaptation measures.
- The Adaptation Action Plan, which establishes the method of implementing measures, competent authorities, implementation deadlines, clear and measurable implementation indicators, financial resources and sources of financing, has not been adopted, and according to the Law on Climate Change and Ozone Layer Protection, it should have been adopted within 18 months of the Law entering into force, i.e. by the end of June 2021.
- Systematic and continuous collection of data on implemented adaptation activities has not been established.
- The implementation of adaptation measures and the achievement of adaptation goals, i.e. the overall results and effects of the implementation of activities, are not monitored.
- Given that a monitoring and evaluation system for the implementation of the Adaptation Strategy has not been established, the public and decision-makers are not informed about the progress in the implementation and achievement of measures and activities.

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SUMMARY

The State Audit Office audited the effectiveness of climate change adaptation in the Ministry of Environmental Protection and Green Transition. The audit subject were the activities of the Ministry of Environmental Protection and Green Transition related to the planning and implementation of climate change adaptation activities.

The main audit objective was to evaluate the effectiveness of the implementation of the activities of the Ministry of Environmental Protection and Green Transition in relation to the planning and implementation of climate change adaptation activities after the signing of the Paris Agreement, i.e. the activities undertaken to ensure that the Republic of Croatia is prepared to respond to the negative effects of climate change and to minimize the negative effects of climate change on the environment, society and economy and to exploit the potential positive effects of climate change. The specific objectives of the audit were to verify the establishment of a legislative and institutional framework in relation to the planning and implementation of climate change adaptation activities, to assess the provision of effective and comprehensive climate change adaptation planning and to assess the implementation of adaptation activities, the establishment of a system for monitoring and evaluating progress in the implementation of climate change adaptation activities and reporting on the implemented adaptation activities.

Global warming and climate change are a challenge for all countries in the world. It is estimated that, if it continues to increase at the current rate, global warming (an increase in the average temperature of the Earth's surface that occurs when the concentration of greenhouse gases in the atmosphere increases) will likely reach 1.5°C by mid-century. Current and future generations will live in a warmer world, and the extent of the warming will depend on different scenarios of greenhouse gas concentrations, i.e. on the actions that countries take now. The increase in average temperature compared to the pre-industrial period has been recorded in the Republic of Croatia, as well as in the rest of the world. Europe is the fastest-warming continent in the world, and 2023 was the warmest year since measurements began. Southern Europe, which includes the Republic of Croatia, is particularly at risk due to the increasing impact of heat and drought on agricultural production, outdoor work, summer tourism and fires. The climate risks that Europe faces are not only related to the increase in climate hazards, but also to how well societies are prepared to deal with them. The greatest climate risks for the Republic of Croatia are droughts, rising sea levels and floods. All projections of future climate predict a decrease in precipitation and soil moisture, or more frequent and intense droughts, which will pose the greatest threat to agricultural production.

International agreements commit countries to undertake climate change mitigation activities to reduce or prevent greenhouse gas emissions and climate change adaptation activities to reduce vulnerability to the current or expected impacts of climate change. The Paris Agreement, the most important international agreement providing guidance on adaptation, sets the global adaptation goal of strengthening adaptive capacity, strengthening resilience and reducing vulnerability to climate change. Each Party must engage in adaptation planning processes and implementing measures, including the development or improvement of relevant plans, policies or contributions, which includes, inter alia, the process of developing and implementing national adaptation plans. The goal of the adaptation planning process is to make people, places, ecosystems and economies more resilient to the impacts of climate change.

According to the European Commission's Guidelines on Member States' adaptation strategies and plans, the prerequisites for successful adaptation to climate change are:

- ⊙ legal frameworks establishing an obligation for adaptation at the national level, including binding sectoral adaptation targets
- ⊙ established adaptation strategies and plans that are regularly updated and provide a framework for the overall adaptation policy and its implementation
- ⊙ adaptation policy priorities to determine which sectors and areas will be included in adaptation planning and which impacts and risks should be addressed when planning adaptation
- ⊙ reliable assessments of climate change impacts and vulnerabilities that are regularly updated and based on the latest scientific knowledge about climate
- ⊙ sufficient professional staff and financial resources in all related institutions to coordinate activities and implement measures at all levels of management
- ⊙ participation of all relevant stakeholders who are particularly exposed or vulnerable or have the knowledge, resources or capacity to design or implement adaptation measures
- ⊙ coordination and inclusion of climate change issues at multiple levels, i.e. horizontal (e.g. in ministries) and vertical (e.g. with other levels of public administration) levels when planning and implementing adaptation measures
- ⊙ continuous monitoring and evaluation of the implementation of adaptation measures, covering procedures as well as impacts and results.

It was determined by the audit that the Ministry of Environmental Protection and Green Transition undertook activities related to:

- ⊙ establishing a legislative framework that establishes the goals of adaptation and the obligation to implement adaptation measures, strategic and planning documents at the national, regional and local level, and the obligation to align national development documents and development documents of individual areas and activities with the Climate Change Adaptation Strategy in the Republic of Croatia for the period until 2040 with a view to 2070
- ⊙ establishing an institutional framework, i.e. determining the bodies that deal with adaptation issues and their responsibilities
- ⊙ establishing a Commission for Intersectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change, which should provide high-level support for climate change adaptation activities
- ⊙ improving the integration of adaptation into sectoral policies and achieving progress in integration compared to the time before the adoption of the Adaptation Strategy
- ⊙ informing and raising public awareness about the need to adapt to climate change
- ⊙ adopting a comprehensive Adaptation Strategy that provides an assessment of climate change until 2040 and 2070, an analysis of the impact and vulnerability to climate change and proposes 83 adaptation measures for eight vulnerable sectors and two cross-sectoral areas
- ⊙ conducting a climate change risk and vulnerability assessment for all sectors that were identified to be vulnerable at the time of the assessment, identifying possible responses to reduce high vulnerability, identifying adaptation measures to respond to the identified risks, impacts and vulnerabilities, and grouping measures according to importance / priorities
- ⊙ publishing several public calls in cooperation with the Environmental Protection and Energy Efficiency Fund, which co-finances projects related to climate change adaptation.

However, **it was determined that there are omissions that**, among other things, **refer to the following:**

- ⊗ Insufficient number of qualified personnel in jobs related to climate change adaptation.
- ⊗ The Commission for Intersectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change, which, among other things, should ensure the rapid and efficient integration of adaptation into sectoral policies, was not established within the deadline prescribed by the provisions of the Law on Climate Change and Ozone Layer Protection.
- ⊗ Procedures that would determine the manner of coordination of competent bodies for adaptation at the national, regional and local levels in order to exchange specific knowledge of all levels for adopting adaptation policies and support competent bodies at the regional/local level in implementing activities related to the alignment of local policies with the national adaptation policy have not been established.
- ⊗ In the adaptation planning process, the groups most vulnerable to the impacts of climate change were not identified and were not included in the decision-making process on the design and implementation of adaptation measures.
- ⊗ Vulnerable groups have not been comprehensively included in the risk assessment, nor have adequate measures been developed to mitigate the risks of climate change for vulnerable groups.
- ⊗ The risk and vulnerability assessment has been slightly updated, but it does not cover or assess all risks, impacts of climate change and vulnerabilities of all sectors implementing adaptation measures.
- ⊗ The Adaptation Action Plan, which establishes the method of implementing measures, competent authorities, implementation deadlines, clear and measurable implementation indicators, financial resources and sources of financing, has not been adopted, and according to the Law on Climate Change and Ozone Layer Protection, it should have been adopted within 18 months of the Law entering into force, i.e. by the end of June 2021.
- ⊗ Systematic and continuous collection of data on implemented adaptation activities has not been established.
- ⊗ The implementation of adaptation measures and the achievement of adaptation goals, i.e. the overall results and effects of the implementation of activities, are not monitored.
- ⊗ Given that a monitoring and evaluation system for the implementation of the Adaptation Strategy has not been established, the public and decision-makers are not informed about the progress in the implementation and achievement of measures and activities.

Based on the facts established by the audit, applying the established criteria, the State Audit Office assessed the activities of the Ministry of Environmental Protection and Green Transition related to the planning and implementation of climate change adaptation activities as **partially effective**.

The State Audit Office made the following **recommendations**:

- ⊗ Urgently strengthen the Ministry's capacities related to climate change adaptation.

- ⊗ Urgently propose to the Government of the Republic of Croatia the establishment of the Commission for Intersectoral Coordination for Policies and Measures for Mitigation and Adaptation to Climate Change and a coordination and technical working group in order to ensure high-level support for climate change adaptation activities and the necessary engagement of all stakeholders, and to establish clear procedures for its work.
- ⊗ Establish procedures that will determine the method of coordination of competent bodies for adaptation at the national, regional and local levels in order to exchange specific knowledge of all levels for adopting adaptation policies and to support competent bodies at the regional/local level in implementing activities related to the alignment of local policies with the national adaptation policy.
- ⊗ Include representatives of all vulnerable groups in the decision-making process on climate change adaptation policy in order to ensure a just transition.
- ⊗ Identify the groups that are most vulnerable to the impacts of climate change within the framework of vulnerable sectors, determine their needs, and conduct analysis and design adaptation measures for vulnerable groups in accordance with the legislative framework.
- ⊗ In cooperation with the authorities responsible for the implementation of adaptation measures, initiate and coordinate activities to update the climate change risk and vulnerability assessment in order to monitor changes in existing risks and identify new risks and vulnerabilities in all relevant sectors.
- ⊗ Undertake the activities of drafting an Action Plan proposal and submitting the proposal to the Government of the Republic of Croatia for adoption, in which the priority adaptation measures will be elaborated on specific activities and in which the competent authorities and their roles and responsibilities, implementation deadlines, clear and measurable indicators of implementation, financial resources and sources of financing will be determined in order to speed up and facilitate the implementation of adaptation measures, in accordance with the Law on Climate Change and Ozone Layer Protection and the Adaptation Strategy.
- ⊗ Undertake activities to establish a systematic and continuous collection of high-quality, reliable and comprehensive data on implemented/undertaken adaptation activities of bodies responsible for implementing adaptation measures, data on the amount of funds spent on implementing the Strategy, and undertake activities to develop indicators for the implementation of adaptation measures.
- ⊗ Publish monitoring results to inform the public and decision-makers about progress in implementing and achieving measures and activities from the Adaptation Strategy, and to highlight areas where progress is being made and areas where there is no progress or progress is slow.

The State Audit Office is of the opinion that by implementing the aforementioned recommendations, improvements would be achieved in connection with the establishment of the legislative and institutional framework for climate change adaptation, the planning of adaptation activities and the implementation, monitoring and evaluation, and reporting on adaptation activities, which would increase the effectiveness of the adaptation of the Republic of Croatia to climate change, which would also contribute to the achievement of sustainable development goal 13, taking urgent action in the fight against climate change and its consequences.

PERFORMANCE AUDIT REPORT

CLIMATE CHANGE ADAPTATION IN THE REPUBLIC OF CROATIA

Based on the provisions of Articles 19 and 21 of the Law on the State Audit Office (Official Gazette 25/19), an audit of the effectiveness of climate change adaptation was carried out in the Ministry of Environmental Protection and Green Transition (hereinafter: the Ministry), until May 2024 Ministry of Economy and Sustainable Development.

The audit was performed in the manner and according to the procedures established by the Framework of Professional Principles, Standards and Guidelines of the International Organization of Supreme Audit Institutions (INTOSAI) (Official Gazette 66/23) and the Code of Professional Ethics of State Auditors.

Audit procedures were carried out from 25 March 2024 to 24 February 2025.

INTRODUCTION

The Republic of Croatia, as a party to international agreements related to climate change and as a member of the European Union, has committed itself to reducing greenhouse gas emissions and implementing measures to adapt to climate change.

During 2023, the International Organization of Supreme Audit Institutions (INTOSAI) through the INTOSAI Development Initiative (IDI) and the INTOSAI Working Group on Environmental Auditing (INTOSAI WGEA), launched the Global Cooperative Audit of Climate Change Adaptation Actions (CCAA). In the framework of the aforementioned initiative, support was given to supreme audit institutions in performing audits in the areas of disaster risk reduction, water resource management, sea level rise and coastal erosion, and the implementation of climate change adaptation planning activities.

The State Audit Office participated in the aforementioned initiative, i.e. the international cooperative audit, and conducted an audit in the area of implementation of climate change adaptation planning activities in the Republic of Croatia. The Republic of Croatia, as a Mediterranean country, is particularly affected by climate change, and because of its vulnerability, it is experiencing increasing economic damage from extreme weather events and climate change. Climate change represents a challenge for all of humanity, including the citizens of the Republic of Croatia, because it affects all aspects of the environment, economy and health, and threatens the sustainable development of society. In order to minimize the above-mentioned impacts, it is necessary to enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change. The aforementioned is achieved through the process of adaptation planning, the ultimate goal of which is to make people, places, ecosystems and economies more resilient to the effects of climate change.

AUDIT SUBJECT, AUDITEES AND AUDIT OBJECTIVES

The **audit subject** were the activities of the Ministry related to planning and implementing climate change adaptation activities.

The **auditee** of the climate change adaptation performance audit was the Ministry, which, among other things, is responsible for climate change policy, which includes mitigation and adaptation to climate change, the preparation, development and supervision of the legislative framework and coordination, development and implementation of strategic documents and expert bases for the adoption of sectoral policies related to climate activities. Furthermore, it proposes harmonization of the legislation in the field of climate change with European Union (hereinafter: EU) regulations, mediates and exchanges data on climate protection with EU bodies and organizations and international organizations and performs other tasks.

The **main audit objective** was to evaluate the effectiveness of the implementation of the Ministry's activities related to climate change adaptation after the signing of the Paris Agreement on Climate Change (hereinafter: the Paris Agreement)¹, i.e. the activities it undertakes to prepare the Republic of Croatia to respond to the negative effects of climate change and to minimize the negative effects of climate change on the environment, society and economy and to exploit any positive effects of climate change.

Specific audit objectives were:

- to verify the establishment of the legislative and institutional framework in connection with the planning and implementation of climate change adaptation activities
- to evaluate the provision of effective and comprehensive climate change adaptation planning
- to evaluate the implementation of adaptation activities, the establishment of a system for monitoring and evaluating progress in the implementation of climate change adaptation activities and reporting on implemented climate change adaptation activities.

AUDIT METHODS

In accordance with the auditing standards of the International Organization of Supreme Audit Institutions (INTOSAI), the audit was planned and performed in a way that provides the necessary audit evidence and provides a reasonable basis for audit findings and conclusions and the achievement of audit objectives.

The following methods of data collection and analysis were used in conducting the audit regarding the planning and implementation of climate change adaptation activities in the Republic of Croatia:

¹The Paris Agreement on Climate Change is a climate agreement signed at the 21st session of the Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris in 2015. The agreement was reached on 12 December 2015 and entered into force on 4 October 2016. The Republic of Croatia signed the Paris Agreement on 22 April 2016 in New York. By the Law on the Ratification of the Paris Agreement (Official Gazette – International Treaties 3/17), it became part of the internal legal order of the Republic of Croatia. In relation to the Republic of Croatia, the Paris Agreement entered into force in June 2017.

- ⦿ analysis of the legislative, strategic and planning framework in connection with the planning and implementation of climate change adaptation activities
- ⦿ insight into published reports and analysis of published data related to the planning and implementation of climate change adaptation activities
- ⦿ analysis of the documentation of the auditee, based on the selected sample, in order to verify the functioning of the planning system and the implementation of climate change adaptation activities
- ⦿ analysis of data collected from the audited entity
- ⦿ meetings/interviews.

AUDIT CRITERIA

In order to evaluate the effectiveness of the implementation of activities related to the planning and implementation of climate change adaptation activities, criteria have been established that derive from laws and other regulations, international agreements to which the Republic of Croatia is a party, and the activities undertaken by the Ministry.

The criteria for the assessment of effectiveness were established according to the **audit areas**: legislative and institutional framework, climate change adaptation planning, implementation of climate change adaptation activities, and monitoring, evaluation and reporting.

The backbone of the audit consisted of the **main question** and **three sub-questions** related to the audit subject.

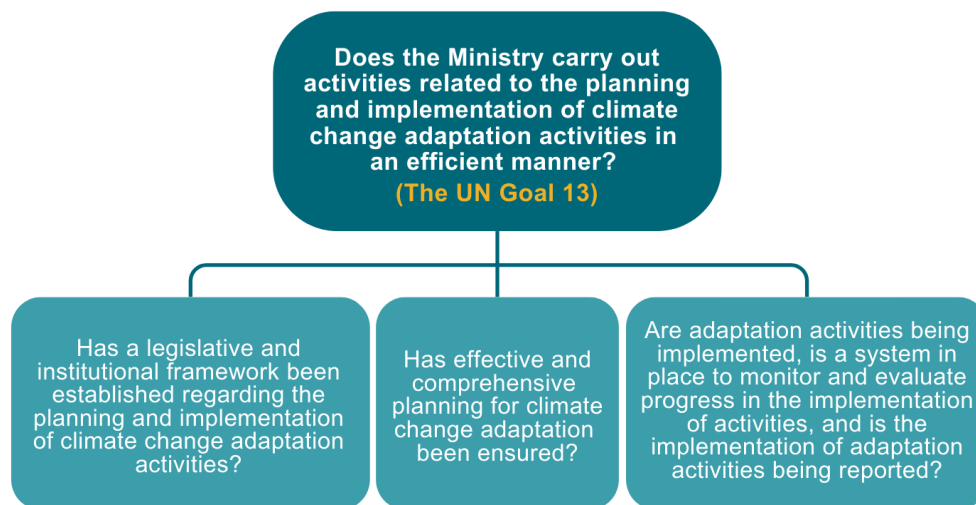


Table 1 provides criteria for evaluating the effectiveness of the Ministry's activities related to planning and implementing climate change adaptation activities, according to audit areas.

Table 1

Criteria for evaluating effectiveness, according to audit areas

Ordinal number	Audit areas	Criteria for evaluating effectiveness
	1	2
1.	Legislative and institutional framework	⦿ regulations were adopted that determine the goals and obligations of adaptation to climate change

Ordinal number	Audit areas	Criteria for evaluating effectiveness
		<ul style="list-style-type: none"> ⊗ institutions and bodies responsible for the preparation of the Adaptation Strategy and the implementation of adaptation measures, as well as their roles and responsibilities were determined ⊗ a sufficient number of qualified personnel are employed in jobs related to the planning and implementation of adaptation measures ⊗ an interdepartmental working group for adaptation (Commission for Intersectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change) was established, to which members from the ranks of scientific, professional, public and other employees as well as representatives of central state administration bodies and representatives of civil society associations were appointed ⊗ the Technical Working Group for Policy and Measures for Adaptation to Climate Change was appointed from the ranks of experts from relevant ministries, professional institutions, representatives of the economy and non-governmental organizations (they work on monitoring and evaluation of implementation, planning of policy and measures for adaptation to climate change, give opinions on planning and strategic documents and draft regulations) ⊗ the adaptation planning process includes all levels of governance, all sectors and all stakeholders whose participation is necessary to design effective climate change adaptation measures ⊗ effective coordination was established between different stakeholders and different government levels in the process of planning and implementing adaptation activities in order to ensure the necessary engagement and successful integration of adaptation into different sectoral policies ⊗ continuous information and public awareness raising about the need for adaptation is ensured ⊗ inclusion of adaptation goals in relevant national strategies is ensured
2.	Climate change adaptation planning	<ul style="list-style-type: none"> ⊗ the Climate Change Adaptation Strategy was adopted, which determines the goals and priorities for the implementation of adaptation measures ⊗ The Adaptation Strategy contains climate models and projections of the future climate, an assessment of the impact of climate change on society and the environment, and an assessment of the sector's vulnerability to climate change impacts and climate change risks ⊗ a comprehensive methodology has been developed to assess the impact of climate change on society, the economy and the environment ⊗ possible responses to reduce high vulnerability, i.e. adaptation options, have been identified ⊗ climate change adaptation measures and activities have been determined in order to respond to identified risks, impacts and vulnerabilities ⊗ measures for individual sectors are grouped according to importance/ priorities ⊗ the costs and benefits of the implementation of adaptation measures were analyzed and the resources for the implementation of adaptation measures were estimated ⊗ an adaptation action plan was adopted, in which the method of implementation of measures, the competent institutions, the

Ordinal number	Audit areas	Criteria for evaluating effectiveness
		necessary resources, sources of financing and the timetable were determined
3.	Implementation of adaptation activities and monitoring, evaluation and reporting	<ul style="list-style-type: none"> ⦿ climate change adaptation measures/activities are being implemented ⦿ the achievement of adaptation goals, i.e. the overall results and effects of the implementation of the activities, is monitored according to established indicators ⦿ indicators of the implementation of adaptation measures have been established ⦿ competent institutions for monitoring, reporting and evaluation of the implementation of measures, as well as competent institutions for individual indicators and their roles, have been determined ⦿ the results of monitoring and evaluation are analyzed in order to monitor the progress and success of the adaptation policy ⦿ the Ministry reports to the relevant international institutions and bodies, as well as the public, on the implemented adaptation activities

Activities related to the planning and implementation of climate change adaptation activities in the Ministry are considered **effective** if a legislative and institutional framework is established and effective coordination is in place that enables the planning and implementation of climate change adaptation activities, comprehensive climate change adaptation planning is established and adaptation activities are carried out, monitoring and evaluation of the implementation of adaptation measures is established and reporting on the implemented adaptation activities is being carried out.

Activities related to adaptation to climate change are evaluated as **effective, with improvements needed**, if certain weaknesses and omissions are identified that do not significantly affect the planning and implementation of activities.

Activities related to adaptation to climate change are assessed as **partially effective**, if certain irregularities and omissions have been identified in connection with the planning and implementation of activities and significant improvements are needed.

Activities related to adaptation to climate change are considered **ineffective** if irregularities and omissions are found that significantly affect the planning and implementation of activities and significant improvements are needed.

CLIMATE CHANGE ADAPTATION IN THE REPUBLIC OF CROATIA

Climate Change in the World and in the Republic of Croatia

Global warming and climate change are a challenge for all countries of the world. According to the United Nations Development Program (UNDP) climate dictionary², **global warming** is an increase in the average temperature of the Earth's surface that occurs when the concentration of greenhouse gases in the atmosphere increases. These gases absorb more solar radiation and trap more heat, causing the planet to become warmer. Burning fossil fuels, deforestation and raising livestock are some of the human activities that release greenhouse gases and contribute to global warming.

Climate change refers to long-term changes in the Earth's climate that warm the atmosphere, oceans and land. Climate change affects the balance of ecosystems that support life and biodiversity and affects health. They also cause more extreme weather events, such as more intense and/or more frequent hurricanes, floods, heat waves and droughts, and lead to sea level rise and coastal erosion as a result of ocean warming, melting glaciers and loss of ice cover.

According to the conclusions of the United Nations Intergovernmental Panel on Climate Change (IPCC), human activities, mainly through the emissions of greenhouse gases, have caused global warming, whereby the global surface temperature in the period 2011-2020 reached 1.1°C above the temperature in the pre-industrial period³, which is why it is estimated that if it continues to increase at the current rate, global warming will probably reach 1.5°C by mid-century. Current and future generations will live in a warmer world, and the extent of warming will depend on different greenhouse gas concentrations scenarios (RCP scenarios), from very low emissions to very high, that is, on the actions that countries are undertaking now⁴. RCPs (Representative Concentration Pathways) are four scenarios for modeling atmospheric greenhouse gas concentrations developed by IPCC scientists. RCP8.5 is the most pessimistic and describes a world in which no action is taken to reduce anthropogenic emissions. RCP2.6 is the most optimistic and describes a world in which all possible measures are taken to reduce anthropogenic emissions, in order to keep global warming below 2°C by 2100, compared to 1850. RCP4.5 is a moderate scenario that assumes that greenhouse gas emissions will decrease from the middle to the end of the 21st century. In the RCP6 scenario, emissions peak around 2080, after which they decrease.

In the Republic of Croatia, as in the rest of the world, an increase in average temperature has been recorded compared to the pre-industrial period. According to the publication Selected Chapters of the Eighth National Communication of the Republic of Croatia under the United Nations Framework Convention on Climate Change (UNFCCC) of the Croatian Meteorological and Hydrological Service (hereinafter: CMHS) from January 2023, the increase in global air temperature in the period 2011-2020 was estimated at 1.09°C compared to the period 1850-1900, comparable to air temperature anomalies 125 thousand years ago. Consistent warming has been observed in the territory of the Republic of Croatia since the second half of the 20th century.

²<https://climatepromise.undp.org/news-and-stories/climate-dictionary-everyday-guide-climate-change>

³The IPCC uses the period 1850-1900 as a frame of reference for climate change analyses. This is the earliest period with nearly global observations and is the reference period used as an approximation of pre-industrial temperatures in IPCC reports.

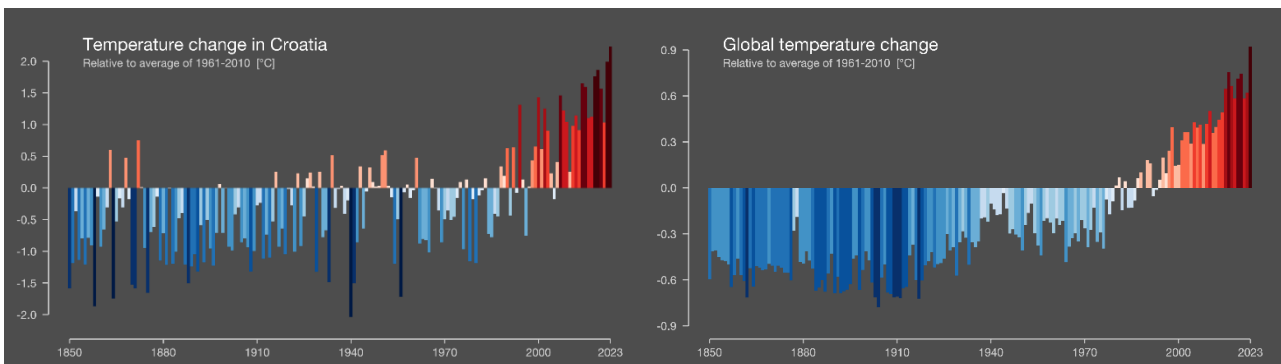
⁴In recent years, shared socioeconomic pathways (SSPs) scenarios have been used to describe possible future development paths, which take into account socio-economic factors and link them to assumptions about the level of ambition for climate change mitigation.

The trend values of the mean annual air temperature are from 0.2 to 0.3°C per decade along the Adriatic, and in central Croatia up to 0.5°C per decade. The observed warming at the annual level is the result of a significant increase in air temperature in all seasons, especially in summer (from 0.3 to 0.6°C per decade). A significant increase was also observed in the values of the mean minimum and maximum air temperatures in all seasons and at the annual level.

The increase in average temperature in the Republic of Croatia and in the world in the last three decades is visible from the graphic representations given in Figure 1, which shows warming stripes, i.e. changes in global temperature and changes in temperature in the Republic of Croatia from 1850 to 2023, in relation to the average temperature from 1961 to 2010.

Figure 1

Warming stripes, i.e. changes in global temperature and changes in temperature in the Republic of Croatia from 1850 to 2023, compared to the average temperature from 1961 to 2010



Source: <https://showyourstripes.info/s/europe/croatia/all>

In order to present temperature changes over the past 100 years or more in an understandable and simple way, and to initiate discussions about global warming and the risks of climate change with minimal knowledge of science, scientists from the University of Reading have designed graphs with warming stripes. Each vertical bar represents the average temperature in the world, or in the Republic of Croatia, in one year. If the average temperature for a particular year exceeds a threshold, or the average temperature in the period from 1961 to 2010, the bar turns red, and when it is below that threshold, the bar is blue. The darkest blue and red represent extreme temperatures during the time period shown.

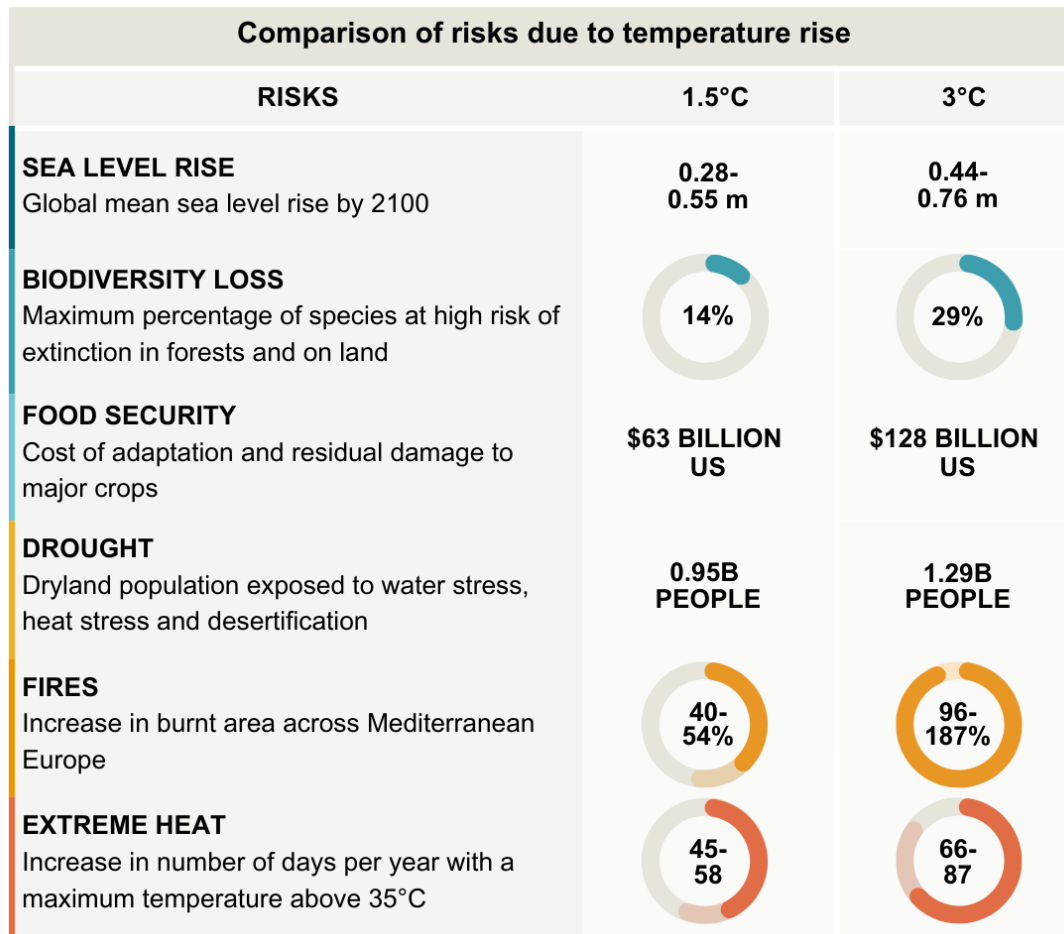
According to the World Meteorological Organization's report United in Science from September 2024⁵, greenhouse gases and global temperatures are at record levels. If current policies continue, there is a 66.0% chance that global warming will reach 3°C by the end of this century.

Figure 2 compares the risks and consequences of a temperature increase of 1.5°C and 3°C.

⁵<https://wmo.int/publication-series/united-science-2024>

Figure 2

Comparison of risks and consequences under conditions of temperature rise of 1.5°C and 3°C



Source: State Audit Office according to the World Resources Institute website
<https://www.wri.org/insights/2023-ipcc-ar6-synthesis-report-climate-change-findings>

According to the press release on the European Environment Agency (EEA) website⁶, Europe is the fastest-warming continent in the world, and climate risks threaten its energy and food security, ecosystems, infrastructure, water resources, financial stability and human health. In March 2024, the European Environment Agency published the first European Climate Risk Assessment⁷. According to the estimate, 2023 was the warmest year on record, with temperatures 1.5°C higher than pre-industrial levels, with Europe the fastest-warming continent, roughly twice the global average. Heat waves are becoming more frequent, longer and with higher temperatures. Rainfall patterns are changing, with increasingly intense downpours and extreme precipitation. Certain areas are experiencing catastrophic floods, while the south of Europe can expect a significant decrease in rainfall. The ten warmest years on record in Europe have occurred since 2000, and the five warmest since 2014. The average temperature in Europe in the period 2018-2022 was about 2.2°C warmer compared to the pre-industrial levels, while during the same period, the average global temperature was 1.2°C warmer. In 2023, exceptional anomalies were recorded. Each month from June 2023 to January 2024 saw record average temperatures compared to the corresponding month in any previous year.

⁶<https://www.eea.europa.eu/en/newsroom/news/europe-is-not-prepared-for>

⁷<https://www.eea.europa.eu/publications/european-climate-risk-assessment>

According to the aforementioned assessment of the European Environment Agency, southern Europe, which includes the Republic of Croatia, is particularly at risk due to the increasing impact of heat and drought on agricultural production, outdoor work, summer tourism and fires. Flooding, soil erosion and salt water intrusion threaten low-lying coastal European regions, including many densely populated cities. The climate risks facing Europe are not only related to the increase in climate hazards, but also to how well societies are prepared to deal with them. Extreme heat events are becoming more frequent, exposing a large proportion of the population to heat stress, especially in southern and western Europe. For example, the record hot summer of 2022 is associated with between 60 and 70 thousand premature deaths, despite significant investments in action plans to protect health from the heat. Southern Europe is now warm enough for mosquitoes to transmit former tropical diseases. Prolonged droughts cause major economic damage in many sectors and can significantly degrade the water resources on which people, agriculture, industry, power plants, river transport and ecosystems depend.

The European Climate Risk Assessment identified and assessed 36 major climate risks for Europe, which are grouped into five broad clusters: ecosystems, food, health, infrastructure, and economy and finance. More than half of the identified risks, 21 of them, require more immediate action, eight of which were assessed as particularly urgent. The purpose of the aforementioned assessment is to help determine policy priorities for adaptation to climate change and for climate-sensitive sectors. It was stated that European policies and adaptation measures are failing to keep up with the rapidly growing risks. Many of these risks have already reached critical levels and could have catastrophic consequences if urgent and decisive measures are not taken.

According to the manual Climate Change in Croatia⁸, the greatest climate risks for the Republic of Croatia are droughts, rising sea levels and floods. All future climate projections predict a decrease in precipitation and soil moisture, i.e. more frequent and intense droughts, both in Dalmatia and in eastern and northwestern Croatia. Droughts will pose the greatest threat to agricultural production. The Republic of Croatia receives most of its electricity from large hydroelectric power plants, so long-term droughts and reduced river flows can threaten electricity production.

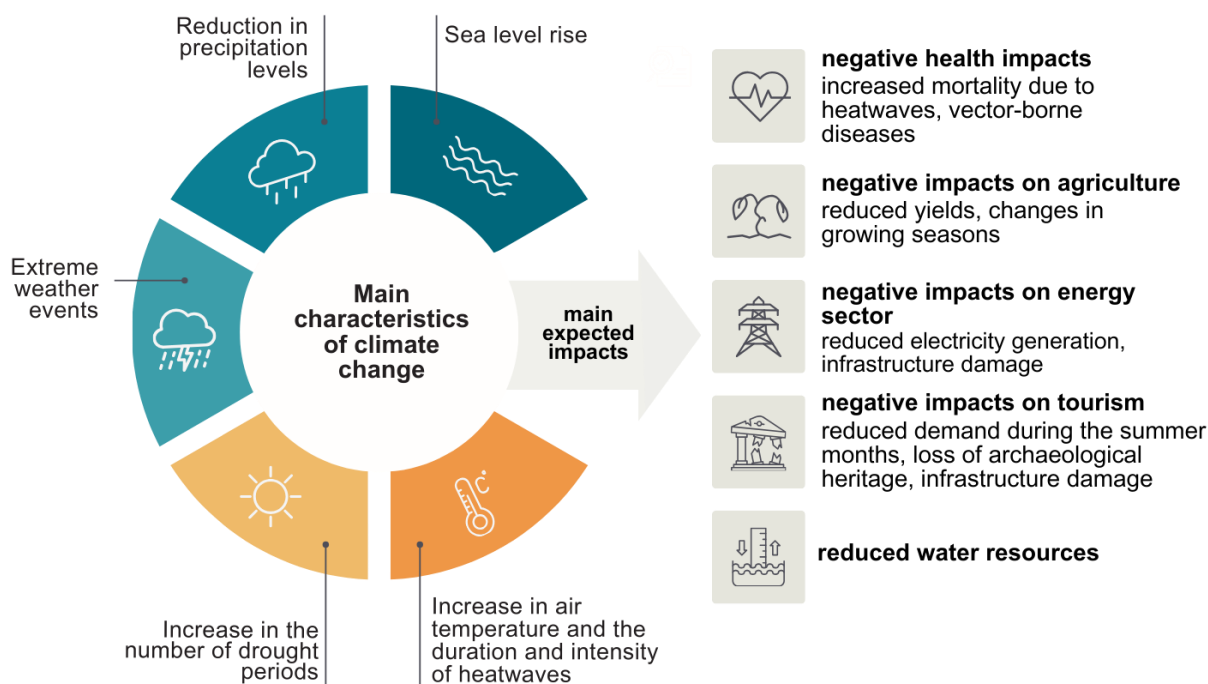
Droughts have so far caused the greatest damage related to climate change. Sea level rise is a consequence of the melting of land glaciers and polar ice caps and the thermal expansion of the sea due to warming. The level of the Adriatic Sea will rise by a maximum of 65-83 cm, depending on the RCP scenario. Also, the occurrence and intensity of severe cyclonic storms will increase, which, in combination with sea level rise, will lead to frequent flooding of coastal areas. About 15.0% of the territory of the Republic of Croatia is subject to flooding (excluding the coastal area). Future climate projections predict regional increases in total precipitation during autumn, especially in areas at risk of flooding, which means that floods will be more frequent in the future. However, it is estimated that the total damage from droughts will be more significant than damage from floods.

Figure 3 shows the main characteristics of climate change in the Republic of Croatia and the expected impacts.

⁸<https://www.znanost-klima.org/wp-content/uploads/2021/12/Klimatske-promjene-u-Hrvatskoj.pdf>

Figure 3

Main characteristics of climate change in the Republic of Croatia and expected impacts



Source: State Audit Office

The increase in air temperature in the Republic of Croatia is recorded year after year. According to the Meteorological and Hydrological Bulletin of the CMHS for August 2024⁹, the summer of 2024 (June, July and August) was the warmest in most areas of the Republic of Croatia since measurements are carried out. Extremely long periods of heat affected the area of Dalmatia and Slavonia in particular during July and August. In Slavonski Brod, only four days with air temperature below 30°C were recorded in the mentioned months, and in Dalmatia one or two days were recorded. Also, three heat waves were recorded in the interior of the country, and four in the Adriatic.

In the Republic of Croatia, there is a health risk for citizens due to the rise in air temperature. According to a study published in the journal *The Lancet Planetary Health*¹⁰ which analyzed the influence of heat and cold on population mortality in 854 European cities within 30 countries, the Republic of Croatia is among the countries with the highest heat-related excess mortality, with an average number of 27 excess deaths per 100,000 people per year. The highest standardized heat-related excess mortality rate was recorded in Osijek, where it amounts to 41 per 100,000 people per year.

According to data from the Croatian Bureau of Statistics, the number of deaths in July 2024 was 13.0% higher than in July 2023. On the website of the Transnational Cooperation Program Central Europe (eng. Interreg Central Europe)¹¹, it was stated that experts believe that the main cause of this increase is the extreme heat waves that affected the Republic of Croatia. In addition to human health, prolonged high temperatures and drought have seriously affected agricultural yields, especially in eastern Slavonia and along the coast.

⁹<https://radar2.dhz.hr/~stars2/bilten/2024/bilten0824.pdf>

¹⁰[https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(23\)00023-2/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(23)00023-2/fulltext)

¹¹<https://www.interreg-central.eu/news/extreme-heatwaves-linked-to-increased-deaths-and-severe-crop-losses-across-croatia/>

Crops such as corn, sunflowers, soybeans, sugar beets, tangerines, medlars, and grapes recorded significant losses, with corn and sunflower losses reaching 70.0-90.0% in some continental areas. In the Neretva river delta, mandarin yields have decreased by up to 50.0%.

According to the UNDP climate dictionary, **climate change mitigation** refers to any action taken by governments, businesses or people to reduce or prevent greenhouse gas emissions, or improve carbon sinks¹² which remove these gases from the atmosphere. Reducing or preventing greenhouse gas emissions can be achieved by switching to more energy-efficient renewable energy sources such as wind and solar, adopting low-carbon or zero-carbon modes of transport, promoting sustainable agriculture and land use, and changing the way we produce and consume food. Increasing the carbon sink can be achieved by restoring forests, wetlands and marshlands, maintaining soil health and protecting terrestrial and marine ecosystems. For mitigation activities to be successful, it is critical that countries develop enabling environments through legislation, policies and investments.

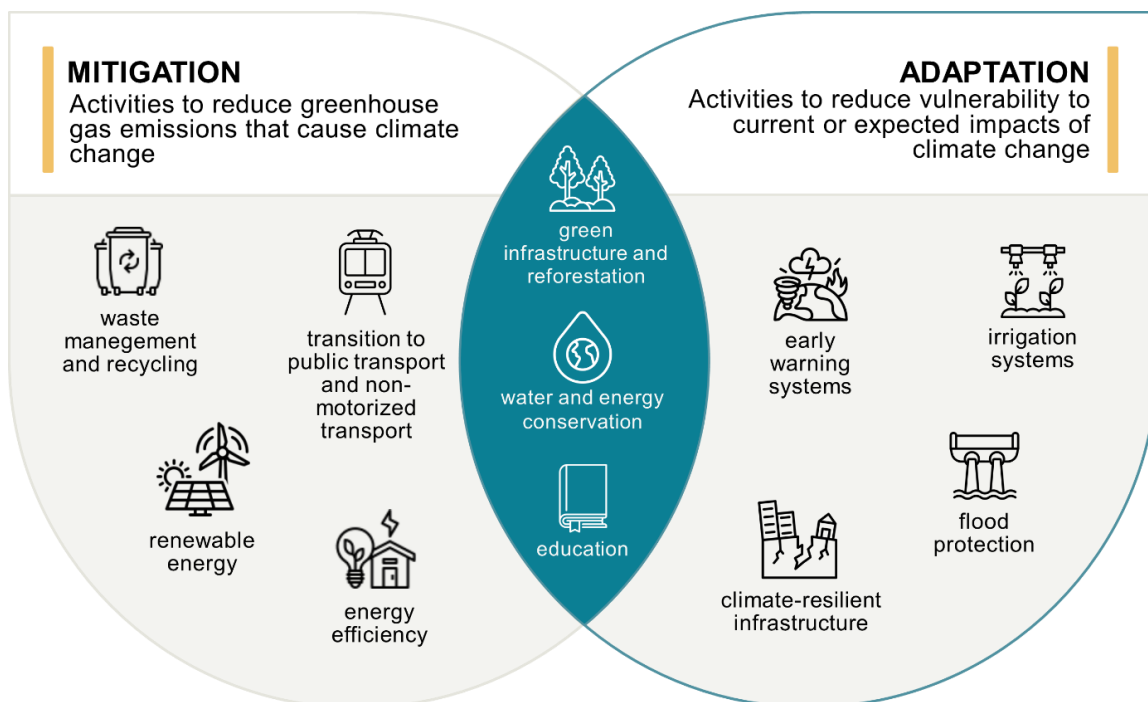
Climate change adaptation refers to activities that help reduce vulnerability to current or expected impacts of climate change such as extreme weather events and natural disasters, sea level rise, loss of biodiversity or food and water insecurity. Many adaptation measures should be implemented at the local level, so rural communities and cities have a major role to play. For example, such measures include planting crop varieties that are more drought-resilient and practicing regenerative agriculture, improving water storage and use, managing land to reduce the risk of wildfires, and building stronger defenses against extreme weather events such as floods and heat waves. Adaptation should also be led and directed at the national and international levels. It is necessary to develop guidelines for adaptation and consider comprehensive measures such as strengthening or relocating infrastructure from coastal areas affected by sea level rise, building infrastructure that can withstand extreme weather events, improving early warning systems and access to disaster information, developing security mechanisms specific to threats related to with the climate and creating new protections for wildlife and natural ecosystems.

Figure 4 shows the activities of climate change adaptation and climate change mitigation, as well as activities that contribute to both adaptation and mitigation.

¹²A system that absorbs more carbon than it emits is called a carbon sink. The main natural sinks are soil, forests and oceans. (<https://www.europarl.europa.eu/topics/en/article/20190926STO62270/what-is-carbon-neutrality-and-how-can-it-be-achieved-by-2050>)

Figure 4

Examples of climate change mitigation and adaptation activities and activities that contribute to both mitigation and adaptation



Source: State Audit Office according to the IPCC website, https://archive.ipcc.ch/publications_and_data/ar4/syr/en/spms4.html and the website of the REGILIENCE project, <https://regilience.eu/understanding-adaptation-and-mitigation/>

Due to its size and economic power, the Republic of Croatia can make a small contribution to the global reduction of greenhouse gas emissions, while at the same time it is significantly affected by climate change. In order to minimize the above-mentioned impacts, it is necessary to improve adaptation capacities, strengthen resilience and reduce sensitivity to climate change, which is the global adaptation goal according to Article 7 of the Paris Agreement. This is achieved through the adaptation planning process, the ultimate goal of which is to make people, places, ecosystems and economies more resilient to the impacts of climate change.

According to the results of the Eurobarometer survey¹³ carried out in 2023¹⁴, 81.0% of the population of the Republic of Croatia believe that climate change is a serious problem. Furthermore, 83.0% of the population believe that the costs of damages caused by climate change are much higher than the costs of the investments required for the green transition. Half of the respondents believe that national governments are responsible for the fight against climate change, and 85.0% of respondents believe that the Government of the Republic of Croatia is not doing enough in this regard. More than half of the population believes that they are personally exposed to risks and threats related to the environment and climate (such as fires, floods, pollution, extreme weather conditions, etc.).

¹³The Eurobarometer is a survey instrument used by the European Commission, the European Parliament and other institutions and agencies of the EU to regularly monitor the state of public opinion in Europe on issues related to the EU, as well as attitudes on topics of a political or social nature. In order to guarantee the representativeness of the results, Eurobarometer surveys rely on a randomly selected sample of at least 1,000 people aged 15 and over per reporting country or territory.

¹⁴https://climate.ec.europa.eu/document/download/e0343fe3-58d7-44de-ade7-4d94be98b162_en?filename=hr_climate_2023_en.pdf&prefLang=hr

Legislative and Institutional Framework

The legislative framework consists of international agreements related to climate change, to which the Republic of Croatia is a party, and legislation of the EU and the Republic of Croatia relating to climate change.

The institutional framework consists of bodies responsible for climate change-related matters, i.e. bodies that implement climate change adaptation activities, which is covered by this audit.

- International Agreements

International agreements and resolutions related to climate change oblige member states/parties to the agreement to reduce greenhouse gases (mitigation) and implement climate change adaptation measures. The Republic of Croatia is also a signatory to the aforementioned agreements and resolutions related to climate change, the most significant of which are the United Nations Framework Convention on Climate Change (hereinafter: UNFCCC), the Paris Agreement and the United Nations General Assembly Resolution "Transforming our world: the 2030 Agenda for Sustainable Development" (hereinafter: Agenda 2030).

Figure 5 shows the main international agreements related to climate change and their brief description.

Figure 5

Main international agreements related to climate change

<p>UNFCCC</p>	<ul style="list-style-type: none"> ⦿ Adopted in 1992 in New York. ⦿ Goal: to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous anthropogenic effects on the climate system. This level should be achieved in a time frame long enough to allow the ecosystem to adapt to climate change, not to jeopardize food production and to enable the continuation of economic development in a sustainable manner. ⦿ The Republic of Croatia became a party to the UNFCCC in 1996 with the adoption of the Law on Ratification of the United Nations Framework Convention on Climate Change (Official Gazette – International Treaties 2/1996)
<p>The Paris Agreement</p>	<ul style="list-style-type: none"> ⦿ The Paris Agreement is the most important international agreement that provides guidelines for adaptation. ⦿ Goal: limiting the increase in the global average temperature to "significantly less" than 2°C, i.e. to a maximum of 1.5°C compared to the pre-industrial period, ensuring food supply, but also strengthening the capacity of countries to fight the consequences of climate change, developing new "green" technology and helping weaker, economically less developed members to achieve their national plans to reduce emissions. ⦿ The Republic of Croatia signed it on 22 April 2016, ratified it (as the 147th country in the world) on 17 March 2017, and it entered into force on 23 June 2017.

Agenda 2030

- ⦿ 17 sustainable development goals elaborated into 169 interconnected sub-goals. All member states have taken a political commitment to implement the 2030 Agenda.
- ⦿ Goal 13 of sustainable development calls for immediate action to combat climate change and its consequences.
- ⦿ Goal 13 includes three sub-goals:
 - ⦿ strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries,
 - ⦿ incorporate measures related to climate change into national policies, strategies and planning and improve education,
 - ⦿ raising awareness and human and institutional capacities for mitigating the impact of climate change, adapting to the effects, reducing the effects and early warning.

Source: State Audit Office

The UNFCCC is the main international agreement on climate policy. The 2015 Conference of the Parties to the UNFCCC adopted the Paris Agreement, which legally binds its signatories to take action to combat climate change. The objectives of the Paris Agreement are to keep global warming to below 1.5°C and to respond to the impacts of climate change. The Paris Agreement is the most important international agreement that provides guidance for adaptation.

According to **Article 7 of the Paris Agreement**, Parties establish 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 adequate adaptation response in the context of the temperature goal. It is necessary to keep the increase in the global average temperature at a level that is significantly lower than 2°C above the pre-industrial levels and make efforts to limit the increase in temperature to 1.5°C above the pre-industrial levels. Adaptation measures should be implemented through a country-driven, gender-responsive, participatory and fully transparent approach. It is necessary to take into account vulnerable groups, communities and ecosystems, and to base measures on and guide by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems in order to integrate adaptation in relevant socioeconomic and environmental policies and actions.

Each Party shall, as appropriate, engage in adaptation planning processes and the implementation of measures, including the development or enhancement of relevant plans, policies and/or contributions, which may include:

- ⦿ the implementation of adaptation actions, undertakings and/or efforts;
- ⦿ the process to formulate and implement national adaptation plans;
- ⦿ the assessment of climate change impacts and vulnerability, with a view to formulating nationally determined prioritized actions, taking into account vulnerable people, places and ecosystems;
- ⦿ monitoring and evaluating and learning from adaptation plans, policies, programs and actions and
- ⦿ building the resilience of socio-economic and ecological systems, including through economic diversification and sustainable management of natural resources.

Each Party should, as appropriate, submit and periodically update an adaptation communication, which may include its priorities, implementation and support needs, plans and actions.

- EU Legislation

The EU legislative framework related to climate change adaptation consists of EU regulations establishing adaptation and reporting obligations, the EU Adaptation Strategy and the European Commission's guidelines.

The basis for the adoption of the above regulations, strategies and guidelines is the Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions – **The European Green Deal**¹⁵ – a strategy to achieve the sustainability of the EU economy by turning climate and environmental challenges into opportunities across all policy areas and ensuring a just and inclusive transition. The European Green Deal was adopted by the European Commission in December 2019 to transform the EU into a clean, resource-efficient and competitive economy, in line with the goals of the Paris Agreement. The European Green Deal aims to ensure that by 2050 Europe becomes the first climate-neutral continent, that is, that there are no net emissions of greenhouse gases.

Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (**European Climate Law**)¹⁶ includes in the law the goal set in the European Green Deal to make the European economy and society climate neutral by 2050.¹⁷

The aforementioned law sets a legally binding target of **net zero greenhouse gas emissions by 2050**, and the EU institutions and Member States are obliged to take the necessary measures at EU and national level to meet the target, taking into account the importance of promoting fairness and solidarity among Member States.

The European Climate Law introduced an obligation for member states to **ensure adaptation**, i.e. to **ensure continuous progress in enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change** in accordance with Article 7 of the Paris Agreement. The law contains provisions on national adaptation strategies and plans and expectations regarding the quality of adaptation policy and its results.

According to the aforementioned law, Member States are required to ensure that adaptation policies are coherent, mutually supportive, provide cross-benefits for sectoral policies and contribute to a better coordinated integration of climate change adaptation into all policy areas, including, where appropriate, relevant socio-economic and environmental policies and actions. Particular emphasis should be placed on the most vulnerable and affected population groups and sectors and, after consulting civil society, identify gaps in this regard. Member States shall adopt and implement national adaptation strategies and plans taking into account the EU Climate Change Adaptation Strategy and on the basis of sound analyses of climate change and its vulnerability, assessments and indicators of progress, and guided by the best available and most up-to-date scientific evidence. Member States shall take into account in their national adaptation strategies the particular vulnerabilities of relevant sectors, such as agriculture, and water and food systems, as well as food security, and shall promote nature-based solutions and ecosystem-based adaptation. Member States shall be required to update the strategies regularly.

¹⁵<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640>

¹⁶<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R1119>

¹⁷Climate neutrality by 2050 means achieving zero net greenhouse gas emissions for countries of the EU as a whole, mainly by reducing emissions, investing in green technologies and protecting the natural environment.

It requires the Commission to regularly assess the consistency of relevant national measures with progress in adaptation and to make recommendations if it finds that the measures of a particular Member State are not consistent in improving adaptation capacity, strengthening resilience and reducing vulnerability to climate change.

In February 2021, the European Commission adopted the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – **Forging a climate-resilient Europe – the new EU Strategy for Adaptation to Climate Change**. The Strategy sets out how the EU can adapt to the inevitable impacts of climate change and become resilient by 2050.

The four main objectives of the strategy are:

- ⦿ smarter adaptation – adaptation actions must be based on robust data and risk assessment tools that are accessible to all
- ⦿ faster adaptation – the consequences of climate change are already being felt, so faster and more comprehensive adaptation is needed
- ⦿ more systemic adaptation – climate change will affect all levels of society and all sectors of the economy, therefore adaptation measures must be systematic
- ⦿ step up international action for climate resilience – the EU will increase support for international climate resilience and preparedness.

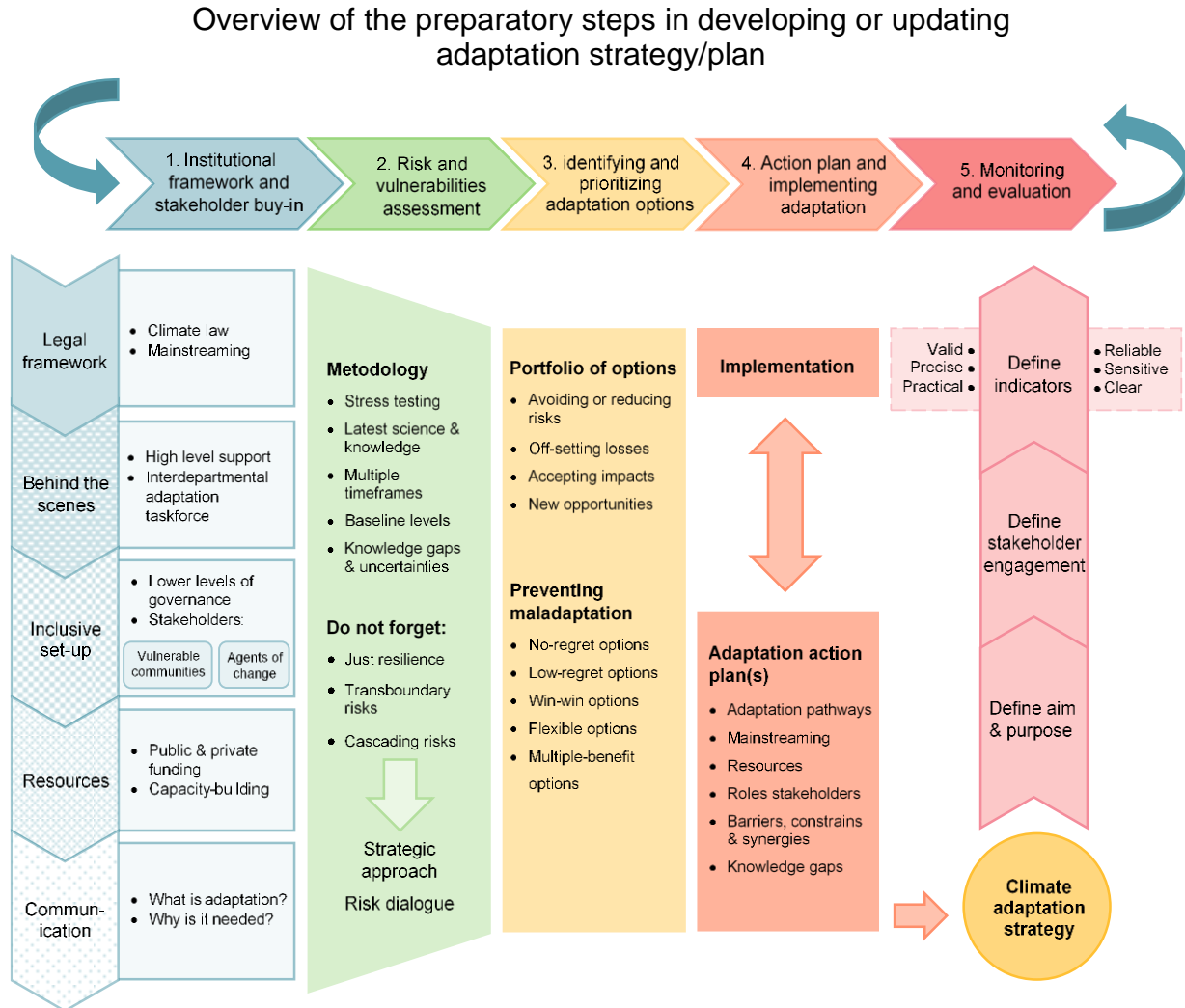
The strategy includes new areas and priorities to facilitate the EU's climate resilience and calls for a revision of the 2013 guidelines for the development of adaptation strategies.

Following the adoption of the new EU Strategy for Adaptation to Climate Change in 2021, in July 2023 the European Commission published Guidelines on Member States' adaptation strategies and plans (2023/C 264/01)¹⁸ (hereinafter: European Commission Guidelines). The purpose of the above guidelines is, inter alia, to support EU Member States in reviewing their adaptation strategies and developing/revising adaptation plans. The European Commission Guidelines state that effective adaptation strategies and plans are needed to enable continuous improvement of social, political and economic preparedness and to anticipate the climate crisis. The above guidelines provide and describe the main steps in developing or updating effective adaptation strategies and plans, which are also prerequisites for successful adaptation to climate change.

Figure 6 shows an overview of the preparatory steps in developing or updating adaptation strategy/plan, according to the European Commission Guidelines.

¹⁸[https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52023XC0727\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52023XC0727(01))

Figure 6



Source: State Audit Office, according to the European Commission Guidelines

The transition to a climate-friendly economy will require large public and private investments. EU Member States have committed to allocate 30.0% of the long-term EU budget for the period 2021-2027 and the NextGeneration EU recovery instrument for green investments. At least 37.0% of the funds from the Recovery and Resilience Facility must be allocated to investments and reforms that support climate objectives. The Facility started in February 2021. It finances reforms and investments by EU Member States from February 2020 until the end of 2026.

As part of the Green Deal, the European Commission has established the Investment Plan for the European Green Deal, which includes a Just Transition Mechanism to provide financial and technical support to the regions most affected by the transition to a low-carbon economy. For this purpose, up to 90 billion euros will be mobilized¹⁹. It is estimated that 275 billion euros of NextGenerationEU and REPowerEU funds will support clean investment, and 118 billion euros of Cohesion Policy until 2027 is dedicated to clean transition²⁰. The EU's efforts in the fight against climate change are in line with the commitments that the EU and its Member States made by signing the Paris Agreement.

¹⁹<https://www.consilium.europa.eu/en/policies/climate-change/>

²⁰https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/story-von-der-leyen-commission/european-green-deal_en

EU Member States support a high level of ambition in the implementation of this international agreement and encourage global partners, both in international forums and in bilateral relations, to accelerate action to limit global warming.

In the Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council²¹, there is an obligation for Member States to report to the Commission by March 15, 2023 and every two years thereafter on the state of implementation of their integrated energy and climate plan, and the EU and Member States submit biennial reports and national reports to the UNFCCC Secretariat. Furthermore, by 15 March 2021 and every two years thereafter, Member States shall report to the Commission on their national climate change adaptation plans and strategies describing their implemented and planned actions to facilitate adaptation to climate change, including the information referred to in Part 1. Annex VIII and in accordance with the reporting requirements agreed under the UNFCCC and the Paris Agreement.

- **Legislative Framework of the Republic of Croatia**

The legislative framework of the Republic of Croatia consists of the Law on Climate Change and Ozone Layer Protection and the Climate Change Adaptation Strategy in the Republic of Croatia for the period until 2040 with a view to 2070, adopted on the basis of the aforementioned Law.

According to the European Commission Guidelines, the adoption of a legal framework is the first step in increasing ambition for climate change adaptation in order to set binding and regularly updated adaptation targets in national climate policy to measure progress in building resilience to climate change.

The Republic of Croatia achieved this by adopting the **Law on Climate Change and Ozone Layer Protection** (Official Gazette 127/19) (hereinafter: the Law on Climate Change) in December 2019. The said Law created a national framework for action and achievement of both climate goals – reducing greenhouse gas emissions and strengthening resilience to climate change. With regard to climate change adaptation, the said Law determines the competence and responsibility for adaptation, documents, adaptation financing, information system, and administrative and inspection supervision.

According to the provisions of the Law on Climate Change, the Government of the Republic of Croatia was obliged to submit a proposal for a Climate Change Adaptation Strategy in the Republic of Croatia for the period until 2040 with a view to 2070 (hereinafter: the Adaptation Strategy) to the Croatian Parliament within one year of the entry into force of the Act, i.e. by 1 January 2021. The Croatian Parliament adopted the Adaptation Strategy in April 2020.

According to the provisions of the Law on Climate Change, the basic climate change documents related to climate change adaptation are the Adaptation Strategy and the Action Plan for the Implementation of the Adaptation Strategy. These documents are described under the title of this report *Climate Change Adaptation Planning*.

²¹<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1999>

The Law on Climate Change stipulates the obligation of compliance of national development documents and development documents of individual areas and activities with the principles, basic goals, priorities and measures established in the Adaptation Strategy. In addition, the counties, the City of Zagreb and large cities are obliged to adopt a program for mitigating climate change, adapting to climate change and protecting the ozone layer, which is an integral part of the environmental protection program for their area.

Climate change adaptation involves assessing the adverse impacts of climate change and taking appropriate measures to strengthen resilience to climate change and prevent or reduce the potential damage it can cause, as well as exploiting the possible positive effects of climate change. Climate change adaptation is carried out by implementing adaptation measures in sectors that are vulnerable to the impacts of climate change. Adaptation measures are implemented by state administration bodies and other legal entities with public authority responsible for meteorology, environmental protection, agriculture, fisheries, forestry, water management, energy, industry, transport, infrastructure, spatial planning, nature protection, the sea, tourism and human health protection. The above-mentioned bodies are required to report to the Ministry every two years on activities related to climate change adaptation.

- Institutional Framework of the Republic of Croatia

The institutional framework of the Republic of Croatia related to climate change adaptation consists of institutions and bodies that implement adaptation activities.

According to the European Commission Guidelines, the first preparatory step in developing or updating an adaptation strategy/plan of EU Member States is the establishment of an institutional framework and stakeholder participation.

An institutional framework for climate change adaptation has been established in the Republic of Croatia. The Law on Climate Change establishes bodies and their responsibilities for climate change adaptation. The effectiveness of adaptation is ensured by the Croatian Parliament and the Government of the Republic of Croatia, as well as representative and executive bodies of local and regional self-government units, while administrative and professional tasks and the implementation of adaptation measures are carried out and ensured by state administration bodies, administrative bodies of local and regional self-government units responsible for environmental protection, and other legal entities with public authority.

The law also establishes that citizens, as individuals and/or organized in associations, contribute through their actions to achieving the goals of climate change adaptation.

The Ministry is responsible for developing the Adaptation Strategy, in cooperation with state administration bodies and other legal entities with public authority in charge of meteorology, environmental protection, agriculture, fisheries, forestry, water management, energy, industry, transport, infrastructure, spatial planning, nature protection, the sea, tourism and human health protection. The Adaptation Strategy is updated every five years, as necessary. The Ministry is responsible for reporting to the Commission on the status of implementation of adaptation measures in accordance with Regulation (EU) No. 2018/1999.

During the audit, in May 2024, the Law on Amendments to the Law on the Organization and Scope of State Administration Bodies (Official Gazette 57/24) established the Ministry of Environmental Protection and Green Transition, which took over tasks related to adaptation to climate change from the Ministry of Economy and Sustainable Development, which changed its name to the Ministry of the Economy.

The Regulation on the internal organization of the Ministry of the Economy and Sustainable Development (Official Gazette 97/20) established the Climate Policy Sector within the Directorate for Climate Activities of the Ministry of the Economy and Sustainable Development. Two services were established within the aforementioned sector:

- ⊗ Climate Action Service and
- ⊗ General Climate Protection Policy Service.

The Climate Action Service, among other things, carried out the tasks of drafting and adopting regulations, programs and measures for the mitigation and adaptation of the climate system, tasks related to the adoption of international agreements in the field of climate protection, desertification and the ozone layer, and carried out the implementation of ratified international agreements, the tasks of preparing and implementing measures for the protection of the climate system and adaptation to climate change, the tasks of participating in the preparation of national positions and opinions for expert working groups in EU bodies, the tasks of preparing answers to questions from business people, the preparation of answers related to informing the public and supervising and directing the development of the environmental protection information system, and other tasks.

The General Climate Protection Policy Service coordinated the development and implementation of strategic documents for environmental protection and sustainable development and prepared expert documents important for sustainable development, and implemented an active sustainable development policy by promoting sustainable production and consumption policies, low-carbon development and climate change adaptation. Furthermore, it ensured the development of a climate change adaptation strategy and action plan, and monitored the implementation of measures from the strategy and action plan in cooperation with the competent state administration bodies. It established an institutional framework for the implementation of climate change adaptation policies and projects, supervised and prepared an annual work plan, participated in the development of project selection criteria and project selection, and in the development of instructions for applicants, participated in monitoring the progress of project implementation, implemented information and communication measures, and implemented educational activities on EU funds, and performed the tasks of the Level 1 Intermediate Body in the field of climate protection and sustainable development.

The Regulation on the Internal Organization of the Ministry of Environmental Protection and Green Transition (Official Gazette 71/24) of June 2024 established the Directorate for Climate Transition. The Directorate established the Sector for Climate Activities with three services:

- ⊗ Service for Climate Certification and Green Public Procurement,
- ⊗ Service for Cross-sectoral Integration of Climate Goals and
- ⊗ Support Service for the Climate Change Adaptation Centre.

Climate Certification and Green Public Procurement Service promotes a general policy of sustainable production and consumption and education for sustainable development; implements environmental and climate protection measures related to environmental management, green public procurement, environmental labelling of products and services and certification of carbon removals and other climate instruments developed by the EU, and performs other tasks not directly related to climate change adaptation.

The Service for Intersectoral Integration of Climate Goals coordinates the development and monitoring of the climate change adaptation strategy and action plan, monitors its implementation and analyses the effects of the implementation of measures, establishes and manages a system for monitoring the effects of climate change adaptation measures.

Furthermore, it leads the Commission for Intersectoral Coordination for Policies and Measures for Mitigation and Adaptation to Climate Change, coordinates national strategic, legislative, planning and development documents with climate goals, prepares expert bases for the adoption of sectoral policies and programs in the part related to climate change adaptation. It monitors the compliance of regional strategic, planning and development documents with national climate change adaptation goals and performs other tasks.

The Support Service for the Climate Change Adaptation Centre cooperates with the CMHS on improving the analysis of climate change risks and impacts and the implementation of the climate change adaptation strategy, and monitors, supervises and directs the work of the Climate Change Adaptation Centre; establishes a system of education and certification of persons performing climate proofing activities in cooperation with the Climate Change Adaptation Centre; implements projects to improve the implementation of climate change adaptation; carries out work on harmonizing national and regional strategic, legislative, planning and development documents with the objectives of climate change adaptation, participates in the preparation of draft proposals for laws and other regulations, plans, programmes and reports within its jurisdiction; prepares expert bases for the adoption of sectoral policies and programmes in the part related to climate change adaptation. The aforementioned service cooperates with other state administration bodies, local and regional self-government, business and civil sectors regarding tasks within its scope of work, prepares answers to questions from business people, prepares answers regarding informing the public; promotes the concept of climate proofing; provides expert support to national, regional, local and other bodies; establishes and manages a system for monitoring the effects of climate change adaptation measures, coordinates the removal of barriers in cooperation with the competent sectors for the implementation of climate change adaptation measures; prepares reports and submits them to EU bodies and other international bodies; performs the tasks of the Level 1 Intermediate Body related to the area of climate protection and sustainable development, participates in the programming process, the development of project selection criteria and in the selection of projects, the development of instructions for applicants, in monitoring the progress of project implementation, in informing and communicating with beneficiaries, and, if necessary, participates in the implementation of educational activities on EU funds.

From the above, it is evident that the Regulation on the Internal Organization of the Ministry from June 2024 significantly expanded the tasks related to adaptation compared to the tasks specified in the Regulation on the Internal Organization of the Ministry of the Economy and Sustainable Development from 2020. It also provides for a larger number of employees who would work on adaptation tasks compared to the aforementioned Regulation from 2020. According to the explanation of the responsible person of the Ministry, until the adoption of the aforementioned Regulation from 2024, only one employee worked on climate change adaptation tasks full-time, and two employees (the Director of the Directorate and the Head of the Sector) worked part-time, in addition to other tasks. The Regulation on the Internal Organization of June 2024 provides for five employees each in the Support Service for the Climate Change Adaptation Center and the Service for Intersectoral Integration of Climate Goals, out of a total of 16 employees in the Sector for Climate Activities.

The State Audit Office recommends urgently strengthening the capacities of the Ministry regarding climate change adaptation.

Apart from the Ministry, certain activities and tasks related to climate change adaptation in the Republic of Croatia are the responsibility of other bodies, which is shown in Table 2.

Table 2

Competent authorities for the implementation of climate change adaptation activities and their main tasks, according to the Law on Climate Change and the Adaptation Strategy

Competent authority	Basic tasks
Government of the Republic of Croatia	<ul style="list-style-type: none"> ⊗ ensures the effectiveness of adaptation to climate change, together with the Croatian Parliament ⊗ establishes the Commission for Intersectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change at the proposal of the Ministry ⊗ proposes an Adaptation Strategy to the Croatian Parliament ⊗ adopts the Action Plan for the implementation of the Adaptation Strategy at the proposal of the Ministry
Ministry of Environmental Protection and Green Transition (Directorate for Climate Transition)	<ul style="list-style-type: none"> ⊗ performs administrative and professional tasks related to adaptation ⊗ prepares and drafts laws and implementing regulations, programs, plans and reports and monitors their implementation ⊗ proposes harmonization of climate change legislation with EU regulations ⊗ mediates and exchanges data on adaptation with EU, OECD and international organizations ⊗ performs the tasks of horizontal and vertical harmonization of climate policy and integration of climate goals into sectoral policies, national and regional development documents for the purpose of achieving climate transition, monitors their implementation and analyzes the effects of the implementation of measures ⊗ coordinates the preparation and monitoring of the adaptation strategy and action plan, monitors its implementation and analyzes the effects of the implementation of the measures ⊗ leads the Commission for Intersectoral Coordination for Policies and Measures for Mitigation and Adaptation to Climate Change ⊗ prepares expert bases for the adoption of sectoral policies and programs in the part related to adaptation ⊗ monitors the compliance of regional strategic, planning and development documents with national adaptation goals ⊗ cooperates with CMHS on improving the analysis of the risks and impacts of climate change and the implementation of the adaptation strategy, and monitors, supervises and directs the work of the Climate Change Adaptation Center ⊗ establishes a system of training and certification of persons who perform climate proofing activities in cooperation with the Climate Change Adaptation Center ⊗ implements projects to improve the implementation of adaptation ⊗ performs tasks of harmonizing national and regional strategic, legislative, planning and development documents with adaptation goals ⊗ promotes the concept of climate proofing and provides expert support to national, regional, local and other bodies ⊗ establishes and manages a system for monitoring the effects of adaptation measures ⊗ coordinates the removal of barriers in cooperation with competent sectors for the implementation of adaptation measures ⊗ performs the duties of the Level 1 Intermediary Body related to the area of climate protection and sustainable development
Ministries responsible for sectors vulnerable to the impacts of climate change	<ul style="list-style-type: none"> ⊗ Ministry of Agriculture, Forestry and Fisheries, Ministry of Tourism and Sports, Ministry of Health, Ministry of Economy (Energy Directorate, Industry and Mining Directorate), Ministry of Environmental Protection and Green Transition (Water Management and Sea Protection Directorate, Nature Protection Directorate), Ministry of the Sea, Transport

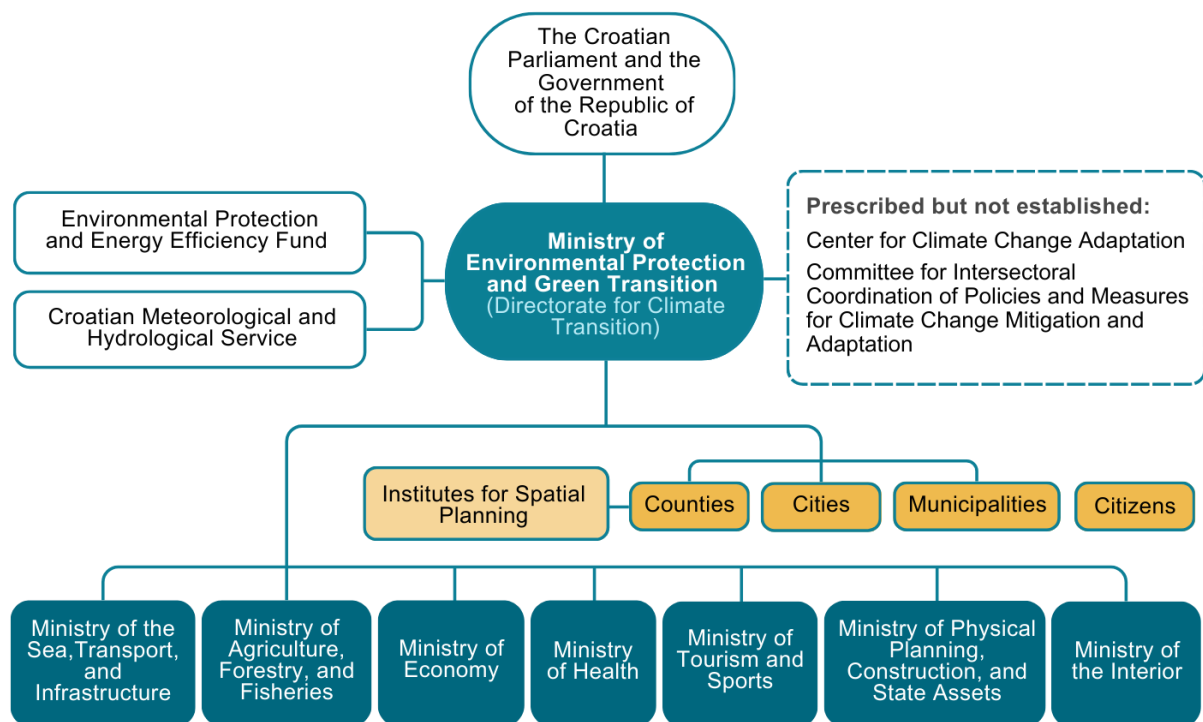
Competent authority	Basic tasks
	<p>and Infrastructure, Ministry of Physical Planning, Construction and State Assets and the Ministry of the Interior</p> <ul style="list-style-type: none"> ⊗ responsible for implementing adaptation measures in their sector
Croatian Meteorological and Hydrological Service	<ul style="list-style-type: none"> ⊗ manages the meteorological and hydrological infrastructure (in cooperation with Croatian Waters), the air quality monitoring infrastructure and the national archive of meteorological, hydrological and related data ⊗ monitors the climate and climate change, in accordance with national and international standards ⊗ conducts climate research ⊗ in the implementation of the Adaptation Strategy, it has a role in climate modeling and monitoring the state of climate indicators
Environmental Protection and Energy Efficiency Fund	<ul style="list-style-type: none"> ⊗ carries out activities on the financing of projects, programs and similar activities in the field of conservation, sustainable use, protection and improvement of the environment and in the field of energy efficiency and the use of renewable energy sources ⊗ co-finances projects for the implementation of climate change adaptation measures defined in national and local strategic and planning documents
Local and regional self-government units	<ul style="list-style-type: none"> ⊗ counties, the City of Zagreb and large cities adopt a program for mitigating climate change, adapting to climate change and protecting the ozone layer, which is an integral part of the environmental protection program ⊗ their representative and executive bodies ensure the effectiveness of adaptation ⊗ their administrative bodies responsible for carrying out environmental protection work perform administrative and professional adaptation tasks and the implementation of adaptation measures ⊗ counties and the City of Zagreb submit available data on activities related to adaptation to the competent Ministry every two years
Institute for Physical Planning of the City of Zagreb and county institutes for physical planning	<ul style="list-style-type: none"> ⊗ they prepare or coordinate the preparation and monitor the implementation of spatial plans at the regional level, i.e. the City of Zagreb ⊗ they prepare a report on the state of the space ⊗ they run the spatial planning information system and manage it within their authority ⊗ they prepare the starting points for the creation, that is, the invalidation of spatial plans ⊗ according to the Adaptation Strategy, they ensure the professional foundation of spatial plans, which are the main instruments for the implementation of climate policies with the force and legal nature of secondary legislation
Commission for Intersectoral Coordination for Policy and Measures for Climate Change Mitigation and Adaptation	<ul style="list-style-type: none"> ⊗ established to monitor and evaluate the implementation and planning of policies and measures for adapting to climate change, giving opinions on reports and participating in the review of these reports ⊗ makes recommendations to the Government of the Republic of Croatia on the overall policy and measures for mitigating and adapting to climate change, proposes the adoption of strategic planning acts and regulations related to policy and adaptation measures ⊗ proposes goals, measures and activities of public policies and monitors their effects and outcomes in implementation ⊗ ensures political support in the implementation of policies and measures to mitigate and adapt to climate change, proposes strategic acts and regulations, proposes goals, measures and activities and monitors their implementation ⊗ according to the Strategy, can assume a role in defining the framework for monitoring the implementation of the Strategy and action plans

Competent authority	Basic tasks
Citizens	<ul style="list-style-type: none"> ⚙ as individuals and/or organized into professional associations for the purpose of adaptation to climate change, they contribute with their activities to the achievement of adaptation goals ⚙ through the process of consultation with the interested public, they can participate in the procedures for passing laws, regulations and acts

The figure below summarizes the institutional framework related to climate change adaptation established by the Law on Climate Change, the Adaptation Strategy, and the Regulation on the Internal Organization of the Ministry.

Figure 7

Institutional framework related to climate change adaptation



Source: State Audit Office

- Horizontal Coordination of Bodies Responsible for Adaptation and Inclusion of Adaptation in Sectoral Policies

According to the European Commission Guidelines, in order to ensure the necessary engagement and successful integration of adaptation in different sectoral policies, it is recommended to establish an interdepartmental working group or committee under the leadership of the office of the Prime Minister or an equivalent body. This working group should be responsible for overseeing the development of the climate change adaptation strategy and/or plan and should be given clear powers to lead their implementation. This group should include the ministries responsible for sectors exposed to a greater risk of the impact of climate change and cross-border stakeholders. Primarily, the ministries responsible for climate change, environment/nature, public health, civil protection/internal affairs, infrastructure, energy, economy/finance, agriculture, forestry, fisheries, water management and employment and social issues should be involved.

According to the World Bank Framework Legislation Reference Guide for Climate Change, the coordination mechanism, which should be established by the legislative framework, should coordinate the response to climate change through a whole-of-government approach through policy development, implementation and evaluation. Coordination is achieved by aligning stakeholders around long-term decarbonization and adaptation goals, medium-term and sectoral goals, and national, regional, and sectoral strategies and plans. Members should be officials (usually heads of the body) so that they have the authority to direct the management of the body and to allocate financial and technical resources for policy development, planning, implementation and monitoring. If the coordinating body is led by the body responsible for the environment, the legislative framework should ensure appropriate authority over other bodies. It should also determine the frequency of holding meetings and the participation of relevant bodies and allocate the human and financial resources required for coordination activities.

On the basis of the Law on Air Protection (Official Gazette 130/11, 47/14 and 61/17), in January 2018 the Government of the Republic of Croatia adopted the Decision on the establishment of the **Commission for Intersectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change** (hereinafter: Commission). According to the aforementioned Decision, the Commission makes recommendations to the Government of the Republic of Croatia on the overall policy and measures for mitigating and adapting to climate change, ensures political support in the implementation of policy and measures for mitigation and adaptation, taking into account strategic goals from the strategies and feasibility with regard to technical, economic and sociological limitations, compliance of medium-term strategic planning acts at the national, regional and local level, and international obligations. Furthermore, it provides proposals for goals, measures and activities of public policies and monitors their effects and outcomes in implementation, provides suggestions and support in promoting interdisciplinary and synergistic goals, measures and activities of public policies.

The composition of the Commission was determined in the said Decision. The President of the Commission is the Minister of Environmental Protection and Energy, and the members are representatives of competent state administration bodies at the level of assistant ministers. The Decision lists the names and surnames of the members and the names of the state administration bodies they represent.

The decision established that the Commission meets at least once a year or as needed, and the President of the Commission can, if necessary, invite other representatives of public authorities, professional organizations and representatives of state-owned companies. It is envisaged that the President of the Commission will appoint a Technical Working Group for Policy and Adaptation Measures to Climate Change to monitor and evaluate implementation, plan policies and measures, and provide opinions on planning and strategic documents and draft regulations.

The audit established that from its establishment in 2018 until the end of the audit (October 2024), the Commission met only once, in May 2019, at a thematic session on the occasion of the presentation of the Draft proposal of the Adaptation Strategy.

The Law on Climate Change establishes a new structure for the Commission, consisting of a Coordination Group and two technical working groups: a technical working group for mitigation and a technical working group for adaptation to climate change. According to the aforementioned Law, the Commission is established to monitor and evaluate the implementation and planning of policies and measures for mitigating and adapting to climate change, giving opinions on reports and participating in the review of these reports.

The presidents and members of the Commission are appointed by the Government of the Republic of Croatia from the ranks of scientific, professional, public and other employees, as well as representatives of central state administration bodies responsible for individual sectors, representatives of civil society associations operating in the field of climate change and the business world. Administrative and technical tasks for the Commission are performed by the Ministry.

In the Adaptation Strategy, it is stated that, since the issue of climate change is an area of intersectoral nature, it is necessary to ensure appropriate intersectoral coordination and that the Commission can take on a role in defining the framework for monitoring the implementation of the Adaptation Strategy and action plans. The Commission should also have a role in reporting on the implementation of the Adaptation Strategy and action plans, and it is stated that it will monitor the implementation at the sessions and consider the reports and propose measures to remove obstacles and improve the implementation.

The audit determined that by the time of the audit (October 2024) the Commission was not established on the basis of the Law on Climate Change, but rather the Decision on the establishment of the Commission from 2018, adopted on the basis of the Law on Air Protection from 2011 and its amendments, was in force.

According to the explanation of the responsible person of the Ministry, in accordance with the Law on Climate Change, in February 2021 the Ministry initiated the procedure for establishing a new Commission and in May 2021 sent a letter to the ministries (12 of them) and professional institutions (CMHS, institutes, faculties, the Environmental Protection and Energy Efficiency Fund, Croatian Waters), to economic entities and non-governmental associations, employers' associations, cities and municipalities and other entities that request the appointment of representatives in Coordination Working Group, Technical Working Group for Climate Change Mitigation and Technical Working Group for Climate Change Adaptation. In addition to the entry into force of the Law on Climate Change, the aforementioned was also necessary due to changes in the organization and scope of ministries and other state administration bodies.

Furthermore, according to the explanation, the coordination working group should be made up of persons at the level of directors of ministries, based on their competence, in order to ensure the necessary political support for the implementation of climate obligations. The technical working group for adaptation should be composed of experts from relevant ministries, professional institutions, representatives of the economy and non-governmental organizations in order to implement the successful and timely incorporation of adaptation measures into sector strategies and programs and their implementation. Because of the above, a large number of representatives of bodies, institutions and associations are expected to be appointed to the aforementioned working groups. A large number of experts is necessary to cover all areas related to adaptation to climate change. The commission was not established due to the lengthy appointment process (collection of nominations from 52 entities, collection of opinions on the text of the Decision, CVs). The appointment procedure was repeated due to the passage of too much time since the initiation of the procedure, a change of ministers (two Ministers of the Ministry, the Minister of the Ministry of Finance, the Minister of the Ministry of Regional Development and European Union Funds, the Minister of the Ministry of Physical Planning, Construction and State Assets), changes in the fiscal impact assessment form, application of the new Regulation on the procedure for issuing the Statement on the assessment of the fiscal impact and the introduction of the euro, as well as parliamentary elections.

Furthermore, in order to avoid long-term collection of appointments and resumes in the future, the Decision establishing the Commission with Coordination and two technical working groups will be adopted by the Government of the Republic of Croatia in terms of representatives of institutions and other legal entities, while individual decisions and appointments will be made by the minister responsible for the environment.

According to the explanation, although the Commission was not officially established by the adoption of the Decision of the Government of the Republic of Croatia, the Ministry is in contact with experts appointed by the bodies, to whom the Ministry sent an invitation during the procedure for establishing the Commission. The Ministry occasionally invites them to meetings and consults with them regarding the review of the reports that the Republic of Croatia is obliged to submit to the European Commission. The members of the Commission appointed by the Decision on the Establishment of the Commission from January 2018 were involved in the preparation of the Adaptation Strategy by participating in workshops and meetings and providing opinions during the adoption procedure.

According to the Explanatory Memorandum to the Proposal for the Decision on the Establishment of the Commission for Intersectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change from 2021, the Commission is being established with the aim of quick and effective horizontal and vertical coordination in order to fulfill all the obligations of the Republic of Croatia in the field of climate change, which would enable successful and timely incorporation of adaptation measures into sectoral strategies and programs and their implementation. Furthermore, it is stated that practice has shown that cooperation without an institutional framework is very difficult, there is no continuity of work on climate issues in the line ministries, it is difficult to get the support of superiors for the part of the work that must be done by the line ministry, on which the fulfillment of the obligations that the Republic of Croatia depends on has as an EU member state and a party to the UNFCCC, the Kyoto Protocol, the Doha Amendments to the Kyoto Protocol and a signatory to the Paris Agreement. Through the work of the Commission, the necessary political support for measures to reduce greenhouse gas emissions and the fulfillment of other climate obligations would be ensured, as well as monitoring and assessment of the implementation and planning of policies and measures for mitigating and adapting to climate change, providing opinions on strategic and planning documents, and more.

According to the Proposal for the Decision on the establishment of the Commission from 2023, submitted during the audit, the tasks of the Coordination Working Group related to adaptation to climate change are:

- giving recommendations to the Government of the Republic of Croatia on overall policy and adaptation measures
- ensuring support in the implementation of policies and measures for adaptation and in the implementation of tasks prescribed by the Law
- evaluating and proposing the adoption of regulations and shaping of public policies related to adaptation
- participation in the drafting of strategic planning documents and
- providing suggestions and support in promoting effective interdisciplinary and synergistic activities in the area of adaptation.

The members of the Coordination Working Group are representatives of ministries at the level of directors of administrations, where the number of members from each body and the authority of the body are specified, without specifying the names of the members and the names of individual bodies. A total of 20 members are expected, including the chairman of the Coordination Working Group, who is the minister responsible for environmental protection.

The Technical Working Group for Adaptation consists of experts from line ministries, professional and scientific institutions, business and non-governmental associations. A total of 68 members are expected.

The tasks of the Technical Working Group are:

- ⊙ providing recommendations on planning documents and draft regulations
- ⊙ providing recommendations on proposals for regulations, studies, reports and other relevant documents related to existing and planned policies and measures and the effects of these policies and measures (recommendations refer to the adequacy of policies and measures with regard to goals, enforceability with regard to limitations and compliance with sectoral planning documents, regional and local planning documents and international obligations in other sectors)
- ⊙ providing recommendations and support in promoting effective interdisciplinary and synergistic activities, policies and measures
- ⊙ providing recommendations and advice regarding quality assurance and assessment of the acceptability of present uncertainties in planning and projections
- ⊙ providing recommendations in choosing a methodological approach, respecting the instructions of the IPCC and the UNFCCC
- ⊙ consideration of the recommendations made by the UNFCCC Expert Group for review and
- ⊙ providing support in accessing information and data.

The members of the Commission are obliged to give the mentioned recommendations within ten days of receiving the document, and they participate in the work by submitting data, giving written statements on the submitted materials or orally at meetings. It is foreseen that the working groups of the Commission meet at least once a year or as needed.

The audit found that the Law on Climate Change provides for the establishment of a Commission, which should consist of a coordination and technical working group. According to the provisions of the Law on Climate Change, the Government of the Republic of Croatia, at the proposal of the Ministry, was to establish the Commission by decision within one year of the entry into force of the Act, i.e. by 1 January 2021.

The State Audit Office recommends urgently proposing to the Government of the Republic of Croatia the establishment of the Commission and coordination and technical working groups to ensure high-level support for climate change adaptation activities and the necessary engagement of all stakeholders, and to establish clear procedures for its work.

According to the Adaptation Support Tool website²² of the European Environment Agency, the adoption and implementation of adaptation goals and measures in sectoral policies and their instruments is crucial because climate change affects almost all sectors of administration and socio-economic activities, and national or sub-national adaptation action plans are therefore mostly multi-sectoral and inter-sectoral documents. As a result, adaptation cannot be implemented in isolation from existing policies, instruments, governance structures and processes of other sectors. The implementation of adaptation therefore requires the integration of adaptation policies into sectoral policy instruments. The main means of achieving policy integration is horizontal governance, which includes mechanisms, institutions and processes for coordination, cooperation and networking of different stakeholders.

²²<https://climate-adapt.eea.europa.eu/en/knowledge/tools/adaptation-support-tool/step-5-3>

Integrating adaptation means including adaptation in all levels of sectoral policy making, from political programs, legislation, strategies, instruments such as programs and plans, to budgets, projects and daily work routines. The main goal is to achieve coherence of public policies, i.e. alignment and harmonization of different sectoral policies with climate adaptation goals in order to minimize conflicts, avoid compromises and encourage mutual synergy towards achieving common comprehensive adaptation outcomes.

Legal provisions for the establishment of sectoral adaptation plans or for the integration of adaptation into existing sectoral documents are not sufficient in themselves to ensure effective implementation in practice, but should be combined with other forms of horizontal management, such as the involvement of representatives of individual sectors in designing measures or designing attractive and customized solutions for adaptation for individual sectors.

Furthermore, it is stated that the integration of adaptation at the level of EU policies is an important driver of the integration of adaptation policy at the national level. Examples include EU water management policies (Water Framework Directive²³), flood risk management (Directive on flood risk assessment and management²⁴), disaster risk reduction (EU Civil Protection Mechanism²⁵), urban planning (EU Plan for cities²⁶, Agreement of Mayors for Climate and Energy) and green infrastructure (EU Green Infrastructure Strategy²⁷), as well as cross-sectoral policies such as environmental impact assessment.

The need to integrate adaptation into sectoral policies is highlighted in the Adaptation Strategy, according to which adaptation to climate change requires the attention and involvement of all stakeholders, the economy and decision-makers at the national, regional and local levels. Furthermore, it was stated that for the first time in one strategic document, an assessment of climate change for the Republic of Croatia by the end of 2040 and 2070, possible impacts and an assessment of vulnerability is given, which should be an incentive to further integrate the described risks into sectoral strategic and planning documents at the national, regional and local level.

The Law on Climate Change stipulates that national development documents and development documents of individual areas and activities must be harmonized with the principles, basic goals, priorities and measures established in the Adaptation Strategy.

According to the explanation of the responsible person of the Ministry, climate change adaptation is integrated into various sectoral policies. Integration was carried out in several ways, through EU sectoral policies, where the necessity of adaptation due to increasing risks of climate change is increasingly emphasized, and through the national procedure for the adoption of laws, strategic documents and other documents in which the Ministry gives its opinion on the documents. Since 2017, when giving opinions on the aforementioned documents, the Ministry has been checking the compliance of individual documents in accordance with Article 15 of the Law on Climate Change, according to which national documents and development documents of certain areas and activities must be harmonized with the principles, basic goals, priorities and measures established in Adaptation strategy.

²³Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 on the establishment of a framework for Community action in the field of water policy

²⁴Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks (Text with EEA relevance)

²⁵https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/eu-civil-protection-mechanism_en

²⁶https://commission.europa.eu/eu-regional-and-urban-development/topics/cities-and-urban-development/urban-agenda-eu_en

²⁷<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52013DC0249>

In this procedure, the Ministry requests that the activities and measures specified in the individual sectoral document be harmonized, that is, connected with the activities and measures from the Adaptation Strategy.

Furthermore, according to the explanation, integration is largely reduced to stating and identifying climate change as a threat and the need to strengthen resilience to climate change. In the explanation it is stated that in the Republic of Croatia there is a significant lack of detailed analyzes of climate risks for individual sectors and policies, as well as proposals for specific measures in sector policies.

By reviewing the submitted documentation during the audit, it was determined that when giving an opinion on development documents, the Ministry checks the compliance of individual documents with the Adaptation Strategy, proposes the implementation of measures, emphasizes the necessity of integrating the obligation to assess the impact, vulnerability and risk of climate change and the obligation to develop measures, standards, conditions and guidelines for adapting to climate change in all segments of individual areas and the necessity of harmonizing individual documents with the Law on Climate Change. The Ministry provides a detailed explanation for each opinion.

For the purposes of the audit, an overview of the legislative, strategic and planning framework of vulnerable sectors in force at the time of the audit (July 2024) was prepared and compared with the situation described in the Working version of the Draft Adaptation Strategy (2017).

Table 3 provides an overview of basic regulations, strategic and planning documents by vulnerable sectors, in which climate change is mentioned.

Table 3

Basic regulations, strategic and planning documents by vulnerable sectors

Vulnerable sectors	Regulations, strategic and planning documents
Water resources	⦿ Law on Water (Official Gazette 66/19, 84/21, 47/23)
	⦿ Water Management Strategy (Official Gazette 91/08)
	⦿ River Basin Management Plan up to 2027 (Official Gazette 84/23)
	⦿ Multi-annual Program for the Construction of Municipal Water Structures for the Period up to 2030 (Official Gazette 147/21)
	⦿ Draft Multi-annual Program of Constructing Water Regulation and Protection Facilities and Amelioration Facilities for the Period up to 2030 (October 2022)
Agriculture	⦿ Law on Agriculture (Official Gazette 118/18, 42/20, 127/20 – Decision of the Constitutional Court of the Republic of Croatia, 52/21, 152/22)
	⦿ Strategic Plan of the Common Agricultural Policy of the Republic of Croatia 2023-2027 (Official Gazette 22/23)
	⦿ Agriculture Strategy until 2030 (Official Gazette 26/22)
	⦿ National Action Plan for the Development of Ecological Agriculture in 2023-2030 (August 2023)
Forestry	⦿ Law on Forests (Official Gazette 68/18, 115/18, 98/19, 32/20, 145/20, 101/23, 36/24)
	⦿ Forest Management Plan 2016-2025 (August 2017)
	⦿ Strategic Plan of the Common Agricultural Policy of the Republic of Croatia 2023-2027

Vulnerable sectors	Regulations, strategic and planning documents
Fisheries and aquaculture	⦿ Law on Freshwater Fisheries (Official Gazette 63/19)
	⦿ National Aquaculture Development Plan for the Period up to 2027 (Official Gazette 133/22)
	⦿ Action Plan for the Implementation of the National Aquaculture Development Plan for the Period up to 2024 (2022)
	⦿ Fisheries and Aquaculture Program of the Republic of Croatia for the Programming Period 2021-2027 (November 2022)
	⦿ More than a Pond - Visions and Implementation Plan of the Transformation Strategy of the Aquaculture Sector in Croatia 2020-2030 (June 2020)
Biodiversity	⦿ Law on Nature Protection (Official Gazette 80/13, 15/18, 14/19, 127/19, 155/23)
	⦿ Law on Environmental Protection (Official Gazette 80/13, 153/13, 78/15, 12/18 and 118/18)
	⦿ Strategy and Action Plan for Nature Protection of the Republic of Croatia for the Period from 2017 to 2025 (Official Gazette 72/17)
Energy	⦿ Energy Development Strategy of the Republic of Croatia until 2030 with a view to 2050 (Official Gazette 25/20)
	⦿ Low-carbon Development Strategy of the Republic of Croatia until 2030 with a view to 2050 (Official Gazette 63/21)
	⦿ Croatian Strategy for Hydrogen until 2050 (Official Gazette 40/22)
	⦿ Integrated National Energy and Climate Plan for the Republic of Croatia for the Period 2021-2030 (December 2019)
Tourism	⦿ Sustainable Tourism Development Strategy up to 2030 (Official Gazette 2/23)
	⦿ Law on Tourism (Official Gazette 156/23)
	⦿ National Plan for the Development of Sustainable Tourism until 2027 (Official Gazette 97/23)
Health	⦿ Strategic Framework for the Development of Mental Health until 2030 (November 2022)
Risk management	⦿ Law on Critical Infrastructures (Official Gazette 56/13 and 114/22)
	⦿ Disaster Risk Assessment for the Republic of Croatia (March 2024)
	⦿ Disaster Risk Management Strategy until 2030 (Official Gazette 122/22)
Physical planning	⦿ Law on Physical Planning (Official Gazette 153/13, 65/17, 114/18, 39/19, 98/19 and 67/23)
	⦿ Spatial Development Strategy of the Republic of Croatia (Official Gazette 106/17)
	⦿ Program for the Development of Green Infrastructure in Urban Areas for the Period from 2021 to 2030 (Official Gazette 147/21)
	⦿ Long-term Strategy for the Restoration of the National Building Fund until 2050 (Official Gazette 140/20)
	⦿ Development Program for the Circular Management of Space and Buildings for the Period 2021 to 2030 (Official Gazette 143/21)
	⦿ Program of Energy Renovation of Multi-apartment Buildings for the Period until 2030 (Official Gazette 143/21)
	⦿ Energy poverty reduction program that includes the use of renewable energy sources in residential buildings in subsidized areas and areas of special state care for the period until 2025 (Official Gazette 143/21)

The audit established that progress has been made in the integration of adaptation into sectoral policies compared to the time before the adoption of the Adaptation Strategy, when climate change, and especially adaptation to it, were mostly only mentioned or briefly analyzed for most sectors.

In the legal, strategic and planning documents of certain vulnerable sectors adopted by mid-2024, climate change is addressed in great detail (for example, water resources, tourism, disaster risk management). In the **Disaster Risk Management Strategy until 2030**, strategic goals and measures are elaborated according to projects/activities, duration of the project/activity, responsible bodies, whereby each strategic project/activity is labeled with a measure from the Adaptation Strategy, where applicable. Out of a total of 45 projects, 13 of them are related to one or more measures from the Adaptation Strategy. In addition, climate change is cited as the main cause of increasingly frequent and intense occurrences of disasters in the world and in the Republic of Croatia. The impact of climate change on risks is described for floods, open fires, epidemics and pandemics, extreme temperatures, droughts, snow and ice, landslides and land salinity. Climate change and the Adaptation Strategy are dealt with in detail in the **River Basin Management Plan up to 2027**. The aforementioned Plan provides an interpretation of climate change for the needs of water management, which relies on the results of the study Interpretation of Climate Change Analysis for Water Management Planning Needs by CMHS, and describes the Adaptation Strategy, especially in the part related to water resources. In order to get a complete overview of the list of measures resulting from the Adaptation Strategy, which directly or indirectly relate to the management of water conditions, a special chapter with a list of measures was created. The designation of the measure in the Adaptation Strategy, the level of importance and the name of the measure according to the Adaptation Strategy, the designation and name of the activity, and a link to the Program of Measures of the River Basin Management Plan until 2027 are provided. In addition, measures related to reducing the vulnerability of other sectors to climate change are provided, where the bodies responsible for water management are among the key stakeholders. In addition to the River Basin Management Plan until 2027, in the water resources sector, climate change and adaptation are highlighted in the Law on Water, in the Multi-annual Program for the Construction of Municipal Water Structures for the Period up to 2030 and in the Draft Multi-annual Program of Constructing Water Regulation and Protection Facilities and Amelioration Facilities for the Period until 2030.

The **Sustainable Tourism Development Strategy up to 2030** highlights the unfavourable interrelationship between tourism and climate change and the need to strengthen the resilience of tourism infrastructure to various weather extremes. It is stated that the adaptation of tourism to climate change requires a multidisciplinary approach and more effective cooperation at all levels, taking into account the specificities of their climatic characteristics. One of the four strategic objectives of sustainable tourism in the Republic of Croatia is directly related to climate change (Strategic Objective 2. Tourism with a preserved environment, space and climate). The Scenario Analysis places special emphasis on the impact of tourism on the environment and climate change, as well as the impact of climate change on tourism. The Action Plan for the Implementation of the National Plan for the Development of Sustainable Tourism by 2025 elaborates specific objectives and associated measures, a result indicator, an estimated cost of implementation, a source of financing, and the implementers and collaborators in the implementation of the measures. Out of a total of 21 measures, three are directly related to climate change, and relate to strengthening the resilience of tourism to the consequences of climate change, encouraging innovation, and developing smart destinations based on innovation, accessibility, and sustainability.

In some sectors, climate change adaptation is not integrated into regulations, strategic or planning documents at all or is integrated to a small extent. For example, in relation to the health sector, the National Health Development Plan for the period 2021-2027 (Official Gazette 147/21) does not mention climate change at all. In the Strategic Framework for the Development of Mental Health by 2030, climate change is mentioned in the context of the need to establish mobile teams in crisis situations, including, among others, those related to climate change. In June 2017, the Ministry of Health developed a Protocol on Procedure and Recommendations for Protection from Heat. In the Law on Physical Planning, climate change is mentioned in the context of marine planning, where it is stated that when developing and adopting spatial plans covering the marine area, it is necessary to take into account the interaction of the land and the marine area and long-term changes caused by climate change, and that efforts should be made to contribute to the preservation, protection and improvement of the state of the environment and nature, including resilience to the effects of climate change. The Spatial Development Strategy of the Republic of Croatia from 2017 is in force, which states that all development plans must take into account strengthening resilience to the impacts of climate change. Interventions in the field of spatial planning are listed as a general measure, which primarily means adapting and upgrading spatial standards and building conditions in order to strengthen the resilience of new and built structures to the consequences of climate change, and finding models for increasing the resilience of existing structures to risks.

According to the Decree on the Internal Organization of the Ministry from June 2024, the Sector for Climate Activities, among other things, performs the tasks of horizontal and vertical harmonization of climate policy and the integration of climate goals into sector policies, into national and regional development documents for the purpose of achieving climate transition and monitors their implementation and analyzes the effects of the implementation of the measures. Within the Sector for Climate Activities, the Service for Intersectoral Integration of Climate Goals has been set up, which, among other things, performs the tasks of harmonizing national strategic, legislative, planning and development documents with climate goals and environmental protection goals, prepares expert bases for the adoption of sector policies and programs in the part that refers, among other things, to adaptation to climate change, monitors the compliance of regional strategic, planning and development documents with national adaptation goals and leads the Commission. These tasks were not listed in the 2020 Regulation on internal organization.

According to the explanation of the responsible person of the Ministry, the Sector for Climate Activities is obliged to coordinate the development and implementation of climate goals from strategic and planning documents, which have a large socio-economic impact, which is why it is necessary to balance policies and measures and ensure vertical and horizontal harmonized action for the execution of all obligations of the Republic of Croatia in the field of climate change, which would enable the successful and timely incorporation of adaptation measures into sectoral strategies and programs and their implementation. The aforementioned sector prepares documents, leads a working group, prepares drafts of documents, consults with the public, prepares the final draft, and performs referrals to the procedure of the Government of the Republic of Croatia and the Croatian Parliament. The sector uses the Commission and technical working groups for consultation on these documents and on the determination of priority measures and policies. Furthermore, the Sector monitors the implementation of the adopted documents and resolves challenges and obstacles and prepares periodic reports. The sector uses the Commission and technical working groups as a permanent advisory body composed of experts who can help in critically reviewing reports and challenges in achieving climate goals and giving recommendations and advice for solutions, based on which it prepares the basis for the head of the Ministry who decides on taking certain steps.

The audit established that, although adaptation to climate change is the responsibility of the Ministry, which leads and coordinates the adaptation policy, the implementation of activities and individual tasks is the responsibility of numerous bodies, which is shown in Table 2. From the aforementioned provisions on organization and job description of the Sector for Climate Activities and the Service for Intersectoral Integration of Climate Goals from the Regulation on Internal Organization from June 2024, it is evident that the Ministry has undertaken activities to improve the integration of adaptation in sectoral policies. Given that the objective of establishing the Commission is stated as fast and efficient horizontal and vertical coordination, which would enable the successful and timely incorporation of adaptation measures into sectoral strategies and programs and their implementation, and the Commission has not been established by the end of the audit, *it is necessary to urgently establish the aforementioned Commission, for which a recommendation has been given.*

According to the explanation of the responsible person of the Ministry, the main reasons for the weaker or slower integration of adaptation into sectoral policies are: misunderstanding of the concept of climate change, its impact on the sector and growing risk, confusion of the concepts of mitigation and adaptation, lack of professional capacity in bodies responsible for sectoral policies, insufficient education about the impact and risks of climate change and the possibilities of adaptation, the lack of experience in integrating climate policies and the lack of better communication of the Adaptation Strategy.

Given that there is a perceived lack of understanding of the concept of adaptation and a lack of education on the impact and risks of climate change, as well as better familiarization with the significance and content of the Adaptation Strategy and the role and tasks of individual bodies, the State Audit Office recommends planning and implementing continuous education of employees of sectoral bodies, primarily bodies in which significant activities related to the integration of adaptation have not been undertaken (for example, through workshops, meetings, consultations, training, joint projects, partnerships, etc.) on the importance of climate change adaptation.

- Vertical Coordination

According to the European Commission Guidelines, local and regional administrations are the main drivers of adaptation to climate change because many activities are carried out at the local and regional level and depend on the specific local context. Local authorities have an important role in encouraging public engagement because they inform citizens about the benefits of adaptation for their region and have essential information about potential adaptation measures that are feasible in their area. The interdepartmental working group on adaptation should enable meaningful cooperation with regional and local governments in order to use their expertise to adopt adaptation policies and to promote regional/local activities in line with the national adaptation policy.

According to the Climate ADAPT website of the European Environment Agency²⁸, given that climate change affects all levels of governance in the country, from national to regional and local levels, adaptation-related activities must be planned and undertaken at all levels. Implementation of adaptation at all levels of governance in a consistent and effective manner requires appropriate mechanisms and arrangements for multi-level coordination and cooperation. The national level has a central role in harmonizing its adaptation policies with the EU and transnational levels and in supporting adaptation processes at lower levels, covering all steps of the adaptation cycle.

²⁸<https://climate-adapt.eea.europa.eu/en/knowledge/tools/adaptation-support-tool/step-5-4>

Vertical governance to promote adaptation at lower levels involves providing a clear strategic and legal framework, financing and funding mechanisms, and a framework for facilitation, enabling and empowerment, including the provision of information and other non-monetary forms of support.

In the Republic of Croatia, the legislative framework establishes the inclusion of local and regional management levels in adaptation to climate change. The Law on Climate Change stipulates that adaptation actions and the implementation of adaptation measures are carried out and ensured by the administrative bodies of local and regional self-government units responsible for environmental protection. Furthermore, it is stipulated that the development documents of individual areas must be harmonized with the principles, basic goals, priorities and measures established in the Adaptation Strategy. The representative body of the county, the City of Zagreb and the big city is obliged to adopt a program for mitigation of climate change, adaptation to climate change and protection of the ozone layer, which is an integral part of the environmental protection program for the area of the county, i.e. the City of Zagreb and the big city (hereinafter: Program).

In December 2023, the European Commission published the document Assessment of Progress in Adaptation to Climate Change in Member States under the European Climate Law. According to the aforementioned report, only four of the 20 counties, and only three of the 16 large cities created the Program.

Adaptation measures to climate change are implemented at the local level through the involvement of local self-government units in the Covenant of Mayors for Climate and Energy initiative.

The aforementioned Covenant is an initiative of the European Commission launched in 2008, which actively involves local and regional self-government units in the fight against climate change. By joining the aforementioned Covenant, the mayors commit to take measures to reduce greenhouse gases and adapt to climate change.

According to the Covenant of Mayors for Climate and Energy website²⁹, the signatories commit to adopt an integrated approach to climate change mitigation and adaptation. They are required to, within two years of joining the Covenant, prepare an Action Plan for Sustainable Energy Development and Adaptation to Climate Change (hereinafter: SECAP) with the aim of reducing CO₂ emissions by at least 55.0% by 2030 and increasing resilience to climate change. According to the data published on the aforementioned website³⁰, 125 cities and municipalities in the Republic of Croatia have undertaken the obligation to adapt to climate change out of a total of 172 that have signed the said Covenant. According to data published on the website of the Society for the Design of Sustainable Development, 28 cities and 9 municipalities in the Republic of Croatia have created a SECAP that will serve as an effective tool for planning mitigation and adaptation measures.

²⁹<https://eu-mayors.ec.europa.eu/en/signatories>

³⁰Data retrieved on June 28, 2024.

According to the explanation of the responsible person of the Ministry, there is no institutional mechanism in the Republic of Croatia that enables vertical coordination, that is, it is not provided for in the Law on Climate Change. However, from the Competitiveness and Cohesion Program 2021-2027, the operation *Development of the National Network of Climate Officers is planned under policy objective 2. A greener, resilient, low-carbon Europe transitioning to a net-zero carbon economy by promoting the transition to clean and fair energy, green and blue investments, circular economy, climate change adaptation and climate change mitigation, risk management and its prevention, and sustainable urban mobility, a special goal 2. iv. Promoting climate change adaptation and disaster risk prevention and resilience, taking into account ecosystem-based approaches, program activity Strengthening institutional capacities for integrating climate goals into projects and strategic and planning documents.* The mentioned operation is intended for local and regional self-government units with a goal that refers to a specific recommendation for a particular country 4.1 Increase the efficiency and capacity of public administration for the creation and implementation of public projects and policies at the central and local level. Local and regional self-government units will be provided with co-financing of future/existing climate experts with training on climate proofing methods³¹ as well as training for strong integration of climate goals in the activities of local and regional self-government units.

Furthermore, according to the explanation, it is planned to amend the Law on Climate Change, which should contain elements of the institutional mechanism of vertical coordination. Until now, through the Commission, efforts have been made to involve the community of counties and cities in order to achieve vertical coordination.

In order to encourage local and regional self-government to adapt to climate change, the Environmental Protection and Energy Efficiency Fund, in cooperation with the Ministry, announced several public calls for co-financing of working documents for the creation of the Program or SECAP or reports on their implementation and for the implementation of climate change adaptation measures, whereby adaptation measures defined by the current Program or SECAP are financed. The aforementioned public calls are described under the title of this Report *Implementation of Adaptation Activities and Monitoring, Evaluation and Reporting.*

The audit determined that the legislative framework established the obligation to include the regional and local levels of management in the implementation of adaptation to climate change, financing mechanisms were established to encourage the creation of the Program or SECAP and the implementation of measures, and a large number of cities and municipalities joined the Covenant of Mayors for Climate and Energy. The Ministry intends to strengthen the capacity of local and regional self-government units by co-financing climate experts with education and training. According to the Decree on the Internal Organization of the Ministry from June 2024, the tasks of the Sector for climate activities have been expanded to the tasks of vertical harmonization of climate policy and the integration of climate goals and environmental protection goals into sector policies, into national and regional development documents, among others. However, no mechanism has been established that would enable efficient cooperation with regional and local administrations, in which their representatives would be represented. An institutional mechanism for vertical coordination could be implemented, for example, through the Commission, councils, committees and procedures for communication and harmonization of common goals in adaptation, information exchange and joint decision-making, and the like.

³¹According to the Adaptation Strategy, all large infrastructure projects financed from EU funds are obliged to prove that climate change adaptation measures have been taken into account in order to reduce risks, and it must be proven that the project contributes to the reduction of greenhouse gas emissions (so-called climate proofing).

Given that many adaptation interventions are carried out at the local and regional level, the State Audit Office establishing procedures that will determine the method of coordination of competent national, regional and local adaptation authorities in order to exchange specific knowledge of all levels for adopting adaptation policies and to support competent regional/local authorities in implementing activities related to the alignment of local policies with national adaptation policy.

- Stakeholder Participation

According to Article 7 of the Paris Agreement, adaptation to climate change is a global challenge faced by all stakeholders at the local, sub-national, national, regional and international levels and is a key component of a long-term global response to climate change to protect people, living conditions and ecosystems. The Parties recognize that adaptation measures should be implemented within a country-driven, gender-sensitive, participatory and fully transparent approach, taking into account vulnerable groups, communities and ecosystems, and that these measures should be based on the best available scientific knowledge and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems, with a view to integrating adaptation into relevant socio-economic and environmental policies and actions, as appropriate.

According to the European Commission Guidelines, the participation of all levels of government and civil society is essential for the development of an effective strategy and/or plan for adaptation to climate change. Given that climate change affects the entire society, it is necessary to define all relevant groups of stakeholders whose participation is necessary in order to design effective adaptation measures. The first group of stakeholders is represented by potential agents of change who can contribute to the work of national and/or regional and local administrations by providing additional information, resources or capacities. Research institutes, the private sector, cross-border actors and non-governmental organizations can belong to this group.

According to the World Bank Framework Legislation Reference Guide for Climate Change, the legislative framework should institutionalize ongoing engagement with stakeholders to support the development of sector plans, policies and instruments, monitoring results, and identifying gaps or unintended negative consequences.

The Law on Climate Change foresees the establishment of a Commission whose presidents and members are appointed by the Government of the Republic of Croatia from the ranks of scientific, professional, public and other employees, as well as representatives of central state administration bodies responsible for certain sectors, representatives of civil society associations operating in the field of climate change and the business world. With the above, the interaction between the key stakeholders of adaptation to climate change has been formally established.

The audit established that in May 2019, during the final revisions of the Adaptation Strategy, a thematic session of the Commission was held, attended by representatives of state administration bodies, the academic community, local and regional self-government units, civil society organizations, and the private sector. At the session, a discussion was held on the content of the Adaptation Strategy and on measures that are considered very important and should be included in the first five-year Action Plan.

During the implementation of the project Strengthening the capacity of the Ministry of Environmental Protection and Energy for adaptation to climate change and the preparation of the Draft Adaptation Strategy, within the framework of which the Draft Adaptation Strategy and the Draft Action Plan were prepared, key stakeholders were identified who participated in the implementation of individual activities in different ways and at different stages of the procedure.

Within the framework of sub-activity 1.1.1 Study of Assessment of Needs for Building the Capacity of Experts in the Field of Climate Change Adaptation (October 2017), stakeholders who have a role in implementing adaptation were identified, the most important stakeholders per individual sector and their needs for strengthening adaptation capacities were defined, and the most important topics for capacity building were identified. Experts in each sector were identified who further participated in education through the project.

Furthermore, a total of 18 workshops and an introductory and final conference were organized within the framework of the mentioned project. Of these, ten expert workshops were organized in 2016 and 2017 for sectors (spatial planning and management of coastal areas, tourism, agriculture, forestry, fisheries, energy, natural ecosystems and biodiversity, hydrology and management of water and marine resources, health, risk management) with the aim of training experts for modeling climate scenarios, assessing the impact of climate change based on the results obtained from modeling and assessing adaptation measures to climate change, and familiarization with existing solutions and adaptation technologies. Furthermore, during 2016 and 2017, seven workshops were held for officials at the local and regional level and the interested public on the impact of climate change and adaptation measures. Workshops were held in Gospić, Osijek, Rijeka, Zadar, Varaždin, Dubrovnik and Zagreb. One workshop was held to transfer the experiences of other countries in the creation and implementation of climate change adaptation strategies, and two conferences were held.

As part of the Ministry Capacity Building project, a report was published in November 2017 on the collection of opinions of relevant officials in national and local level bodies, experts and the interested public and the updating of the working version of the Strategy, the draft Strategy and the draft Action Plan in accordance with the proposals for the purpose of harmonization and refinement of the document. The aforementioned report published the comments received on the draft Adaptation Strategy and the draft Action Plan and the responses of the drafters to the comments.

According to the explanation of the responsible person of the Ministry, representatives of the interested public can participate in the formulation and implementation of strategies, plans and policies related to climate change adaptation through the process of consultation with the interested public (e-Consultation). The process of standardizing the consultation process in the Republic of Croatia began in 2009, when the Government of the Republic of Croatia adopted the Code of Consultation with the Interested Public in the Procedures for Adopting Laws, Other Regulations and Acts (Official Gazette 140/09). Along with the adoption of the Code, the Government simultaneously obliged the Office for Cooperation with NGOs of the Government of the Republic of Croatia to develop Guidelines for the Application of the Code and a program of systematic training of consultation coordinators, who are appointed in state administration bodies and government offices. The aforementioned procedure was applied during the development and adoption of the Climate Change Adaptation Strategy, and the preparation and adoption of the Climate Change Act.

In addition to the above, according to the Report on consultation with the interested public submitted during the audit and according to the Final Report of the project, the Ministry initiated a public discussion of the Green Paper to collect opinions through two joint meetings and consultation with representatives of vulnerable sectors from the involved ministries and other institutions. Consultations were held on 5 and 7 July 2017. The text of the Green Paper was published on the website of the project and the Ministry for the purposes of collecting opinions on the Green Paper, and the collected comments served for a better preparation of the Draft Adaptation Strategy and the Draft Action Plan.

The above-mentioned documents were published on the websites of the project and the Ministry from 6 to 24 October 2017. The receipt of comments was extended until 30 October 2017. Two public discussions on the White Paper and the Action Plan were held with key stakeholders (ministries, agencies, institutes and others) on 19 and 24 October 2017. The public debate held on 19 October was attended by 34 stakeholders, and 31 stakeholders participated in the public debate held on 24 October. 36 forms with comments from institutions, interested and professional public were received (18 for the Draft Strategy and 18 for the Draft Action Plan). The comments have been incorporated into the updated version of the White Paper (Draft Adaptation Strategy).

According to the aforementioned Report on consultation with the interested public related to the Draft Adaptation Strategy proposal, during the consultation, 60 comments were received from nine representatives of the interested public (non-profit organizations, CMHS and others). In addition to the e-Consultation portal, six representatives of the interested public (CMHS, Croatian Waters, Croatian Forests and others) submitted 20 comments on the document.

According to the Final Project Report for the period 17 May 2016 – 17 November 2017, which was submitted during the audit, a total of 308 stakeholders and over 800 representatives of these stakeholders were involved in the creation of the Strategy.

According to the explanation of the responsible person of the Ministry, a Strategic Environmental Impact Assessment was carried out for the Adaptation Strategy, which estimated the likely significant impacts on the environment that may arise from the implementation of the Strategy.

This procedure includes determining the content of the strategic study, preparing the strategic study and assessing the integrity and professional validity of the strategic study, especially in relation to reasonable alternatives to the strategy, the procedure for providing opinions by the strategic assessment committee, the procedure for providing opinions by bodies and/or persons designated by special regulations, and the opinions of regional self-government units or local self-government units and other bodies, the results of cross-border consultations if they were mandatory in accordance with the Law on Environmental Protection, informing and participating the public, the procedure for providing opinions by the Ministry of Economy and Sustainable Development or the competent administrative body for environmental protection in the county on the conducted strategic assessment, and the reporting procedure after the adoption of the strategy.

Furthermore, according to the explanation, the Ministry continuously communicates with the academic community in order to inform about the latest trends and research in the field of climate change adaptation. During the creation of the open call for submission of project proposals from the Competitiveness and Cohesion Operational Program 2014-2020, entitled the Scheme for strengthening applied research for climate change adaptation measures, the academic community participated in the creation of the questionnaire "Preparation of the open call for the allocation of grants to strengthen research for adaptation measures to climate change" in order to shape the said call as best as possible.

The audit established that in the Republic of Croatia a mechanism for the participation of the first group of stakeholders (research institutes, the private sector, non-governmental organizations and others) has been established in such a way that they participate through the Commission, which was not established until the end of the audit (which is described in the subtitle *Horizontal coordination of bodies responsible for adaptation and integration of adaptation in sectoral policies*). The Government of the Republic of Croatia would appoint presidents and members of the said Commission from the ranks of scientific, professional, public and other employees, as well as representatives of central state administration bodies responsible for certain sectors, representatives of civil society associations operating in the field of climate change and the business world.

Furthermore, the audit established that representatives of scientific, professional institutions, non-governmental organizations, the private sector and other representatives of the interested public were satisfactorily involved during the process of drafting and adopting the Adaptation Strategy. However, they should be systematically involved in the implementation of the Strategy, for example, through regular and continuous participation in the work of the Commission, in order to support the development of sectoral plans, policies and instruments, monitor results and identify shortcomings and unintended negative consequences.

According to the European Commission Guidelines, the second group of stakeholders consists of those who are more likely to be affected by climate change. These are mainly vulnerable communities (for example, people living in poverty or at risk of poverty and social exclusion, people with disabilities, elderly and sick people, pregnant women, children, exposed workers and others) or subjects and interest groups representing these vulnerable communities which would otherwise not be able to participate in the process of adapting to climate change.

The unequal exposure and sensitivity of different regions and socio-economic groups to climate impacts exacerbates existing inequalities and vulnerabilities. It is crucial to ensure a just transition that reduces the inequality of burdens caused by climate risks and ensures that all stakeholders benefit equally from adaptation.

According to Article 5 of the European Climate Law, adaptation policies place particular emphasis on the most sensitive and affected population groups and sectors and, after consultation with civil society, identify deficiencies in this regard.

According to the publication published on the website of the European Environment Agency "Towards just resilience: leaving no one behind when adapting to climate change"³² from 2022, the level of impact of climate change on individuals, communities and regions depends on their vulnerability and level of exposure to climate change. Vulnerability of persons depends on their age, socio-economic status, health status, housing security and other factors.

The level of exposure of a person is determined by the probability of coming into contact with climatic hazards, which depends, for example, on their geographical location, thermal insulation of the residential building, occupation, etc. Climate change adaptation measures do not bring equal benefits to all members of society, which can further worsen existing inequalities or create new ones. Therefore, it is necessary to achieve just adaptation by redirecting the benefits of adaptation measures and reducing the burden of adaptation in favor of the most vulnerable groups. In order to ensure just adaptation to climate change and just outcomes, the participation of vulnerable groups or stakeholders representing their interests in the planning and implementation of adaptation and in monitoring the social impacts of adaptation measures is essential.

³²<https://www.eea.europa.eu/publications/just-resilience-leaving-no-one-behind>

To guide just adaptation measures, it is critical to identify vulnerable communities and individuals and match climate change responses to their specific needs. For example, warning messages about extreme weather events provided via mobile devices are unlikely to reach people who do not own or cannot use such devices, such as the elderly, people with severe mental health conditions, the homeless and people in areas with poor mobile coverage networks. Therefore, it is crucial to adapt these communication methods to the specific needs of vulnerable groups in order to ensure timely and effective information.

According to the explanation of the responsible person of the Ministry, during the preparation of the Adaptation Strategy, vulnerable groups were not analysed, but rather vulnerable sectors that are listed in the Strategy. Vulnerable groups are indirectly identified through measures for vulnerable sectors.

Given that the groups most vulnerable to the impacts of climate change have not been determined (which is described under the title of this Report *Climate Change Adaptation Planning*), these groups are not included in the decision-making process on the design and implementation of adaptation measures.

The State Audit Office recommends including representatives of all vulnerable groups in the decision-making process on climate change adaptation policy in order to ensure a just transition.

- Informing the Public

According to the European Commission Guidelines, the public should be informed about issues related to climate change in a more systematic and easy-to-understand manner with the purpose of encouraging the community to actively participate and take steps to adapt to climate change. Climate messages need to be tailored to different target groups, such as the public sector and local communities, using different communication channels and adapted formats to encourage their engagement.

According to the explanation of the responsible person of the Ministry, the Ministry provides continuous information and awareness raising of the public about adaptation to climate change through the website <https://prilagodba-klimi.hr/> where relevant information on adaptation to climate change is published. The website provides information on: climate and climate change, future climate scenarios, observed and expected impacts of climate change, sectors and cross-sectoral topics sensitive to climate change, and examples of good practice and projects that test various options for adapting to climate change.

Furthermore, the Ministry provides expert and advisory assistance related to climate change adaptation to state administration bodies and public bodies (e.g. Ministry of Regional Development and European Union Funds, Ministry of Tourism and Sports, Central Finance and Contracting Agency for European Union Programmes and Projects, HAMAG-BICRO, Croatian Bank for Reconstruction and Development), gives opinions on documents related to adaptation to climate change submitted by other state administration bodies and gives opinions on the procedures of Assessment of the need for environmental impact assessment (EIA), Environmental impact assessment (EIA) and Strategic Environmental Impact Assessments (SEAs).

The Ministry published on its website the guidelines of the European Commission for the inclusion of climate change and biodiversity in assessments and strategic assessments of environmental impact, as well as Guidelines for project managers: How to increase the resilience of vulnerable investments to climate change.

In June 2023, the Ministry organized a Conference on the role of science in providing solutions for adapting to climate change³³. The purpose of the Conference was to present the results of 25 projects that, based on the Public Call "Scheme for Strengthening Applied Research for Climate Change Adaptation Measures" (KK.05.1.1.02) through the Operational Program Competitiveness and Cohesion 2014-2020, received co-financing from EU funds and Environmental Protection and Energy Efficiency Fund in the total amount of about HRK 90 million/EUR 12 million (2020-2023). The public call was launched in order to encourage a stronger involvement of scientists in the Republic of Croatia in proposing solutions for adaptation to climate change, which must be smart, fast and systematic.

Furthermore, the Ministry, in cooperation with the Croatian Association of Nature and Environmental Protection Experts, organized two online workshops on the topic of climate proofing and participated in the European and regional conference "Environmental Assessments and the European Green Deal '22" on the same topic.

Since 2022, the Ministry, as a partner of the Ministry of Tourism and Sports, participates in workshops and trainings entitled Strengthening the Resilience of Tourism to Climate Change. By the time of the audit, 10 workshops had been held³⁴. Also, since 2022, the Ministry, as a partner with the Ministry of Regional Development and European Union Funds, is collaborating on a joint project with JASPERS³⁵, Support for the development of national guidelines for the preparation of projects within the framework of EU funds for adaptation to climate change and related technical capacity building. Until now, the Guidelines for climate verification for the preparation of investments in the program period 2021-2027 in the Republic of Croatia have been prepared. The aforementioned guidelines are intended for project holders for the purpose of preparing projects in accordance with the requirements for climate certification for the program period 2021-2027, i.e. the Competitiveness and Cohesion Program and the Integrated Territorial Program 2021-2027. In the continuation of the project, work is underway to develop educational material by modules for further education and training of experts in the field of climate proofing.

³³<https://mingo.gov.hr/vijesti/najava-5-lipnja-2023-konferencija-o-ulozi-znanosti-u-davanju-rjesenja-za-prilagodbu-klimatskim-promjenam/9291>

³⁴<https://mint.gov.hr/odrziviturizam/upravjena-i-edukacija/23013>

³⁵Joint Assistance in Supporting Projects in European Regions

Climate Change Adaptation Planning

According to the IPCC's Sixth Assessment Report (Climate Change 2023 – AR6 Synthesis Report) published in 2023³⁶, the global temperature has already risen by 1.1°C compared to pre-industrial levels, and it is expected to exceed 1.5°C during the 21st century. The risks and impacts of climate change will intensify as the Earth continues to warm. Along with the urgent need to reduce greenhouse gas emissions, the IPCC urges countries to accelerate their efforts in climate change adaptation. Although significant progress has been made worldwide in adaptation, it is not keeping pace with the impacts of climate change. In fact, the gap between what is happening and what is needed is only growing – a concerning trend, given that over 3 billion people already live in areas highly vulnerable to climate change. The IPCC concluded that most of the current adaptation responses have been fragmented, incremental³⁷, and unevenly distributed across regions.

Furthermore, several important barriers to action in the field of adaptation have been highlighted: limited resources, lack of private sector and citizen engagement, insufficient mobilization of financial resources (including for research), low climate literacy, lack of political engagement, limited research and/or slow and weak acceptance of adaptation science, and a weak sense of urgency.

By committing to the adaptation planning process, countries can address these barriers, mobilize financial and other resources, and accelerate the implementation of equitable solutions with long-lasting impacts, especially for people living in poverty and facing discrimination. However, adaptation plans must be actionable and should articulate clear priorities, goals, responsibilities, as well as associated costs and funding sources.

The adaptation planning process is established by the UNFCCC, the Paris Agreement, the European Climate Law, and the Law on Climate Change, according to which the Adaptation Strategy and the action plan for its implementation are the core documents for climate change adaptation.

The Adaptation Strategy sets the goals and priorities for the implementation of climate change adaptation measures in the Republic of Croatia and includes:

1. Climate models and projections of future climate
2. Assessment of the impacts of climate change on society and the environment
3. Assessment of vulnerability and risks
4. Priority measures and activities
5. International obligations and international cooperation of the Republic of Croatia
6. Guidelines for scientific research in the field of impact assessment and climate change adaptation
7. Assessment of the resources required for implementation
8. Cost-benefit analysis of implementing climate change adaptation measures
9. A framework for monitoring and evaluation with indicators.

³⁶<https://www.ipcc.ch/report/ar6/syr/>

³⁷According to the IPCC, incremental climate change adaptations are understood as extensions of actions and behaviors that already reduce losses or increase the benefits of natural variations in extreme weather/climate events.

According to the provisions of the Law on Climate Change, the responsible party for the development of the Adaptation Strategy is the state administration body responsible for environmental protection, i.e. the Ministry, in cooperation with state administration bodies and other legal entities that have public authorities responsible for meteorology, nature protection, environmental protection, agriculture, fisheries, forestry, water management, energy, industry, spatial planning, transport, the sea, tourism and human health protection. The Adaptation Strategy is adopted by the Croatian Parliament at the proposal of the Government of the Republic of Croatia and is updated every five years as necessary.

In April 2020, the Croatian Parliament adopted the **Climate Change Adaptation Strategy in the Republic of Croatia for the period until 2040 with a view to 2070** (Official Gazette 46/20). The Adaptation Strategy is the first strategic document that provides an assessment of climate change by the end of 2040 and 2070, an analysis of the impact and vulnerability to climate change, and proposes a series of climate change adaptation measures.

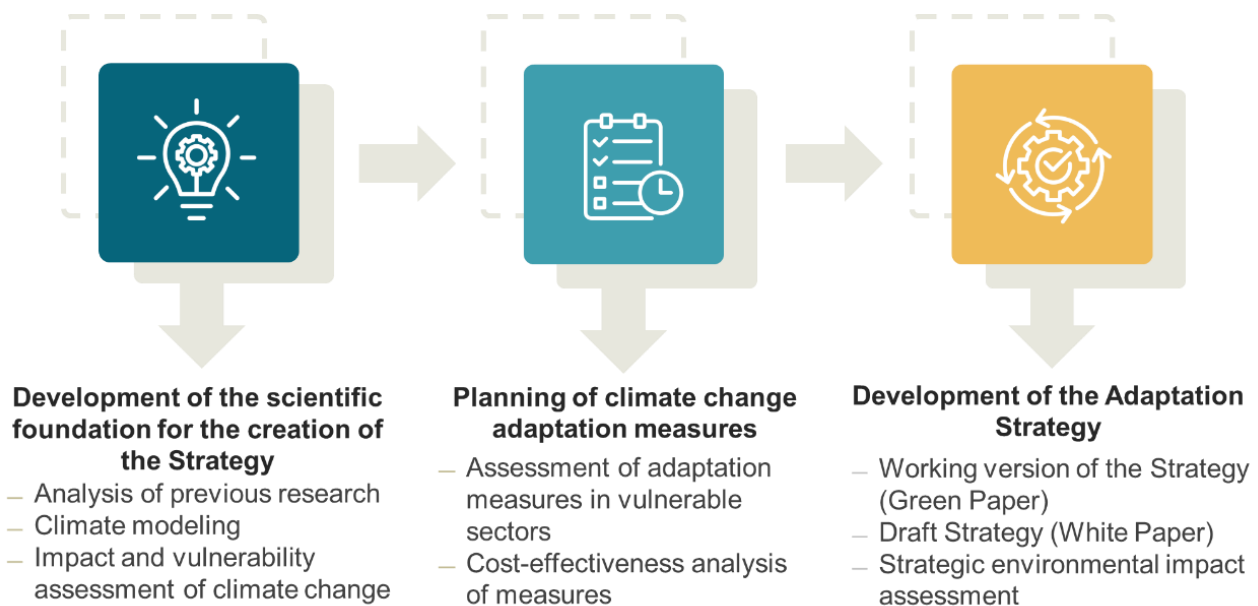
The process of climate change adaptation planning in the Republic of Croatia began with the adoption of the Law on Air Protection (Official Gazette 130/11 and 47/14), which prescribed the obligation to develop an Adaptation Strategy with an Action Plan, identified vulnerable sectors and the obligation to implement modelling, vulnerability and impact assessments by 2040 for each of the vulnerable sectors, on the basis of which an Adaptation Strategy with an Action Plan is developed.

The EU Strategy on Adaptation to Climate Change (2013/C 356/07), adopted in 2013, provided a framework for the development of an Adaptation Strategy, i.e. the way in which the EU and its Member States should prepare for the consequences of climate change. The EU Strategy proposes three lines of action: encouraging Member States to take action on climate change adaptation, in particular through the development and adoption of adaptation strategies, improving decision-making by strengthening knowledge on climate change adaptation, and strengthening the adaptive capacity of the most vulnerable sectors.

For the needs of the then Ministry of Environmental Protection and Energy, the project **Strengthening the Capacity of the Ministry of Environmental Protection and Energy for Climate Change Adaptation and Preparation of the Draft Climate Change Adaptation Strategy** (hereinafter: Strengthening the Capacity of the Ministry) was implemented with the purpose of developing a draft Adaptation Strategy and a draft Action Plan. The project was implemented from May 2016 to November 2017 and consisted of two components: a) Education of experts and officials and raising public awareness in the field of climate change adaptation and b) Development of a draft Climate Change Adaptation Strategy in the Republic of Croatia for the period until 2040 with a view to 2070 and a draft Action Plan. Each component consisted of several sub-activities. The stages of developing the Adaptation Strategy and the project sub-activities are shown in the figure below.

Figure 8

Stages of developing the Climate Change Adaptation Strategy



Source: State Audit Office

- Preparing the Draft Strategy and Draft Action Plan

In October 2017, a **Study on the Assessment of Needs for Capacity-Building of Experts in the Field of Climate Change Adaptation** (Sub-activity 1.1.1) was published, which identified stakeholders who have a role in implementing adaptation, defined the most important stakeholders by sector and their role in the adaptation process, and based on this, determined their needs for strengthening adaptation capacities, as well as the topics that are most important for strengthening capacities and that would form the basis for developing an action plan in that part of the adaptation strategy.

For each sector, shortcomings in the institutional system, shortcomings and obstacles in technology transfer, and shortcomings and obstacles in identifying vulnerabilities and implementing adaptation measures were identified.

The conclusion of the aforementioned study stated that there is no integrated system for managing the consequences of climate change in the Republic of Croatia and that awareness of the need to take timely adaptation measures is insufficiently developed. Furthermore, institutions that are involved or are planned to be involved in the implementation of adaptation measures should take adaptation into account in strategic and development planning, strengthen technical and technological knowledge on individual aspects of adaptation, strengthen mechanisms for implementing adaptation programs and plans, and strengthen mechanisms for securing financing from the public and private sectors.

According to the Final Report on the Implementation of the Strengthening the Capacity of the Ministry project, a total of 95 meetings between project experts and experts from various vulnerable sectors were held under this sub-activity, with communication taking place through both phone calls and emails.

According to the European Commission Guidelines, after establishing the institutional framework and stakeholder participation, the second step in the development or update of the adaptation strategy is **the implementation of climate change risk and vulnerability assessments**. The purpose of the assessment is to determine what the impacts of climate change might be on a specific area, what risks are associated with these impacts in a given area or sector, and to identify which risks require more urgent responses.

For adaptation strategies or plans to be effective, it is recommended that the assessment be regularly updated, at least in parallel with each update of the strategy or plan. The assessment should be based on the latest scientific knowledge about the climate to define the population, key infrastructure, and sectors that are particularly vulnerable to climate change, determine the overall strategic direction of adaptation policy, and continuously contribute to decision-making.

The European Commission Guidelines state that the first step in conducting the assessment is the development of a comprehensive methodology for evaluating the impacts of climate change. The methodology for assessing the impacts of climate change, which is the basis for proper risk and vulnerability assessment, should be based on the latest scientific knowledge to ensure the accuracy and relevance of current predictions of climate change impacts in the future. It should be based on the results of resilience testing, with a focus on infrastructure and systems providing key services. It should be conducted using a baseline related to the reference point concerning climate conditions and location-specific vulnerability in a given area. Furthermore, the assessment should ideally include quantitative information on climate change impacts (physical damage, health effects, economic and fiscal consequences), a clear timeframe for conducting the assessment, and a timeline for expected future climate risks. The assessment should also take into account the lack of knowledge and uncertainties. Moreover, the assessment needs to consider the impacts of climate change on society, transboundary and cascading risks, and evaluate and prioritize the identified impacts and sensitivities for the adaptation strategy.

In the first phase of the project, the development of the scientific basis, one of the activities was **defining the sectors vulnerable to climate change**. As a result of this activity, in November 2017, a document titled **Review of Previous Research and Activities Related to the Impacts of Climate Change and Climate Change Adaptation in the Republic of Croatia** (Sub-activity 2.1.1) was published. This sub-activity involved a review of key sectors, showcasing research and activities, an overview of existing data on observed impacts and monitored parameters, including extreme weather events, results of implemented projects and activities related to the impacts and adaptation to climate change, including biodiversity and NATURA 2000, as well as protection and rescue activities. These findings can serve as a basis for the expected modeling and the development of the draft Adaptation Strategy.

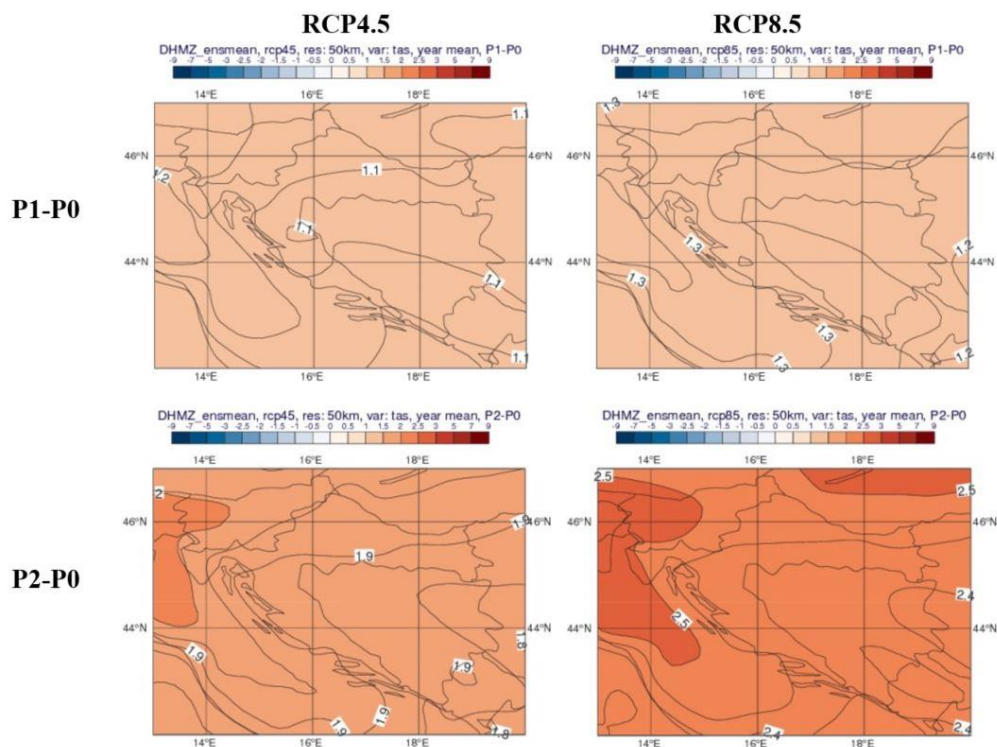
Experts engaged in the project conducted a review of relevant research and selected those they considered best suited to the needs of the project. The research was categorized into 11 thematic areas: biodiversity, health, risk management, agriculture, spatial and coastal areas, fisheries, forestry, climate modeling, energy, tourism, and water resources and seas. For each area, an overview of relevant legislation, scientific and professional references, analysis of researched papers, recommendations for future research, and conclusions were provided. The project team concluded that, given the significance of the issue of climate change impacts, particularly adaptation to them, there were very few systemic studies addressing the entirety of specific phenomena affected by climate change. Most research focused only on specific aspects within individual sectors, and an unsatisfactory level of quantification of climate change impacts was noted. In certain sectors, a complete lack of research was observed (for example, in the disaster risk management sector).

The second activity was **the implementation of climate change modelling for vulnerable sectors**. In March 2017, a document titled **Results of Climate Modelling** on the HPC Velebit System for the Purposes of Developing the Draft Climate Change Adaptation Strategy of the Republic of Croatia until 2040, with a View to 2070, and the Action Plan³⁸ was published (Sub-activity 2.2.1). This report describes the results of climate integrations using the regional climate model RegCM, which defines boundary conditions using results from four global climate models, with a special focus on the effects on specific vulnerable sectors and topics. Along with simulations of "historical" climate (1971-2000), expected changes (projections) for future climate are presented for two periods, 2011-2040 and 2041-2070, based on the IPCC RCP4.5 scenario. Projections according to the RCP8.5 scenario are also briefly discussed. All calculations were carried out on the supercomputer VELEbit installed at the University Computing Centre (SRCE) in Zagreb, which was purchased by the Ministry for the needs of this project. The RegCM model integrations and all processing of the generated data were carried out by experts from CMHS. A total of 20 climatological variables were analyzed (air temperature, precipitation, evapotranspiration, soil moisture, runoff, cloud cover, and others). The results of climate modelling were presented according to parameters important for individual sectors (hydrology, water and marine resources, biodiversity, spatial planning and coastal zone management, fisheries, forestry, tourism, health, risk management, energy).

Figure 9 provides an example of the results of climate modelling for the mean annual air temperature for the periods 2011-2040 and 2041-2070 according to two scenarios, RCP4.5 and RCP8.5, conducted for the purposes of developing the Adaptation Strategy.

Figure 9

Climate modelling results for mean annual air temperature for periods 2011-2040 and 2041-2070 under two scenarios, RCP4.5 and RCP8.5



Source: document Results of Climate Modeling on the HPC Velebit System for the Purposes of Drafting the Climate Change Adaptation Strategy of the Republic of Croatia until 2040, with a view to 2070 and the Action Plan.

³⁸<https://prilagodba-klimi.hr/wp-content/uploads/2019/05/Rezultati-klimatskog-modeliranja-na-sustavu-HPC-Velebit.pdf>

The document states that, since climate change and adaptation to climate change are long-term processes, it is essential to continue monitoring future climate changes in order to adequately define adaptation measures in the future (since these measures may change over time). As climate models improve and become more accurate, it will be necessary to update knowledge on possible projections of future climate in a few years. Numerical integrations using climate models should be repeated when new global climate model results and new IPCC reports become available. This approach requires significantly greater human and technical resources than are currently available. Therefore, substantial investments are needed in the meteorological and climatological sector in the Republic of Croatia to better adapt to future climate changes and their consequences on the overall socio-economic state of the country and society. The future development of climate modelling should strengthen research capacities in the Republic of Croatia on climate modelling at 12.5 km and higher resolutions (1-4 km), as well as coupled atmosphere-ocean modelling.

In November 2017, an **Addendum to the Results of Climate Modelling on the HPC VELEbit System: Basic Results of Integrations at a Spatial Resolution of 12.5 km** (within sub-activity 2.2.1) was published. Simulations using the RegCM model at a spatial resolution of 12.5 km contain more details than the basic simulations at 50 km. The document presents the basic results of climate projections at a 12.5 km resolution.

Even after the end of the Strengthening the Capacity of the Ministry project, CMHS carries out activities related to climate monitoring and climate modelling. According to the explanation from the responsible person of the Ministry, the most extensive activities related to climate monitoring and modelling carried out by CMHS are presented in the document Selected Chapters of the Eighth National Communication of the Republic of Croatia to the United Nations Framework Convention on Climate Change (UNFCCC) from January 2023. Compared to the previous Seventh Report, data series from stations were extended, and new ensembles of climate projections with improved spatial resolution were used. The report also provides a detailed analysis of changes in agro-meteorological parameters and the fire hazard index in the new climate period (1991-2020) compared to the previous period (1961-1990).

According to the Ministry's request, analyses in the form of graphs and downloadable data for air temperature and precipitation from simulations of regional climate models for twenty cities, three RCP scenarios, and the future period 2041-2070 are available on CMHS's website.

On the website meteo.hr, a new indicator for monitoring rainy and dry conditions, the Standardized Precipitation Evapotranspiration Index (SPEI), was introduced. This index indicates deviations in the water balance (on a specific time scale) from the median for standard deviation values.

CMHS participated in a project of the World Meteorological Organization in 2022 and 2023 aimed at improving the quality system of climate services, resulting in the certification of the management system in accordance with the ISO-9001:2015 standard in the area of "Climate Services – processing, control, archiving, and distribution of data, development of climate data and applications, climate modelling, monitoring climate change, and biometeorology."

From 2018 to 2023, the employees of CMHS published several scientific and professional papers on climatological topics.

As part of the Strengthening the Capacity of the Ministry project, in May 2017, **the Report on Assessed Impacts and Vulnerabilities**³⁹ to Climate Change across Individual Sectors (Sub-activity 2.3.1) was published. According to the report, this document represents the most comprehensive assessment of the impacts of climate change and the evaluation of vulnerability for the key sectors that had been prepared for the Republic of Croatia up until that point. In addition to a deeper analysis of each sector, the report also examines inter-sectoral impacts and provides an assessment of the vulnerability level for specific sectoral elements dependent on climate parameters. This report provides the first value-based assessment of the impacts of climate change in the process of developing the Adaptation Strategy and serves as the foundation for proposing adaptation measures.

The basic input data for this report are the results of the described climate modelling for climate change up to 2040 and with a view to 2070, based on the IPCC-defined RCP4.5 scenario (the so-called medium scenario). The impacts of climate change were analyzed, and vulnerability was assessed in eight "resource" sectors (hydrology, water and marine resource management; agriculture; forestry; fisheries; natural ecosystems and biodiversity; energy; tourism; health) and two "transversal" sectors (spatial planning and coastal zone management, and risk management). For each sector, a general overview of the sector is provided, along with economic activities related to the sector, an assessment of the sector's development under business-as-usual conditions, without considering expected climate changes, and a description of the sector's importance for the Republic of Croatia.

Furthermore, the current impact of climate on the sector is presented, including the state of climate parameters and changes in those parameters by 2040 and 2070.

Finally, the report provides an assessment of the future impact of climate parameters on the sector, expected vulnerability, intersectoral and transboundary effects, and potential positive outcomes resulting from climate change.

The impacts of climate change on the environment and the economy were analyzed, taking into account the impacts on infrastructure (buildings, transport infrastructure, energy infrastructure, etc.). Impacts on infrastructure were mentioned, for example, in the water resources sector as a reduction in the efficiency of coastal infrastructure due to sea level rise, in the energy sector as damage to energy infrastructure and facilities due to extreme weather events, in the tourism sector as damage or reduction in the functionality of various infrastructure systems due to rising sea level. In the spatial planning sector, precipitation is recognized as a climate parameter with an impact on infrastructure systems in settlements.

Regarding the impact of climate change on society, the European Commission Guidelines recommend that the assessment should include not only the physical impacts of climate change but also social factors, considering not only the objective impacts on different social groups and geographical areas, but also, for example, differences in the perception of risk based on gender. This contributes to achieving equitable resilience, which is considered a key factor in building adaptation capacity and in enabling vulnerable communities to participate in the benefits provided by adaptation activities.

During the audit, the aforementioned report was analyzed in order to determine the extent to which vulnerable groups were identified within the framework of the analysis of vulnerable sectors. Within the framework of the presentation of the expected vulnerability and possible consequences of climate change, the impacts of climate change on society have been addressed to some extent.

³⁹According to the Summary for Policymakers of the Contribution of Working Group II to the Sixth Assessment Report (AR6) of the IPCC, vulnerability is defined as the tendency or predisposition to be adversely affected, or the susceptibility to such exposure. It encompasses a range of concepts and elements, including vulnerability or susceptibility to harm, and the lack of capacity to cope with and adapt to negative impacts.

Except for the health sector, the impact of climate change with regard to age, gender, ethnic origin, level of income, disability and other relevant socio-economic factors is not dealt with in detail in the document. In the health sector, it was stated that the impact of climate change is expected due to an increase in the gap between people of different socio-economic status, due to inappropriate living conditions, especially in urban areas, and an increase in the proportion of people over 60 years of age. In addition to the elderly, homeless people and children, at-risk subgroups due to the impact of climate extremes on the ability to work and the health consequences due to professional exposure are also workers employed in jobs in open spaces such as construction workers, farmers, wage earners, utility service workers and similar occupations. In the context of the assessment of the possible future impacts of climate change on the health sector, the negative impacts of prolonged periods of high temperatures on chronic patients (those suffering from respiratory and cardiovascular diseases) and an increase in total mortality are mentioned. An increase in the number of respiratory diseases is also expected due to the impact of aeroallergens on acute or chronic allergic diseases with the conclusion that the impacts of climate change will increase the level of vulnerability, especially of sensitive groups such as people with allergies and children (cross-reaction of pollen allergens with food allergens and an additional effect external and internal air pollution). Furthermore, given the extreme temperatures in urban areas, any irregularity in the maintenance of the ventilation system will represent a vulnerability to people's health, especially risk groups such as children, the elderly or people suffering from respiratory diseases. There is also a risk of contracting acute bacterial and viral diseases of the respiratory system due to the influence of the unfavorable microclimatic characteristics of the closed space on the response mechanisms to infectious diseases.

In the water resources sector, it was noted that climate change, with its impact on hydrological characteristics, will generate negative socio-economic effects. In the fisheries and mariculture sector, the impact of climate change on socio-economic conditions is mentioned as both positive and negative, depending on the species being caught or farmed, with implications for employment opportunities and local community development. In the energy sector, there is a negative impact of climate change on the socio-economic conditions of those employed in this sector.

In the tourism sector, with regard to rising temperatures, the expected impacts are related to food and water availability, ecosystem diversity, the health of tourists and local populations, heatwaves, increased cooling costs, and a rise in infectious diseases.

In the forestry sector, the analysis indicates that there is generally a positive correlation between human health and proximity to forests and other urban greenery. The negative health impact is associated with the occurrence of allergies, particularly in urban areas, due to pollen from certain tree species.

The audit found that within individual vulnerable sectors there is an analysis of the impact of climate change on certain vulnerable groups, however, vulnerable groups are not comprehensively included in the risk assessment, their needs have not been identified, nor have appropriate measures been developed to mitigate the risks of climate change for vulnerable groups. According to the provisions of the European Climate Law, adaptation policies place particular emphasis on the most sensitive and affected population groups and sectors.

The State Audit Office recommends identifying the groups most vulnerable to the impacts of climate change within vulnerable sectors, determining their needs, and conducting an analysis and designing adaptation measures for vulnerable groups in accordance with the legislative framework.

Cross-sector impacts were analyzed for all ten sectors. Cross-border impacts were analyzed for all sectors where applicable (they were not mentioned in spatial planning and management of the coastal area, and in agriculture they were described briefly with the emphasis that they are difficult to determine). Potential positive consequences of climate change are briefly described for all sectors.

For each sector, for each potential impact of climate change, the possibility of occurrence, degree of impact and degree of vulnerability are shown.

Table 4 provides an example of the potential impacts of climate change for the period up to 2040 with a view to 2070 and the degree of vulnerability for the water resources sector, according to the Report on Assessed Impacts and Vulnerabilities to Climate Change across Individual Sectors.

Table 4

Potential impacts of climate change for the period up to 2040 with a view to 2070 and degree of vulnerability for the water resources sector

Potential impact	Possibility of appearing	Degree of influence	Degree of vulnerability
Changes in climate characteristics: Decrease in flow			
Reduction of the amount of water in watercourses and springs	4	5	medium
Reduction of underground water supplies and lowering of groundwater levels	4	4	high
Reduction of the water level in lakes and other dammed natural or constructed systems	4	5	high
Salinization of coastal aquifers and aquatic systems	3	5	high
Changes in climate characteristics: Temperature rise			
The increase in water temperatures is accompanied by a decrease in the reception capacity of aquatic receivers	4	4	high
Changes in climate characteristics: Increase in extreme water waves			
Increasing the frequency and intensity of floods in threatened areas	4	4	high
Increasing frequency and intensity of flash floods	4	4	high
Intensification of fluvial erosion processes	3	3	medium
Increasing frequency and intensity of stormwater flooding in urban areas	5	5	high
Changes in the characteristics of the climate: Intensification of longer periods of water			
Increasing the risk of landslides	3	3	medium
Changes in climate characteristics: Sea level rise			
Increase in the risk of flooding events at river mouth areas	4	5	high
Reduction of efficiency of coastal infrastructure	5	5	high
Intensification of salinization of river estuaries and coastal aquifers	4	5	high
Coastal erosion and natural hazards	3	4	medium

Source: Report on Assessed Impacts and Vulnerabilities to Climate Change across Individual Sectors

The sectors covered by the risk and vulnerability assessment conducted in 2017 are those specified in the Law on Air Protection that was in force at the time of the development of the Strategy, with the addition of sectors considered key for the implementation of effective climate change adaptation.

The Law on Air Protection identifies the sectors exposed to the impacts of climate change: hydrology and water resources, agriculture, forestry, biodiversity and terrestrial ecosystems, biodiversity and marine ecosystems, coastal zone management, tourism, and human health. The Law stipulates that adaptation measures are carried out by the government bodies responsible for meteorology, environmental protection, agriculture, fisheries, forestry, water resources, energy, spatial planning, nature protection, the sea, tourism, and public health protection.

The Law on Climate Change establishes that, in addition to the aforementioned bodies, adaptation measures are also implemented by bodies responsible for transport, industry and infrastructure.

The audit found that a comprehensive climate change impact and vulnerability assessment had been carried out for all sectors that were identified as vulnerable to climate change and key for adaptation at the time of the assessment (in 2017). However, the Law on Climate Change (2019) identified additional sectors that should implement adaptation measures. ***The State Audit Office is of the opinion that, in order to identify appropriate adaptation measures for the mentioned sectors, a risk and vulnerability assessment should be carried out for these sectors.***

The audit found that the 2017 risk assessment is based on the latest scientific knowledge and the results of climate modelling carried out within the framework of the project Strengthening the Capacity of the Ministry based on a simulation of the “historical” climate for the period 1971-2000, and includes quantitative information on the impacts of climate change (for example, data on damage from droughts, floods and frost, estimates of reduced crop yields by 2050, the number of kilometres of damaged overhead power distribution and transmission networks after an ice storm, the number of people suffering from various zoonoses⁴⁰ and others) and includes a clear time frame for expected climate risks in the future, i.e. in the mid-term (up to 2040) and long-term (up to 2070). The assessment takes into account the RCP4.5 climate scenario (which is more likely to result in a global temperature rise of between 2 and 3°C by 2100). In the framework of the assessment, cross-sectoral and cross-border risks were considered, as well as the potential positive impacts of climate change. However, the assessment does not consider the impacts of climate change on different social groups to a sufficient extent, for which a recommendation is made.

The risk and vulnerability assessment has been updated in the part related to the activities of developing climate monitoring and modelling carried out by the CMHS and published in the document Selected Chapters of the Eighth National Communication of the Republic of Croatia to the United Nations Framework Convention on Climate Change (UNFCCC) in January 2023. Compared to the previous report, the data series from the stations have been extended and new ensembles of climate projections with improved spatial resolution have been used. The document provides a detailed analysis of changes in agrometeorological parameters and the fire danger index in the new climate period 1991-2020 compared to the previous period 1961-1990 and addresses the impacts of climate change on tourism.

⁴⁰Zoonoses are diseases in domestic and wild animals, which under natural conditions can be transmitted to humans and cause disease.

Given that the risk and vulnerability assessment is the basis for decision-making on adaptation measures and is an integral part of the Adaptation Strategy, the State Audit Office recommends, in cooperation with the authorities responsible for the implementation of adaptation measures, to initiate and coordinate activities of updating climate change risk and vulnerability assessments in order to monitor changes in existing risks and identify new risks and vulnerabilities in all relevant sectors.

As part of the second phase of the project Strengthening the Capacity of the Ministry, climate change adaptation planning, two activities were carried out, assessment of adaptation measures in vulnerable sectors and analysis of the cost-effectiveness of the measures.

According to the European Commission Guidelines, following the assessment of risks and vulnerabilities to climate change, it is necessary to identify potential adaptation options, collect relevant information about these options, and prioritize them based on the highest benefits or the prevention of the greatest losses. The purpose of adaptation options is not only to prevent or reduce exposure to climate risks but also to encompass acceptance of climate impacts and losses by retreating from certain areas or leveraging new opportunities brought about by climate change.

Once adaptation options are identified, they can be evaluated and prioritized using specific criteria. The strategy should include options that contribute most effectively and efficiently to achieving adaptation goals. The efficiency of an adaptation option can be determined through cost-benefit analysis, which may also consider non-monetary factors.

To prevent maladaptation, it is essential to consider broader social, economic, and environmental goals and other aspects when evaluating adaptation options. Priority should be given to options that provide co-benefits in other areas, such as biodiversity, climate change mitigation, circular economy, and human health and well-being. Wherever possible, prioritization should be based on multi-criteria analyses.

In May 2017, the **Report on Assessed Climate Change Adaptation Measures in Vulnerable Sectors Based on the Assessment of Impacts and Vulnerabilities to Climate Change** (Sub-activity 2.4.1)⁴¹ was published as part of Activity 2.4: Assessing Adaptation Options and Providing an Overview of Climate Change Adaptation Measures by Sectors (under the project Strengthening the Capacity of the Ministry).

The proposed measures are based on climate change modelling and assessment of the impact of climate change and the vulnerability of individual sectors.

In the aforementioned report, the measures are not given in the order of importance of implementation, but all the estimated necessary measures for a specific sector and cross-sectoral topics are listed, with the aim of achieving a desirable state in which the negative impacts of climate change would be reduced to a minimum within the given time frames (2040 and 2070). Furthermore, the report provides an overview of potential outcomes if no action is taken, or if measures outlined in existing sectoral strategies and action plans are implemented, referred to as the BAU (Business as Usual) scenario. It includes an overview of adaptation measures in vulnerable sectors and cross-sectoral themes.

According to the report, the proposed measures are not solely the result of vulnerability analyses of specific sectors conducted by the project team's experts. A significant contribution was also made by stakeholders who participated in sectoral focus groups during specialized sectoral workshops and through subsequent communication.

⁴¹<https://prilagodba-klimi.hr/wp-content/uploads/2019/12/Izvjestaj-o-procijenjenim-mjerama-prilagodbe-uranjivim-sektorima.pdf>

Table 5 provides an example of two climate change adaptation measures for the sector of natural ecosystems and biodiversity from the Report on Assessed Climate Change Adaptation Measures in Vulnerable Sectors Based on the Assessment of Impacts and Vulnerabilities to Climate Change.

Table 5

Climate change adaptation measures for the sector of natural ecosystems and biodiversity

Name of the measure	Designation of the measure	Description of the measure	The period of implementation of the measure	Expected result of the implementation of the measure - positive impacts of the measure	Bodies in charge of implementation of the measure	The approximate cost of implementing the measure and clarification of the approximate cost
Improving knowledge and databases on ecosystems and biodiversity	EB-01	<p>Conducting research as a supplement to current knowledge about natural ecosystems and biodiversity and creating a database, with the aim of quality preparation, development and implementation of measures to mitigate and adapt to the negative effects of climate change.</p> <p>The basic actions that will be carried out under this measure are:</p> <ol style="list-style-type: none"> 1. Improvement of Croatia's Habitat Map 2. Upgrading the National Habitat Classification (NHC) with elements of distribution, endemism, sensitivity, and potential threats to individual habitats. 3. Completion of a statistically justified inventory of the fauna and implementation of the inventory of the mushroom kingdom 4. Inventory of invasive species with control measures and a list of the potentially most endangered native habitats and species 5. Defining the zero state of all protected areas 	until the next revision of the strategy	<ul style="list-style-type: none"> • A detailed habitat map of the Republic of Croatia was created • Created NHC database with a detailed description of the condition and vulnerability of habitats • Inventory of 3 kingdoms with dominant macro-organisms: Flora, Fauna and Mycobiota. • Created database of invasive species. • Database with zero status of protected areas 	<ol style="list-style-type: none"> 1.-4. Ministry responsible for nature/Croatian Environment and Nature Agency (CENA) 5. Public institutions of protected areas (JIPA); County Public Institutions for the Management of Protected Areas of Nature (CPIMPAN) 	Category C
Integrating knowledge about the effects of climate change into the nature protection system	EB-02	<p>On the basis of all existing and realized data, achieve a synthesis of knowledge about the most sensitive habitats and species to the negative consequences of climate change and the implementation of the nature protection system, through the measure:</p> <ol style="list-style-type: none"> 1. Creation of a list of the most endangered habitat types and species sensitive to the negative effects of climate change with mitigation and adaptation measures* <p>*The measure is already foreseen through the valid NSAP from January 2017: Activity 2.1.5</p>	2-5 years	<ul style="list-style-type: none"> • Created database with the most vulnerable and endangered habitats and species for the consequences of climate change and the development of specific conservation measures 	<ol style="list-style-type: none"> 1. Ministry responsible for nature/CENA 	Category A

Source: Report on Estimated Adaptation Measures to Climate Change in Vulnerable Sectors Based on Assessment of Impact and Vulnerability to Climate Change

Measures can be divided into structural measures (encompassing any built object or natural structure whose existence is intended to reduce or avoid the possible impacts of climate change, e.g. dams, embankments, etc.) and non-structural measures (administrative measures, policy measures, legislative measures, technical measures, plans, raising awareness of the need for adaptation, measures related to data collection, monitoring and scientific research).

For each measure, a brief description of the problem that the measure is intended to address is provided, as well as a limited number of actions that should be implemented in order for the measure to have its full impact. For each measure, the implementation period, the expected result of implementing the measure, the responsible stakeholders for implementation, and the approximate total cost expressed through a cost category are also provided. The costs of implementation have been estimated for most measures (where possible), a cost category has been determined, and a description of the cost has been provided.

The document identifies 83 adaptation measures to address climate change across eight vulnerable sectors and two cross-sectoral areas. Nine measures are identified for the hydrology, water, and marine resource management sector; ten measures in the agriculture sector; nine measures in forestry; 11 measures in fisheries; nine measures in natural ecosystems and biodiversity; eight measures in energy; seven measures in tourism; nine measures in health; five measures in spatial planning and coastal zone management; and six measures in risk management.

According to the aforementioned report, the largest number of measures falls into the group of non-structural measures, and a relatively small number of structural measures have been proposed, which include certain technical interventions such as the construction of protective dams and walls, hydrotechnical structures, afforestation, construction of green infrastructure, etc. The reasons are the long period of adaptation planning with a large number of uncertainties and insecurities and the large financial investments required for the implementation of structural measures. It is stated that it is necessary to start implementing non-structural measures as soon as possible (raising the awareness of all stakeholders, analyzing the situation and assessing cost-effectiveness, strengthening professional capacities) in order to create an appropriate social climate. Most of the measures are also classified as a group of so-called "no-regret" measures i.e. measures that will always have a positive impact on people's lives and the health of ecosystems regardless of the extent of climate change.

The report further emphasizes that the proposed measures form a solid foundation for drafting a working version and initial draft of the Adaptation Strategy, as they already allow for the identification of certain sectoral priorities. Additionally, the proposed measures, especially the activities suggested within each measure, serve as input data for developing an Action Plan for the first five-year implementation period of the Strategy. Most proposed adaptation measures will require synergies with other sectors. Achieving these synergies will necessitate cross-sectoral cooperation, both at the expert level and within governance structures, creating opportunities for more effective and often more cost-efficient actions. Implementation will also require appropriate measured data for better assessments of when and how to implement specific measures, particularly structural measures. In this regard, cross-sectoral collaboration can result in resource savings and generate additional potential ecological and societal benefits.

The audit found that in the process of drafting the Adaptation Strategy, possible adaptation options were proposed in the form of an extensive list of measures (83 of them) for eight vulnerable sectors and two cross-sectoral areas. For each sector, the main expected impacts causing high vulnerability are presented, an assessment of development in the scenario without adaptation measures, specific objectives in the sector, identified adaptation measures for the sector (name and designation of the measure, description (purpose, objectives of the measure and basic actions to be implemented), implementation period, expected result of implementation – positive impacts of the measure, competent authorities and indicative cost of implementation and explanation of the cost).

Regarding the cost of implementation, for each measure, where possible, a cost category designation was given (from A – low, cost up to 1 million HRK per unit of measure to E – very high, measures up to more than 150 million HRK per unit of measure) and the estimated cost.

In the third phase of the project, the development of the Adaptation Strategy, the working version of the Strategy, the draft Strategy, and the draft Action Plan were created.

In October 2017, **the Working Draft of the Climate Change Adaptation Strategy in the Republic of Croatia for the Period up to 2040 with a View to 2070 (Green Paper)** (hereinafter: the Green Paper) was published under subactivity 2.6.1 of the project Strengthening the Capacity of the Ministry. The Green Paper was based on climate modeling, analysis of climate change impacts and vulnerabilities, the definition of an initial program, cost-effectiveness analysis of measures, and the assessment of the need for capacity building for the implementation of climate change adaptation. The purpose of the Green Paper was to encourage and initiate a national discussion on all the critical issues related to climate change adaptation.

The draft version of the Green Paper was open to the public for comments via a form on the project website or by email. Following the comments received, the Green Paper was updated and approved by the Ministry in November 2017 (with comments from the profession and the public included). The adaptation measures proposed in the Green Paper represent an initial proposal of possible measures and were discussed at public meetings and through comments from stakeholders.

The Green Paper presents the relevant legislation of the Republic of Croatia for each vulnerable sector. It describes the expected climate changes based on climate modeling results, provides an assessment of climate change impacts and vulnerabilities in various sectors, and gives an overview of the importance of each sector, the general impact of climate on the sector, and an evaluation of risks and vulnerabilities to climate change. The assessment includes an evaluation of the current state, an evaluation of climate change impacts, an assessment of sector development under a no-adaptation scenario, expected vulnerabilities, possible consequences of climate change, cross-sectoral impacts, data needs, and guidelines for scientific research.

Based on a multi-criteria analysis conducted with the participation of over 130 stakeholders from all sectors represented, as well as the work of project experts and cooperation with sector experts from several dozen institutions, 83 climate change adaptation measures were identified. The measures were evaluated according to criteria and factors and their impact on reducing vulnerability in individual sectors.

The Green Paper describes the method of ranking priority measures. Based on the list of identified preliminary climate change adaptation measures by sector and the results of their ranking through multi-criteria analysis, the sectoral approach to ranking measures was supplemented by ranking the measures and their activities according to set priorities, implementation costs, and types of measures.

The measures are categorized by type into regulatory and administrative measures (RE), implementation measures (PR), education and public awareness measures (ED), and research and development measures (IR). The adaptation measures are classified into three main categories based on their importance (very high, high, and medium importance). Out of the total 83 measures, 30 are of very high importance, 31 of high importance, and 22 of medium importance.

In November 2017, the **Draft Climate Change Adaptation Strategy in the Republic of Croatia for the period to 2040 with a view to 2070 (White Paper)**, was published, which was developed after consultations with key stakeholders and incorporated conclusions from public discussions. Along with the Draft Adaptation Strategy, a Draft Action Plan for the first five years of implementation (2019-2023) was also developed.

The White Paper describes the importance of climate change adaptation for the Republic of Croatia, the timeframe for the Adaptation Strategy, and the development of greenhouse gas concentrations in the future. The process of developing the Adaptation Strategy and the methodological approach are outlined. The general objectives of the Adaptation Strategy are specified, and the international context and EU policy are described. Furthermore, the situation in the Republic of Croatia related to future climate projections and the assessment of sectoral impacts and vulnerabilities to climate change is discussed. The adaptation measures by sector (a total of 81 measures), priorities, and types are listed. These measures are elaborated through specific activities.

The White Paper also presents the financial framework for implementing climate change adaptation measures. It outlines the possibilities for financing priority measures and activities related to climate change adaptation, as well as risk prevention and management, from the European Regional Development Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development, and the European Maritime and Fisheries Fund. In addition to the aforementioned EU funds, measures and activities related to education and awareness-raising can be financed through the European Social Fund (ESF), and research and development measures can be financed through the European Regional Development Fund (ERDF).

For the programming period 2014-2020, an overview of the financing of climate change adaptation measures under the Thematic Objective 5 – Promoting Climate Change Adaptation, Risk Prevention and Management, with a total amount of EUR 245.4 million, is provided. This funding is secured from the Operational Program for Competitiveness and Cohesion through two priority axes: 5a/Promoting Investment in Climate Change Adaptation, Including Ecosystem-Based Approaches, with a total amount of EUR 30.4 million, and 5b/Promoting Investments Related to Specific Risks, Ensuring Disaster Resilience, and Developing Disaster Management Systems, with EUR 215.0 million.

The document states that, although it is expected that the Adaptation Strategy will be primarily financed from EU funds, certain specific measures (regulatory and administrative activities) will require funding from the State Budget. The total amount of funding from the State Budget is estimated at EUR 7.73 million for the period 2019-2020. The White Paper presents the estimated amounts for adaptation measures by sector.

The White Paper also includes an overview of the financing of priority measures and activities by sector under the Operational Programme for Competitiveness and Cohesion, the Rural Development Programme, and the Operational Programme for Maritime Affairs and Fisheries for the period 2014-2020. The total cost of measures under the Operational Programme for Competitiveness and Cohesion amounts to EUR 101.8 million, the Rural Development Programme totals EUR 256.2 million, and the Operational Programme for Maritime Affairs and Fisheries amounts to EUR 3.4 million.

The total amount of funding to be provided from the European Structural and Investment Funds for the implementation of priority measures and activities during the 2014-2020 programming period is EUR 361.4 million. The estimated cost per measure or activity is presented for each of these programmes.

The White Paper provides an overview of the financing of climate change adaptation measures by sector and funding source for the entire period of the Strategy's implementation, as shown in Table 6. The funding sources are the State Budget, the European Regional Development Fund, the European Maritime and Fisheries Fund, the European Agricultural Fund for Rural Development, and the European Social Fund. The total estimated investment required for the implementation of the Strategy is approximately EUR 3.6 billion.

Table 6

Financing of climate change adaptation measures by sectors and sources of financing for the period of implementation of the Adaptation Strategy until 2070 (in millions of euros*), according to the White Paper

Sector	State budget	European Fund for Regional Development	European Maritime Fund and fishing	European Fund for Agriculture and Rural Development	European Social Fund	TOTAL
Cross-sectoral measures	0.1	0.0	0.0	0.0	1.0	1.1
Hydrology, management of water and marine resources	0.0	722.4	0.0	0.0	0.8	723.2
Agriculture	0.0	1.2	0.0	1,668.2	1.3	1,670.7
Forestry	0.1	17.6	0.0	677.9	0.0	695.6
Fishing	0.1	0.1	6.0	0.0	0.3	6.5
Biodiversity	0.0	22.5	0.0	9.6	1.3	33.4
Energetics	0.0	249.1	0.0	0.5	0.0	249.6
Tourism	0.6	89.0	0.0	0.0	1.7	91.3
Health/Health	0.1	44.6	0.0	0.0	0.1	44.8
Physical planning; Coastal zone management	0.5	7.4	0.0	0.0	0.6	8.5
Risk management	6.8	28.9	0.0	0.0	13.9	49.6
TOTAL	8.3	1,182.8	6.0	2,356.2	21.0	3,574.3
TOTAL in %	0.2	33.1	0.2	65.9	0.6	

* For the purposes of this audit, the State Audit Office converted the data from the White Paper into euros.

According to the White Paper, more than half of the estimated amount will be allocated to the implementation of structural measures, primarily in the sectors of agriculture and forestry, and to a lesser extent, in energy and tourism. Investments in the first two sectors can also be considered "non-questionable measures", meaning measures that are planned to be implemented regardless, and their effects will be positive for climate change adaptation. The average annual cost of implementing the Adaptation Strategy will be approximately HRK 520 million, or around EUR 70 million (over a period of 52 years), including significant capital investments.

As part of the final sub-activity of the project Strengthening the Capacity of the Ministry, in November 2017, a **Draft Action Plan for the Implementation of the Climate Change Adaptation Strategy in the Republic of Croatia for the period 2019-2023** was developed.

The Draft Action Plan contains priority measures derived from the Adaptation Strategy for the next five-year period, from 2019 to 2023. It includes a total of 42 measures, each consisting of several activities, and only includes measures of very high importance, which also have the highest priority for implementation. The measures outlined in the Draft Action Plan were determined based on comprehensive consultations with experts and stakeholders in each sector and are based on a professional analysis of the current state and future needs.

The Draft Action Plan outlines the priority measures and activities for individual vulnerable sectors. For each measure, a description of the measure and the expected results are provided. Furthermore, the measures of very high priority and their activities in the vulnerable sectors and cross-sectoral areas have been elaborated. The elaboration of measures and activities includes the measure and activity designation, the name of the activity, the priority designation of the Adaptation Strategy, the activity category, a description of the activity/method of implementation, the implementation period, the responsible entities and collaborators for the measure/activity implementation, an estimate of the total cost and potential funding sources, cost estimation by years of implementation, and implementation indicators.

The table below provides an example of the elaboration of the measure P-05 Construction of reservoirs for irrigation in the agricultural sector, according to the Draft Action Plan.

Table 7

Elaboration of measure P-05 Construction of reservoirs for irrigation for the agricultural sector

Designation of the measure and activity and name of the activity	Priority designation of the Climate Adaptation Strategy change	Description of the activity/method of implementation	Implementation period	The holder and collaborators of the implementation of the measure/ activities	Estimate of total cost (million euros)	Cost estimation according to years of implementation (million euros)					Indicators of implementation
	Activity category				Possible sources financing	in 2019	in 2020	in 2021	in 2022	in 2023	
P-05-01 Creation and implementation of a promotional and educational program to popularize the construction of reservoirs for irrigation among farmers	P2	Production of posters, video materials and other promotional and visual materials. Implementation of a promotional and educational program among farmers at workshops and visits to farmers who apply the operation, etc.	2020-2023	Consulting companies Ecological and associations of agricultural producers Advisory service	0.28	0.00	0.07	0.07	0.07	0.07	A promotional video and poster made (printed in a total edition of 1,000 pieces). Participation of at least 100 advisors and 1,000 farmers in the educational program. Increased interest in the construction of irrigation reservoirs (which is evident from the increased number of beneficiaries of support for the construction of irrigation reservoirs).
	ED				Ministry responsible for agriculture Rural Development Program of the Republic of Croatia 2014-2020 FZOEU						
P-05-02 Implementation of the construction of reservoirs for irrigation	P2	Construction of reservoirs for irrigation in accordance with administrative requirements. Supervision of the construction of reservoirs for irrigation by the Agency for Payments in Agriculture, Fisheries and Rural Development.	2020-2023	Farmers Ministry responsible for agriculture Agency for payments in agriculture, fisheries and rural development	39.82	0	5.31	7.96	10.62	15.93	At least 200 reservoirs built with an average holding capacity of 30,000 m3, which irrigate 3,000 ha. Better adaptation of the agricultural sector enabled to the lack of moisture in the soil.
					Rural development program of the Republic of Croatia 2014-2020						

* For the purposes of this audit, the State Audit Office converted the data from the Draft Action Plan into euros.

The Draft Action Plan provides an overview of the amounts and sources of financing for the 2019-2023 Action Plan by sectors, adaptation activities, and years of implementation in millions of kuna. It also presents an overview of the amounts and sources of financing by sectors and adaptation measures in millions of kuna, as well as an overview of the amounts and sources of financing by priorities of the Adaptation Strategy.

Regarding financing, it is stated that the main sources of funding for the measures and activities outlined in the 2019-2023 Action Plan will be the European Structural and Investment Funds (ESI). For the future programming period 2021-2027, the majority of the funds for implementation should be secured from the European Regional Development Fund (ERDF), the Cohesion Fund (CF), the European Agricultural Fund for Rural Development (EAFRD), the European Maritime and Fisheries Fund (EMFF), and the European Social Fund (ESF). Activities related to regulatory and administrative tasks, which serve as preparatory actions for defining the operational framework, analyses, studies, legal frameworks, etc., will be financed from the State Budget (SB).

Table 8 provides an example of cost estimation in the Draft Action Plan for one activity in the water resources sector.

Table 8

An example of a cost estimate in the Draft Action Plan for one activity
in the water resources sector

Measure	Activity	Estimated costs by years of implementation (millions of euros)					Estimate of total costs (million euros)	Possible sources of financing				
		2019	2020	2021	2022	2023		SB	ERDF/CF	EMFF	EAFRD	ESF
Water resources		3.2	7.3	21.9	35.0	42.8	110.2	0.0	110.0	0.0	0.0	0.1
HM-01	HM-01-01 Development of a model for forecasting the occurrence of extreme precipitation in wider catchment areas and their local occurrences	0.2	0.2	0.2	0.0	0.0	0.6		0.6			

* For the purposes of this audit the State Audit Office converted the data from the Draft Action Plan into euros.

Furthermore, the risks and obstacles that will need to be monitored and addressed during the implementation of the Action Plan, as well as proposals for mitigating or eliminating the anticipated risks or obstacles, are outlined. For example, the lack of coordination among state bodies is identified as a risk/obstacle, and the formation of an intersectoral body for implementing the Action Plan is proposed as a mitigation/elimination measure. For the risk/obstacle of potential conflict with development plans of other sectors, it is proposed to ensure timely and expert-based planning with broader consensus among professionals and the public, raise awareness among public authority leaders, and prioritize adaptation measures at the top of decision-making agendas at all levels.

According to the draft Action Plan, its implementation must be supported by an appropriate system of indicators. These include indicators for monitoring the implementation of measures and activities (process indicators), indicators of the effects of implemented measures and activities, and climate indicators.

A list of potential indicators for the effects of implemented measures is provided in the Adaptation Strategy. However, for the purpose of selecting the most appropriate indicators, the draft Action Plan prioritizes Measure RP-01: Development of indicators for assessing the effects of the Adaptation Strategy on vulnerable sectors and society.

A strategic environmental impact assessment procedure was carried out for the Adaptation Strategy in accordance with the provisions of the Environmental Protection Act, the Regulation on the Strategic Assessment of the Impact of Strategies, Plans and Programmes on the Environment (Official Gazette 3/17), and the Regulation on Information and Participation of the Public and Interested Public in Environmental Protection Matters (Official Gazette 64/08). The strategic environmental impact assessment identifies, describes and assesses the likely significant environmental impacts that may arise from the implementation of the Adaptation Strategy, and proposes environmental protection measures and a monitoring programme depending on the identified impacts. Its integral part is also the Main Acceptability Assessment for the Ecological Network. The strategic environmental impact assessment analysed the impact of the Adaptation Strategy measures and activities on individual environmental components (air, water and water bodies, soil, landscape, and cultural heritage), economic activities, population and human health, spatial planning and disaster risk management. The results of the conducted analyses showed that the measures and activities can mostly have a positive impact, that some measures and activities will have no impact or the impact will be neutral, and that for certain measures and activities, the impacts at the strategic level cannot be determined. Through the strategic environmental impact assessment procedure, environmental protection measures were determined and included in the Adaptation Strategy.

- Adaptation Strategy

The aim of the Adaptation Strategy is to raise awareness of the importance of the impact of climate change on society, to point out the threats and the necessity of integrating the concept of adaptation into existing and new policies, strategic and planning documents, programs and other activities implemented at all levels of governance. In this sense, it should help the principle of adaptation become one of the decisive criteria in planning and making development decisions in the future at all levels of government. This will contribute to reducing the vulnerability of the environment, economy and society to climate change, and will eliminate possible conflicts between sectors in the adaptation process. Furthermore, the aim is to encourage and guide scientific research to gain a better understanding of the complexity of climate change impacts and to reduce the level of uncertainty associated with its effects.

The Adaptation Strategy states that the purpose of the Strategy is to bring together all relevant institutional, political, economic and social stakeholders in order to create a sufficiently strong support for the implementation of joint adaptation measures and activities, whereby a proactive approach is necessary. This means that action, or measures, should be taken immediately, as any delay will reduce their effectiveness and make them more expensive.

According to the Adaptation Strategy, climate change adaptation is defined as a process that involves assessing the adverse impacts of climate change and taking appropriate measures to prevent or reduce the potential damage they may cause. To achieve the vision of the Adaptation Strategy, The Republic of Croatia Resilient to Climate Change, the Strategy's objectives have been set: to reduce the vulnerability of natural systems and society to the negative impacts of climate change, to enhance the ability to recover from the effects of climate change, and to utilize potential positive effects that may also result from climate change.

According to the Adaptation Strategy, the approach to developing the Strategy combines the expert work of a group of sectoral and cross-sectoral experts and scientists with contributions obtained through the participation of interested stakeholders. These stakeholders include representatives of public authorities such as ministries, counties, cities, and municipalities, as well as representatives of various scientific, educational, and professional institutions, non-governmental organizations, professional associations, and other interested members of the broader public. The development of the document in all its phases was based on proposals presented at stakeholder meetings (workshops) organized during the preparation of the Adaptation Strategy (a total of 18), through direct communication with specific stakeholders, and through suggestions received during the public consultation process.

According to the Adaptation Strategy, the sectors and cross-sectoral areas relevant to adaptation were analyzed based on their socio-economic importance to the Republic of Croatia and/or their significance for nature and the environment.

The sectors most exposed to the impacts of climate change include water resources, agriculture, forestry, fisheries and aquaculture, biodiversity, energy, tourism, and health, along with two cross-sectoral themes that are crucial for the comprehensive and effective implementation of climate change adaptation: spatial planning and management, and risk management. For each sector, the main expected impacts that could lead to a high degree of vulnerability, as well as possible responses to reduce this high vulnerability, are outlined.

It is stated that further monitoring of the impacts of climate change on the Republic of Croatia will determine whether measures should also be undertaken in other sectors, and, if necessary, the Adaptation Strategy will be updated.

The Adaptation Strategy is based on the results of climate model projections for two periods, taking into account two scenarios of future greenhouse gas concentration growth: RCP4.5 and RCP8.5. Based on the results of climate modelling for the entire period up to 2070, the impacts of climate change on individual sectors, as well as the expected changes and vulnerabilities in the observed sectors, were assessed. The proposed adaptation measures are based on the greenhouse gas concentration growth scenario RCP4.5, which is considered more likely.

The Adaptation Strategy presents the results of climate modelling for the most commonly requested climate variables under the RCP4.5 scenario, which are shown in the table below.

Table 9

Projections of climate parameters for the Republic of Croatia according to the RCP4.5 scenario compared to the period 1971-2000

2011-2040	2041-2070
PRECIPITATION	
Average annual quantity: slight decrease (except for a slight increase in northwestern Croatia)	Average annual quantity: further decreasing trend (up to 5%) in almost all of Croatia, except for northwestern parts
Seasons: different signs; winter and spring in most of Croatia a slight increase of +5 to 10%, and summer and autumn decrease (mostly from -5 to 10% in southern Lika and northern Dalmatia)	Seasons: decrease in all seasons (up to 10% in mountainous areas and northern Dalmatia) except in winter (increase of 5–10% in northern Croatia)
Decrease in the number of rainy periods (except in central Croatia where it would slightly increase). The number of dry periods would increase	The number of dry periods would increase

2011-2040		2041-2070
SNOW COVER		
Decrease (highest in Gorski Kotar, up to 50%)		Further decrease (especially in mountainous areas)
SURFACE RUNOFF		
There are no major changes in most regions; however, in mountainous areas and the hinterland of Dalmatia a decrease of up to 10%		Decrease in runoff throughout Croatia (especially in spring)
AIR TEMPERATURE		
Average: increase of 1–1.4°C (all seasons, entire Croatia)		Average: increase of 1.5–2.2°C (all seasons, entire Croatia – especially the continental parts)
Maximum: increase in all seasons 1–1.5°C		Maximum: increase up to 2.2°C in summer (up to 2.3°C on the islands)
Minimum: the highest increase in winter , 1.2–1.4°C		Minimum: the highest increase in the continent in winter 2.1–2.4°C; and 1.8–2°C in coastal areas
EXTREME WEATHER CONDITIONS		
Hot days (number of days with Tmax > +30°C)	6 to 8 days more than the reference period (reference period: 15–25 days per year)	Up to 12 days more than the reference period
Cold days (number of days with Tmin < –10°C)	Decrease in the number of days with Tmin < –10°C and increase in Tmin values (1.2–1.4°C)	Further decrease in the number of days with Tmin < –10°C
Warm nights (number of days with Tmin ≥ +20°C)	Increasing	Increasing
WIND		
Average speed at 10 m	Winter and spring without change, but an increase of 20–25 % in summer and particularly autumn in the Adriatic	Winter and spring mostly without change, but an increasing trend in summer and autumn in the Adriatic.
Max. speed at 10 m	Per year: without change (highest values on islands in southern Dalmatia) Per season: decrease in winter in southern Adriatic and hinterland	Per season: decrease in all seasons except in summer. The highest decrease in winter in southern Adriatic
EVAPOTRANSPIRATION		
Increase in spring and summer 5–10% (outlying islands and western Istria > 10%)		Increase of 10% for most of Croatia, up to 15% in coastal areas and hinterland, and up to 20% on outlying islands.
AIR HUMIDITY		
Year-round increase (most in summer in the Adriatic)		Year-round increase (most in summer in the Adriatic)
SOIL HUMIDITY		
Decrease in northern Croatia		Decrease throughout Croatia (most in summer and autumn)
SOLAR IRRADIANCE (INPUT SOLAR ENERGY FLUX)		
Increase throughout Croatia in summer and autumn , increase in northern Croatia, and decrease in western Croatia in spring ; decrease throughout Croatia in winter		Increase in all seasons except in winter (highest in mountainous and central Croatia)
MEAN SEA LEVEL		
2046-2065		2081-2100
19 – 33 cm (IPCC AR5)		32–65 cm (estimation of average mean values for the Adriatic from various sources)

Source: State Audit Office, according to the Climate Change Adaptation Strategy

Adaptation measures are defined on the basis of general principles⁴², analyses of the current situation by sector and assessments of the level of vulnerability and possible responses to the challenges of climate change adaptation. A set of measures has been identified in each sector with the aim of effectively defining the adaptation system. In addition to sectoral measures, a set of cross-sectoral measures (spatial planning and regulation and risk management) has also been identified.

The Adaptation Strategy proposes 83 measures that were selected through a multi-criteria analysis conducted in cooperation with sector experts and as part of consultations with over 130 stakeholders from all represented sectors and thematic areas. The measures were evaluated according to criteria and factors and their impact on the reduction of vulnerability in the individual sector.

During the process of harmonizing the concept of adaptation to climate change in the Republic of Croatia, the stakeholders determined five national priorities of the Adaptation Strategy:

1. ensuring sustainable regional and urban development
2. ensuring prerequisites for the economic development of rural areas, coasts and islands
3. ensuring sustainable energy development
4. strengthening management capacities with a networked monitoring and early warning system
5. ensuring the continuity of research activities.

According to the type of measures, they are divided into regulatory and administrative (RE), implementation measures (PR), education and public awareness measures (ED) and research and development measures (IR). According to the urgency and importance of implementation, the measures are divided into three categories of importance: measures of very high importance of implementation, high and medium importance of implementation.

In the Adaptation Strategy, the measures are divided into groups according to national priorities, importance and type of measure, and for each measure, activities for implementation are listed (a total of 279 activities).

According to the Adaptation Strategy, the total estimated investment required for its implementation is approximately EUR 3.6 billion for the period up to 2040. When considering a 20-year period, it is estimated that the average annual cost of implementing the Adaptation Strategy would be about HRK 1.3 billion (approximately EUR 183 million). While this may seem like a significant amount, it should be compared with the average annual damages (from 2013 to 2018) in the Republic of Croatia, solely from the consequences of extreme weather and climate events that have been recorded so far (approximately EUR 295 million per year). If no action is taken, this amount could increase over the years in the context of projected climate changes, seriously threatening the sustainable development of the Republic of Croatia.

Table 10 provides an estimate of the required investments for the implementation of the Adaptation Strategy by sector up to 2040.

⁴²Science-based approach to adaptation, complementarity of adaptation and mitigation of climate change, precautionary principle, adaptability principle, sustainability principle, involvement of stakeholders in the negotiation and decision-making process and integration of adaptation into sectoral policies.

Table 10

Assessment of the necessary investments for the implementation of the Adaptation Strategy until 2040.by sectors, according to the Adaptation Strategy

Sector	In total (million euros)
General measures	1.0
Water resources	723.2
Agriculture	1,670.8
Forestry	695.5
Fishing	6.4
Biodiversity	33.4
Energetics	249.6
Tourism	90.8
Health	44.7
Physical planning	8.0
Risk management	42.8
TOTAL	3,566.2

*For the purposes of this audit, the State Audit Office converted data from the Adaptation Strategy into euros.

Table 10 shows that the largest portion of the estimated investments is allocated to agriculture, water resources, and forestry, amounting to EUR 3,089.4 million, or 86.6% of the total estimated investments in climate change adaptation measures until 2040.

The Adaptation Strategy provides guidelines for strengthening the capacities of experts and institutions for climate change adaptation, based on an analysis conducted in cooperation with experts and authorities during the preparation of the Strategy. For example, the need for the development of a professional, advisory, and educational center for climate change adaptation and ecological transition is highlighted, with the goal of further advancing cross-sectoral cooperation and improving decision-making at the strategic level. Additionally, the need to strengthen the technical and implementation capacities of local and regional authorities is emphasized, as well as the need for training experts on climate change both within and outside the public sector and within non-governmental organizations, among others.

The audit established that a comprehensive Adaptation Strategy was adopted, which includes 83 adaptation measures in eight vulnerable sectors and two cross-sectoral areas. Adaptation goals have been established for each sector. Adaptation measures are designed based on an assessment of climate change risk and vulnerability for each sector. Future climate changes were analyzed for two periods, 2011-2040 and 2041-2070. Adaptation measures were ranked and the priorities of the Strategy were defined through the analysis of cost-effectiveness. Key stakeholders are listed in the Adaptation Strategy for each measure.

According to the provisions of the Climate Change Act, the Adaptation Strategy is updated every five years as necessary. The Adaptation Strategy states that the Strategy will be revised for the first time upon the expiry of the first Action Plan. The draft Action Plan was prepared, but the Action Plan has not been adopted, systematic implementation of adaptation activities has not begun, a system for monitoring the implementation of the Adaptation Strategy has not been established (described under the title of this report *Implementation of Adaptation Activities and Monitoring, Evaluation and Reporting*) and an assessment of the need to update the Adaptation Strategy has not been carried out. ***The State Audit Office is of the opinion that, after the knowledge about the climate is renewed (climate modelling is carried out) and the risk and vulnerability assessment is updated, which requires a longer period of time and involves a large number of bodies, it is necessary to update the Adaptation Strategy in order to enable continuous progress in adaptation in line with the latest scientific knowledge about the climate.***

- Action Plan

According to the European Commission Guidelines, the action plan for implementing the Adaptation Strategy converts the proposed adaptation options into concrete measures that can be implemented. It details the necessary actions, responsible authorities, implementation deadlines, financial resources, and sources of funding. Action plans are an integral part of any adaptation strategy as they facilitate the implementation of adaptation measures. They typically cover a shorter time period than the strategy and are revised more frequently. They are crucial for achieving the goals described in the adaptation strategy.

Under the Law on Climate Change based on the Adaptation Strategy, an **Action Plan for the Implementation of the Climate Change Adaptation Strategy** (hereinafter: the Action Plan) is adopted. The Action Plan is adopted by the Government of the Republic of Croatia, at the proposal of the Ministry, for a period of five years. The Action Plan elaborates the implementation of the Adaptation Strategy, and should contain a description, method of implementation, sequence of activities, deadline, responsible parties and coordinators of the implementation of measures and activities, and sources of financing. In addition, it should also contain an effectively developed system for monitoring the implementation of measures and activities and their effectiveness.

According to the aforementioned Law, the action plan should have been adopted within 18 months of the Law entering into force, i.e. by the end of June 2021, however, it was not adopted by the end of the audit (October 2024). The preparation and adoption of the Action Plan are planned in the Implementation Program of the Ministry of the Economy and Sustainable Development for the period 2021-2024⁴³, and in the Annual Work Plan of the aforementioned Ministry for 2023⁴⁴ and 2024.⁴⁵

⁴³[https://mingo.gov.hr/UserDocsImages//GLAVNO%20TAJNI%C5%A0TVO/Strategija,%20planovi%20i%20ostali%20dokumenti/Provedbeni%20program of the Ministries of the Economy and the Ministry of Development for the 2020-2021 Period](https://mingo.gov.hr/UserDocsImages//GLAVNO%20TAJNI%C5%A0TVO/Strategija,%20planovi%20i%20ostali%20dokumenti/Provedbeni%20program%20of%20the%20Ministries%20of%20the%20Economy%20and%20the%20Ministry%20of%20Development%20for%20the%202020-2021%20Period)

⁴⁴[https://mingo.gov.hr/UserDocsImages/GLAVNO%20TAJNI%C5%A0TVO/Strategija,%20planovi%20i%20ostali%20dokumenti/God and%C5%A1new%20plan%20of%20work%20of%20the%20Ministry%20of%20Economy%20and%20adr%C5%B Eivog%20development%20for%202023.%20year.pdf](https://mingo.gov.hr/UserDocsImages/GLAVNO%20TAJNI%C5%A0TVO/Strategija,%20planovi%20i%20ostali%20dokumenti/Godan%C5%A1new%20plan%20of%20work%20of%20the%20Ministry%20of%20Economy%20and%20adr%C5%B Eivog%20development%20for%202023.%20year.pdf)

⁴⁵[https://mingo.gov.hr/UserDocsImages/GLAVNO%20TAJNI%C5%A0TVO/Strategija,%20planovi%20i%20ostali%20dokumenti/God and%C5%A1new%20plan%20of%20Ministry%20of%20Economy%20and%20of%20BEivog%20development%20for%202024.%20year.pdf](https://mingo.gov.hr/UserDocsImages/GLAVNO%20TAJNI%C5%A0TVO/Strategija,%20planovi%20i%20ostali%20dokumenti/Godan%C5%A1new%20plan%20of%20Ministry%20of%20Economy%20and%20of%20BEivog%20development%20for%202024.%20year.pdf)

According to the explanation of the responsible person of the Ministry, at the time when the Adaptation Strategy was adopted, most of the sectoral strategic documents were not up to date and it was difficult to implement the planned measures. Most of the measures from the Adaptation Strategy are sectoral, therefore the Ministry took the approach that it would be more efficient to implement the measures from the Adaptation Strategy into sectoral documents when drafting sectoral documents, which are submitted to the Ministry for its opinion, and which participates in many working groups when drafting sectoral documents. In this way, other state administration bodies gain a sense of ownership over individual measures and they are implemented more effectively. In addition, at that time, programming for the new period of EU funds (MFF 2021-2027) began, in which the Ministry actively participated and sought to implement the measures from the Adaptation Strategy.

In the next period, the Ministry plans to develop an Action Plan for implementing the Adaptation Strategy, focusing on measures that are not being implemented or have not been incorporated into the sectoral documents. When preparing the Action Plan, attention will be given to the passage of time and the relevance of certain measures that may now be redundant or unnecessary.

The State Audit Office recommends undertaking activities to draft an Action Plan and submit the proposal to the Government of the Republic of Croatia for adoption, in which priority adaptation measures will be elaborated into specific activities and in which competent authorities and their roles and responsibilities, implementation deadlines, clear and measurable implementation indicators, financial resources and sources of financing will be determined in order to accelerate and facilitate the implementation of adaptation measures, in accordance with the Law on Climate Change and the Adaptation Strategy.

Implementation of Adaptation Activities and Monitoring, Evaluation and Reporting

- Implementation of Adaptation Activities

The audit established (as stated in the Eighth National Report and the Fifth Biennial Report of the Republic of Croatia under the UN Framework Convention on Climate Change (UNFCCC)) that, although the key document for the systematic implementation and monitoring of the Adaptation Strategy has not been adopted, activities and projects related to climate change adaptation are being implemented. The State Audit Office did not audit the implementation of adaptation measures and activities from the Adaptation Strategy. This subtitle provides an overview of adaptation activities implemented by the Ministry independently or in cooperation with other bodies.

The **Environmental Protection and Energy Efficiency Fund** (hereinafter: the Fund) performs tasks related to financing the preparation, implementation and development of programs and projects in the field of preservation, sustainable use, protection and improvement of the environment and in the field of energy efficiency and the use of renewable energy sources. In the system of management and control of the use of EU structural instruments in the Republic of Croatia, the Fund has the role of Intermediate Body 2 for certain specific objectives in the field of environmental protection and resource sustainability, climate change, energy efficiency and renewable energy sources.

In order to encourage regional and local self-government to adapt to climate change, the Fund, in cooperation with the Ministry, published several public calls from July 2021 to September 2024. Two public calls were intended to co-finance working papers for the development of the Climate Change Mitigation, Adaptation and Ozone Layer Protection Program or working papers for the development of Sustainable Energy Development and Climate Change Adaptation Action Plans (SECAP) and/or reports on their implementation, and three public calls were intended to directly co-finance the implementation of climate change adaptation measures.

Furthermore, two public calls were intended for co-financing environmental protection projects, including adaptation awareness-raising projects, and one public call for direct co-financing of seedling cultivation, including species intended for greening urban areas, which is related to climate change adaptation.

Table 11 provides an overview of the Fund's public calls for co-financing projects related to climate change adaptation, the number of projects, and financial resources, according to data from the Ministry.

Table 11

The Fund's public calls for co-financing of projects related to adaptation to climate change

Ordinal number	Public call code	Month and year	Subject of the public call	Approved projects	Implemented projects	Total project value	Acceptable cost	Realized by 31 August 2024	Fund Co-financing Amount
1	2	3	4	5	6	7	8	9	
1.	JP ZO 6/2021	July 2021	Work bases for the development of the Program or SECAP and/or reports on their implementation	50	45	584,208.00	584,208.00	279,051.00	292,078.00
2.	ZO 5/2021	October 2021	Environmental protection projects (including activities for raising awareness about adaptation)	3*	3	26,810.00	26,388.00	19,564.00	21,110.00
3.	JP ZO 10/2022	September 2022	Implementation of adaptation measures from national and local planning and strategic documents	46	8	15,058,179.00	15,058,179.00	2,918,350.00	11,144,726.00
4.	JP ZO 4/2023	April 2023	Work bases for the development of the Program or SECAP and/or reports on their implementation	91	62	1,018,543.00	941,943.00	333,092.00	516,899.00
5.	JP ZO 9/2023	June 2023	Implementation of climate change adaptation measures to strengthen the resilience of urban environments	76	3	23,356,005.00	23,157,584.00	473,003.00	16,772,029.00
6.	JP ZO 11/2023	November 2023	Seedling cultivation for forest and species intended for greening urban areas	9	0	1,554,730.00	1,554,730.00	177,075.00	641,808.00
7.	JP ZO 5/2024	March 2024	Implementation of climate change adaptation measures to strengthen the resilience of urban environments	79	0	24,284,093.00	23,000,835.00	0.00	16,999,999.00
Total				354	121	65,882,568.00	64,323,867.00	4,200,135.00	46,388,649.00

* A total of 39 projects have been approved, of which three are related to the field of climate.

According to the data from Table 11, a total of 354 projects related to climate change adaptation activities were approved under the Fund's public calls from 2021 until the completion of the audit, with a total value of EUR 65.9 million, and 121 projects were implemented.

The public calls JP ZO 6/2021⁴⁶ and JP ZO 4/2023⁴⁷ are intended for local and regional self-government units for the development of SECAPs, or for counties, the City of Zagreb, and large cities for the preparation of working documents for the development of programs. The public calls related to co-financing the implementation of adaptation measures (JP ZO 10/2022⁴⁸, JP ZO 9/2023⁴⁹, and JP ZO 5/2024⁵⁰) are intended for local and regional self-government units, with co-financing for costs related to works, equipment, and services for the implementation of climate change adaptation measures defined by the applicable Program or SECAP. Public call ZO 5/2021⁵¹ is intended for associations, while the call JP ZO 11/2023⁵² is intended for local government units that are founders of companies producing forest seedlings and seedlings for urban greening, as well as scientific institutes, higher education institutions, public sector companies, and other legal or natural persons-craftsmen outside the public sector who are registered in the Register of Suppliers of Forest Reproductive Material and/or the Register of Agricultural Reproductive Material.

In addition to the aforementioned public calls, in September 2024 a public tender was published for co-financing projects in the field of environmental protection and energy efficiency of civil society organizations (associations) (Public Call ZO/ENU 1/2024)⁵³ for co-financing, among other things, project activities aimed at raising awareness on climate change resilience and adaptation. The available funds from the Fund for this tender amount to EUR 400,000.00, with the Fund being able to approve grant funding to selected applicants, ranging from a minimum of EUR 2,650.00 to a maximum of EUR 10,600.00 per individual approved project.

The National Recovery and Resilience Plan 2021-2026 of July 2021 (hereinafter: NRRP) is aligned with national strategic development documents as well as with European priorities focused on digital and green transitions. These priorities are incorporated into the binding framework of the Recovery and Resilience Mechanism, which stipulates that at least 20.0% of the plan's funds should be directed towards digital transformation through investments and reforms, while at least 37.0% of the funds should be dedicated to the green transition and the fight against climate change.

According to the Eighth National Communication and the Fifth Biennial Report of the Republic of Croatia under the United Nations Framework Convention on Climate Change (UNFCCC), the Ministry of Physical Planning, Construction and State Assets published a public call in September 2022 for local self-government units for the allocation of funds for the development of Green Urban Renewal Strategies from the NRRP for the period 2021-2026.

⁴⁶<https://www.fzoeu.hr/en/tender-163>

⁴⁷<https://www.fzoeu.hr/en/tender-201>

⁴⁸<https://www.fzoeu.hr/en/tender-193>

⁴⁹<https://www.fzoeu.hr/en/tender-209>

⁵⁰<https://www.fzoeu.hr/en/tender-227>

⁵¹<https://www.fzoeu.hr/en/tender-166>

⁵²<https://www.fzoeu.hr/en/tender-220>

⁵³<https://www.fzoeu.hr/en/natjecaj-245>

The aim of the call is to provide support in preparing Green Urban Renewal Strategies to encourage the development of green infrastructure in urban areas and circular space and building management, in order to ensure the foundations for the development of sustainable spaces with an emphasis on green infrastructure, integration of nature-based solutions, integration of circular economy models for space and buildings, strengthening resilience to risks and climate change, and supporting overall sustainable development.

In April 2024, the Ministry published the **Guidelines on climate proofing for investment preparation in programming period 2021-2027 in the Republic of Croatia**⁵⁴ (hereinafter: Guidelines on Climate Proofing), which establish the analytical methodology for climate proofing related to climate change adaptation and mitigation. According to these guidelines, climate proofing includes two pillars: the verification of climate neutrality, which confirms the project's alignment with the goal of climate neutrality by 2050, and the verification of climate change resilience, which assesses the infrastructure's resilience to predicted climate risks throughout its lifecycle. The guidelines are intended for project holders to prepare projects in accordance with the climate proofing requirements for the 2021-2027 programming period, specifically for the Competitiveness and Cohesion Program and the Integrated Territorial Program 2021-2027. Considering that climate proofing is a new requirement in project preparation, significant capacity-building needs have been identified in the field of climate proofing at all levels. In this regard, the Ministry, together with the Ministry of Regional Development and European Union Funds, as the lead bodies for this process, will continue with training activities both within the EU fund management and control system and for project applicants and beneficiaries. EU funds in the 2021-2027 programming period (InvestEU, Connecting Europe Facility (CEF), European Regional Development Fund (ERDF), Cohesion Fund (CF), and Just Transition Fund (JTF)) are focused, among other things, on promoting the transition to a net-zero carbon economy and building a climate-resilient Europe. Climate change resilience encompasses mitigating the impact of infrastructure on climate change by reducing greenhouse gas emissions during the construction and operation (use) of infrastructure, and adapting infrastructure to climate change, i.e., addressing and resolving the inevitable consequences of climate change and striving to reduce risks and improve infrastructure resilience.

The Guidelines on climate proofing are based on the European Commission Technical guidance on the climate proofing of infrastructure in the period 2021-2027⁵⁵, supplemented with relevant recommendations for the Croatian context, data sources, and sectoral case studies.

The Regulation on Common Provisions (EU) 2021/1060⁵⁶ establishes common provisions for several EU funds, such as the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, the Just Transition Fund, and the European Maritime and Fisheries Fund. Recital 10 states that, in the context of addressing climate change, "the funds should contribute to the inclusion of climate measures and the achievement of the overall goal of 30% of Union budget expenditures supporting climate objectives." Article 6 of the Common Provisions Regulation further clarifies that the European Regional Development Fund and the Cohesion Fund contribute 30.0% and 37.0% respectively of Union contributions to expenses aimed at achieving climate goals.

⁵⁴https://mingor.gov.hr/UserDocImages/klimatske_aktivnosti/Smjernice-za-klimatsko-potvrdivanje-03042024.pdf

⁵⁵[https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021XC0916\(03\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021XC0916(03))

⁵⁶Regulation (EU) 2021/1060 of the European Parliament and of the Council of 24 June 2021 laying down common provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, the Just Transition Fund and the European Maritime, Fisheries and Aquaculture Fund and financial rules for those and for the Asylum, Migration and Integration Fund, the Internal Security Fund and the Instrument for Financial Support for Border Management and Visa Policy

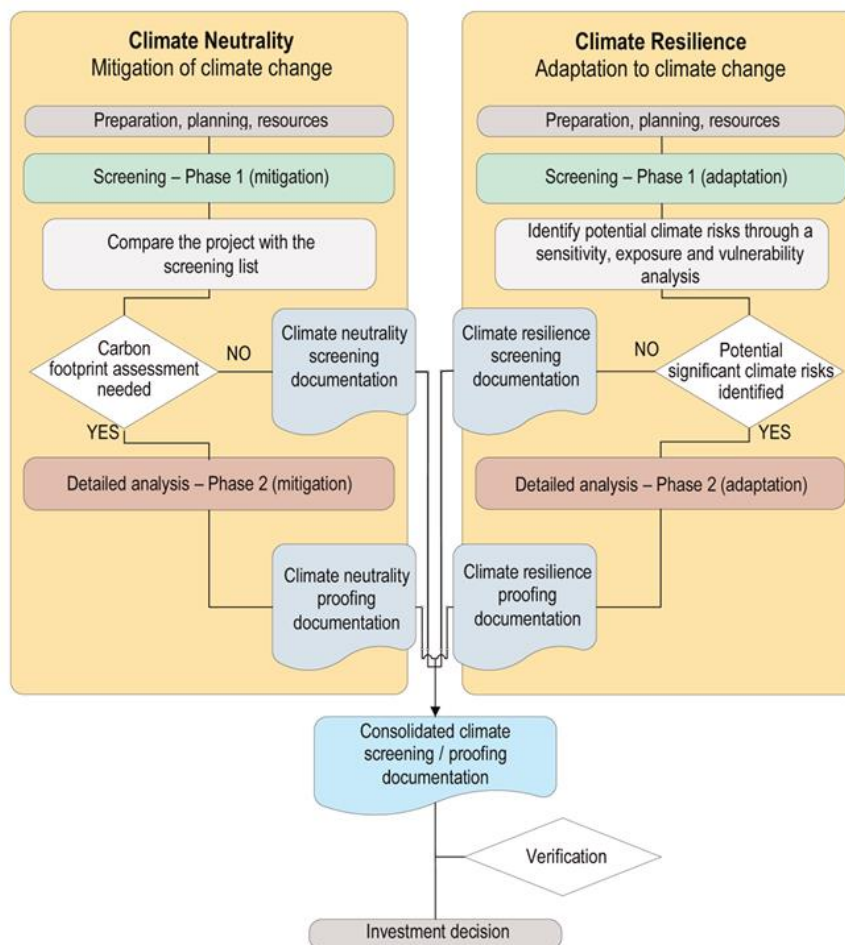
Recital 10 also mentions that the Funds should support activities that respect the Union's climate and environmental standards and priorities and do not significantly harm the environmental objectives within the meaning of Article 17 of Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 establishing a framework to facilitate sustainable investment and amending Regulation (EU) 2019/2088. In this regard, it calls for "appropriate mechanisms to ensure climate resilience of infrastructure investments receiving support, which should be an integral part of the programming and implementation of the funds."

Infrastructure projects with an expected lifespan of at least five years will be required to undergo the climate proofing process. The climate proofing process should utilize climate data from the most recent projections for the Republic of Croatia, which should, if necessary, be supplemented with information from other data sources, such as regional or local climate change adaptation plans or studies and data sources providing information on geological features, soil characteristics, water resources, heat islands, flooding, droughts, landslides, etc.

Figure 10 presents a schematic overview of the climate proofing preparation process and the pillars of "climate neutrality" and "climate change resilience" according to the Guidelines on Climate Proofing.

Figure 10

Schematic representation of the climate proofing preparation process and the pillars of "climate neutrality" and "climate change resilience"



According to the explanation from the responsible person of the Ministry, the Ministry, in collaboration with the Croatian Association of Environmental and Nature Protection Experts, organized two online workshops on the topic of climate proofing. On the same topic, the Ministry participated in the European and regional conference "Environmental Assessments and the European Green Deal '22."

According to the explanation, since 2022, the Ministry has been cooperating as a partner with the Ministry of Regional Development and European Union Funds on a joint project with JASPERS, aimed at supporting the development of national guidelines for preparing projects under EU funds for climate change adaptation and related capacity building. As part of this project, the Guidelines for Climate Proofing were developed, and workshops were held for cities, islands, and the Central Finance and Contracting Agency (CFCA). The Ministry has actively provided expert assistance to HAMAG-BICRO (Croatian Agency for SMEs, Innovation and Investments) and CFCA on the subject of climate proofing. Currently, a trainer training program for climate proofing is being implemented for individuals from the internal control bodies of EU funds.

In 2013, the Ministry translated and published on its website the European Commission's Guidance on integrating climate change and biodiversity into environmental impact assessment, as well as the Guidelines for Project Managers: How to Increase the Resilience of Vulnerable Investments to Climate Change.

In 2022, the Ministry published the National Guidelines for Integrating Climate Change into Strategic Impact Assessment and Environmental Impact Assessment Procedures. The methodology and structure proposed in these guidelines are recommended for use in strategic studies, environmental impact assessments, and environmental protection reports.

Furthermore, according to the explanation, the Ministry participated in the programming of the Competitiveness and Cohesion Program 2021-2027, within which it planned the following program activities: Strengthening the system for monitoring and assessing climate change (implementation of activities from the Adaptation Strategy KM-01-01 to KM-01-05 within measure KM-01⁵⁷), Establishing a national center for coordinated implementation of climate change adaptation policy (implementation of activities from the Adaptation Strategy OM-01-03 Establishment and development of a national expert, research, and educational center for climate change adaptation and ecosystem conservation), and Activities for investing in climate change adaptation solutions and disaster risk reduction (continuation of activities from the Adaptation Strategy OM-01-02 Program for financing research and development of innovative climate adaptation solutions), Strengthening institutional capacities for integrating climate goals into projects and strategic and planning documents.

According to the responsible person of the Ministry, the Ministry prepared and conducted the call for the Applied Research Scheme for climate change adaptation measures under the Operational Program Competitiveness and Cohesion 2014-2020, which is also part of the implementation of activities from the Adaptation Strategy OM-01-02 Program for financing research and development of innovative climate adaptation solutions. According to the website prilagodba-klimi.hr the call aimed to promote the improvement of data quality and availability in the climate sector by strengthening scientific research on climate change adaptation options in the Republic of Croatia. The call awarded grants for 25 projects.

⁵⁷Measure KM-01: Strengthening professional and technical capacities for the implementation of research and applied activities, as well as operational activities that include the field of climate modeling and predictive technologies for forecasting weather and environmental conditions, related warnings for hazardous weather and environmental conditions, and the analysis and interpretation of observed and expected climate changes and hazardous weather events caused by them.

According to the explanation, in June 2023, after the completion of all scientific projects funded through the call from the Operational Programme Competitiveness and Cohesion 2014-2020 (OPCC), the Ministry organized a conference titled "Conference on the Role of Science in Providing Solutions for Climate Change Adaptation." The conference was attended by representatives from all 25 scientific institutions that received funding for projects, as well as representatives from ministries, stakeholders, and the media. An evaluation survey of the mentioned call was conducted, and its results will be used in planning further activities related to scientific research.

According to the Ministry's Annual Report for 2023, one of the measures is measure 15: Coordination of adaptation measures and increasing the level of knowledge and capacity for monitoring the impacts of climate change, risk assessment, and adaptation to climate change. It is stated that the Adaptation Strategy contains a series of measures, and given the new and more ambitious European Adaptation Strategy, as well as the increasing frequency, intensity, and cost of weather and climate-related disasters, it is necessary to establish a coordination system to ensure that the strengthening of resilience to climate change is faster, smarter, and more systematic. Therefore, steps have been taken to establish a national center for climate and ecological transition, which will focus on coordinating the monitoring of climate change impacts, developing a climate change risk assessment system, and creating a system for coordinated adaptation measures to climate change in the Republic of Croatia. Amendments to the Law on Climate Change and Ozone Layer Protection have been initiated, with a new article added about the obligation to establish a climate and ecological transition center, as well as stronger integration of adaptation into the legislative framework and obligations. Upon adoption of these amendments, the prerequisites for the establishment of the center will be created.

In the description of the implementation status of the measure, it is noted that in 2023, possibilities were considered for establishing a national center for climate change adaptation, which would, among other things, establish a system for monitoring the implementation of the Adaptation Strategy. An activity for preparing a feasibility study for the national center for climate and ecological transition was planned, but it was not carried out due to a lack of guidance on the direction for establishing the Center.

According to the explanation of the responsible person from the Ministry from August 2024, the Ministry, in collaboration with the CMHS, is preparing the establishment of the Climate Change Adaptation Center. Through its professional, scientific, advisory, and educational activities, the center aims to contribute to a more comprehensive understanding of the issues that climate change presents to the Republic of Croatia and to encourage the implementation of climate change adaptation measures. The Center would link existing knowledge and guide the development of new knowledge to strengthen an interdisciplinary approach to understanding and addressing these issues. At the beginning of 2020, during the preparation of the National Development Strategy until 2030, the document "Draft Concept - Climate Change Adaptation Monitoring System" was created, and in mid-2020, a pre-feasibility study with a cost-benefit analysis for the project "Strengthening the Climate Change and Adaptation Monitoring System" was prepared.

The establishment of the Center is mentioned in the Program of the Government of the Republic of Croatia 2024-2028, under Goal 4.1: Decarbonization of the Economy, Energy, and Transport. It is stated that a national Climate Change Adaptation Center will be established as a professional, research, and educational body within CMHS, contributing to the faster, smarter, and more systematic implementation of climate change adaptation measures.

Furthermore, according to the explanation, the Center should carry out monitoring and reporting activities, develop indicators and a system for monitoring and evaluation, provide expert support for the preparation of strategic and planning documents, create scientific, study, and analytical foundations, conduct and monitor scientific research, prepare and implement funding programs for adaptation measures, carry out information and education activities, develop and manage the climate change adaptation information system, develop and manage the national climate change adaptation platform, conduct climate certification activities, and undertake other related tasks.

- Monitoring and Evaluation

According to the European Commission Guidelines, adaptation efforts must be monitored and evaluated in order to guarantee accountability and improve the overall adaptation policy. By clearly defining goals, options and adaptation measures that can be "easily" measured and monitored, and whose success can be assessed and then communicated, it is possible to make the monitoring and evaluation system more reliable. Unlike other policies, the difficulty of adaptation policy lies in the fact that successful adaptation prevents the negative consequences of climate change, which is why real benefits are not always visible and measurable.

The most important purpose of monitoring and evaluation is to monitor the progress and success of the adaptation policy in order to contribute to the design and improvement of policies. It is recommended that monitoring and evaluation focus not only on the strategy or adaptation plan, but also on the relevant sectoral policies. Therefore, it is first necessary to check whether adaptation is included in sectoral policies and to what extent, and to regularly monitor measures related to adaptation that already exist in sectoral policies. Furthermore, the purpose of monitoring and evaluation is to increase responsibility in public administrations, improve the knowledge base, and learn how to adjust current or future processes, or raise awareness of the need for adaptation.

In order for monitoring, reporting and evaluation to be effective, it is important to decide who is responsible for them, clarify the roles of different actors and establish mechanisms for vertical and horizontal coordination with actors in different sectors and at different administrative levels. As a rule, actors responsible for process coordination and reporting on results are responsible for monitoring, reporting and evaluation. It can be a body that coordinates national adaptation policies or an entity independent of those responsible for planning and implementing adaptation policies. Monitoring and evaluation findings need to be communicated to a wide range of decision-makers in a timely and appropriate manner so that the results can be maximally used to improve the overall adaptation policy.

Monitoring and evaluation of the effectiveness and efficiency of implemented climate change adaptation measures are important in order to review the physical and social effects of adaptation measures in order to assess whether the adaptation strategy should be updated.

The Adaptation Strategy states that the effective implementation of the Strategy must be supported by an appropriate system for monitoring the implementation of measures and activities and monitoring the impact and effectiveness of these measures and activities. A system for monitoring the implementation of the Adaptation Strategy should be selected and established, and the Strategy must be implemented in coordination with all sectors and with a participatory approach and the involvement of all stakeholders in its implementation and monitoring of implementation.

Furthermore, it was stated that the system of indicators for monitoring the implementation of measures and activities and for monitoring the effect results from a set of indicators that have yet to be selected. The information obtained from the monitoring will be the basis for making periodic evaluations of the implementation of the Adaptation Strategy. Indicators of the implementation of adaptation measures and activities should provide answers as to whether the measures and activities are being implemented, whether improvements are possible in the implementation of the measures and activities, and which of the measures are not achieving the expected effects.

Indicators of the effects of implemented adaptation measures should show whether the measures taken have contributed to reducing vulnerability to climate change and increased the ability of natural systems and society to recover from the consequences of climate change. These indicators enable decision-makers in public administration bodies and bodies involved in implementation to assess the effectiveness and efficiency of climate change adaptation measures undertaken. Also, they ensure the monitoring of the Adaptation Strategy's goals, especially its main goal – reducing the vulnerability of natural systems and society to climate change and reducing damages.

In the Adaptation Strategy within the framework of priority 4. Strengthening management capacities with a networked monitoring and early warning system, measure RP-01 Development of indicators of the effects of the implementation of the Adaptation Strategy is listed as one of the very important measures. The measure consists of two activities: defining the best set of data necessary for monitoring the implementation of the Adaptation Strategy and developing a protocol for monitoring climate change adaptation indicators.

Furthermore, possible indicators for monitoring the implementation of activities and adaptation measures are proposed in the Strategy, some of which are already monitored, but most of them are not monitored systematically, and the methodology for monitoring and measuring the data needed to calculate the indicators has yet to be developed. It was stated that one of the priorities for the first action plan should be the implementation of measure RP-01 Development of indicators of the effects of the implementation of the Adaptation Strategy.

A total of 88 indicators were proposed, of which 13 for the water resources sector, 10 for the agriculture sector, nine for the forestry sector, seven for the fisheries sector, eight for the biodiversity sector, five for the energy sector, six for the tourism sector, 12 for the health sector, 12 for the physical planning and development sector and six for the risk management sector. Additionally, 11 climate indicators have been proposed for monitoring climate parameters within the framework of the implementation of the Adaptation Strategy, and the additional development of four climate indicators essential for impact and vulnerability assessment is also proposed.

In the Draft Action Plan, measure RP-01 Development of indicators of the effects of implementation of the Adaptation Strategy on vulnerable sectors and society was established as one of the cross-sectoral measures. Two activities within this measure are described in more detail: RP-01-01 Preparation of the project task, which includes the determination of potential sources of data necessary for the calculation of adaptation indicators and the involvement of the necessary organizations in the implementation of the activity, and RP-01-02 Detailed elaboration of all adaptation indicators, which includes the definition of the indicators, methodology for creating indicators, associated sub-indicators, connection with other indicators, data sources, periodicity of data collection, institution(s) responsible for creating and reporting indicators, and periodicity and reporting schedule.

The expected result of this measure is the establishment of a permanent system for monitoring and reporting on the state of adaptation indicators, which enables decision-makers (Government of the Republic of Croatia and the Croatian Parliament) and organizations involved in the process of adaptation to climate change to assess the effectiveness of their programs and ensures that adaptation achieves the desired outcomes, such as reducing vulnerability to climate change. Evaluation of the adaptation program will help to justify the finances spent on adaptation measures and achieve the maximum value for the invested funds. The implementation period for both activities is 2019, and the holder and collaborators of the implementation of the measure/activity are the ministry in charge of environment and climate and the ministries in charge of vulnerable sectors, universities, scientific research institutes and the ministry in charge of finance. The total cost is estimated at EUR 0.1 million.

The audit established that neither a system for monitoring the implementation of measures from the Adaptation Strategy nor a system for monitoring the effects of measures was established, nor were indicators of the implementation of measures and activities and indicators of effects established, which was one of the priorities of the draft of the first action plan. Indicators of the implementation of measures and activities should provide answers to the questions of whether measures and activities are implemented, whether improvements are possible, and which of the measures do not achieve the expected effects. However, the audit found that the Ministry does not have an analysis and complete information about which adaptation measures from the Adaptation Strategy are being implemented. The Ministry is aware of the fact that individual bodies within their jurisdiction implement adaptation measures, but the implementation of activities and adaptation measures is not systematically monitored, nor is progress in the implementation and realization of measures and activities from the Adaptation Strategy regularly reported. Furthermore, the Ministry does not have information on the amount of funds spent on the implementation of measures from the Adaptation Strategy.

According to the explanation of the responsible person of the Ministry, mechanisms for monitoring progress in the implementation of measures and activities have not been developed due to a lack of human capacity. The Ministry does not have accurate information on the amount of funds spent on the implementation of the Adaptation Strategy because a system for monitoring the implementation of the Strategy has not been established, which is planned to be established through the project to establish the Center for Climate Change Adaptation within the Ministry and the Institute for Environmental and Nature Protection.

According to the Law on Climate Change, state administration bodies and other public authorities responsible for meteorology, nature protection, environmental protection, agriculture, fisheries, forestry, water management, energy, construction, spatial planning, transport, the sea, tourism and human health protection are required to report to the Ministry every two years on activities related to climate change adaptation. In addition, counties and the City of Zagreb that perform environmental monitoring are obliged to submit available data to the Ministry on activities related to adaptation to climate change every two years.

The audit found that the Law on Climate Change does not cover certain bodies for implementing adaptation measures and certain bodies that are obliged to report on adaptation activities. For example, the state administration body responsible for construction is obliged to report on adaptation activities, which is not listed as implementing adaptation measures, and the bodies responsible for industry and infrastructure that are obliged to implement adaptation measures are not listed among the bodies obliged to report on adaptation activities.

The State Audit Office recommends amending the provisions of the Law on Climate Change to identify all competent authorities for the implementation of adaptation measures and all authorities for reporting on adaptation-related activities.

Furthermore, it was established that the bodies responsible for the implementation of adaptation measures, the counties and the City of Zagreb, which perform environmental monitoring tasks, do not report to the Ministry on activities related to adaptation to climate change.

According to the explanation of the responsible person of the Ministry, until now there has been no reporting of state administration bodies and other public authorities, nor reporting of the counties and the City of Zagreb on climate change adaptation activities due to the lack of human capacity within the Ministry and other bodies. It is stated in the explanation that the next step is to establish an adequate digital interface for national reporting to facilitate and simplify the collection of information and the reporting itself. This would establish a system of reporting and monitoring the implementation of the Adaptation Strategy. It is also necessary to raise awareness among all stakeholders about adaptation to climate change.

Regarding the delivery of data from the counties and the City of Zagreb, which perform environmental monitoring activities on climate change adaptation activities, it is stated in the explanation that work is being done to raise awareness among the public and local and regional self-government units. The Ministry's plan is to strengthen institutional capacities for integrating climate goals into projects and strategic and planning documents through the project Development of the National Network of Climate Officers from Competitiveness and Cohesion Programme 2021-2027.

The intention is to include certain county officials in the climate policy education system and the application of climate proofing, for which they should receive a certificate that they will periodically renew. The purpose is to increase the capacity of the regional administration and better vertical coordination for the implementation of the Adaptation Strategy, the Low Carbon Development Strategy and the National Energy and Climate Plan.

Given that the authorities responsible for the implementation of adaptation measures do not report to the Ministry on adaptation activities and that the Ministry does not have data and information on the status of the implementation of adaptation measures from the Adaptation Strategy by vulnerable sectors, i.e. that a system of reporting and monitoring the implementation of the Adaptation Strategy has not been established, for the needs of performing the audit, the Ministry prepared a questionnaire on the status of the implementation of adaptation measures and sent it to the authorities responsible for the implementation of the Adaptation Strategy.

Table 12 provides data on activities from the Adaptation Strategy according to implementation status and vulnerable sectors, according to data from the Ministry.

Table 12

Activities from the Adaptation Strategy according to implementation status
and vulnerable sectors

Vulnerable sectors	Number of measures and activities according to the Adaptation Strategy		Activity implementation status			
	Number of measures	Number of activities	Number of activities reported	Implemented	In implementation	Not implemented
	1	2	3	4	5	6
Water resources	10	46	46	5	30	11
Agriculture	8	23	-	-	-	-
Forestry	12	28	4	-	4	-
Fisheries and aquaculture	10	24	-	-	-	-
Biodiversity	9	30	7	5	2	-
Energy	7	33	1	-	1	-
Tourism	5	13	13	1	11	1
Health	9	31	15	13	2	-
Physical planning	5	17	-	-	-	-
Risk management	5	24	14	3	11	-
General measures	3	10	4	1	3	-
Total	83	279	104	28	64	12

Source: State Audit Office, according to data from the Ministry

The data in the table are not complete because a large number of bodies responsible for certain measures did not respond to the Ministry's inquiry. Complete data with detailed explanations were provided only by the Ministry's Directorate for Water Management and Sea Protection, for the water resources sector, and the Ministry of Tourism and Sports for the tourism sector. Competent authorities for other vulnerable sectors did not submit complete data or did not submit data at all. For example, the Ministry of Agriculture, Forestry and Fisheries did not submit data for any of the three vulnerable sectors under its jurisdiction (agriculture, forestry and fisheries and aquaculture), but Croatian Forests Ltd reported on four activities that are being implemented.

The Ministry of Economy did not submit the data for the energy sector, but CMHS reported on one activity in implementation. Data for the health sector were submitted by two bodies, the Croatian Institute of Public Health and the Croatian Agency for Agriculture and Food, whereby the aforementioned agency reported on the implemented measures, and the Croatian Institute of Public Health on activities.

According to the explanation of the responsible person of the Ministry, regardless of the fact that the data are not complete, they provide an indicative overview of the activities. Information that the Ministry has about the implementation of activities in competent bodies, which the Ministry receives in direct contact with colleagues employed in these bodies through workshops, conferences, seminars and other activities, is confirmed by these data.

The Ministry has no knowledge of why individual bodies did not submit data or comments on the implementation of measures and activities, but assumes that the reason lies in their lack of knowledge of the subject matter or in the fact that the inquiry did not reach the officials dealing with it.

The State Audit Office recommends undertaking activities to establish a systematic and continuous collection of high-quality, reliable and comprehensive data on the implemented/undertaken adaptation activities of the bodies responsible for the implementation of adaptation measures, data on the amount of funds spent on the implementation of the Strategy, and to take actions to develop indicators of the implementation of adaptation measures, in accordance with the Adaptation Strategy.

Furthermore, it recommends requesting and collecting data on adaptation activities from competent authorities and counties, i.e. the City of Zagreb, which are obliged to report to the Ministry within the deadlines set by the Law on Climate Change, which would contribute to increasing their responsibility for implementing adaptation activities and increase the amount of knowledge about adaptation.

It recommends that monitoring results be made public in order to inform the public and decision-makers about progress in implementing and achieving the measures and activities of the Adaptation Strategy and to highlight areas where progress is being made and areas where progress is lacking or slow, in line with the European Commission Guidelines. This would allow the results to be used to improve adaptation policy, promote good practice and encourage implementation where it is slow or non-existent.

- Reporting to International Bodies

According to the Law on Climate Change, the Ministry reports to the European Commission every two years in accordance with Article 19 of Regulation (EU) 2018/1999 of the European Parliament and Council, dated December 11, 2018, on the governance of the Energy Union and climate action, and amendments to Regulations (EC) No. 663/2009 and (EC) No. 715/2009 of the European Parliament and Council, Directives 94/22/EEC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU, and 2013/30/EU of the European Parliament and Council, Council Directive 2009/119/EC, and Regulation (EU) 2015/652, repealing Regulation (EU) No. 525/2013 of the European Parliament and Council (Text relevant to the EEA). According to this regulation, by March 15, 2021, and every two years thereafter, Member States report to the Commission on their national plans and adaptation strategies describing their implemented and planned actions to facilitate climate change adaptation, in line with the reporting requirements agreed within the UNFCCC and the Paris Agreement. In addition, the Ministry reports to the Commission in accordance with Article 17 of Regulation (EU) 2018/1999, according to which Member States report to the Commission by March 15, 2023, and every two years thereafter on the implementation status of their integrated national energy and climate plans using a progress report, which, among other things, includes information on adaptation.

The submitted reports are available on the Climate ADAPT portal⁵⁸.

⁵⁸<https://climate-adapt.eea.europa.eu/en/countries-regions/countries/croatia>

Parties to Annex I of the UNFCCC are required to prepare national reports every four years and biennial climate change reports every two years. The content, format, and deadlines for submitting national climate change reports are determined by UNFCCC decisions. The Ministry has prepared and submitted eight national reports and five biennial reports to the UNFCCC Secretariat. The second, third, and fourth national reports were consolidated into a single report. The most recent, the Eighth national report and the fifth biennial report of the Republic of Croatia to the UNFCCC was submitted to the UNFCCC Secretariat in May 2024. According to Decision 6/CP.25 of the UNFCCC, the deadline for submitting this report was December 31, 2022.

According to the explanation provided by the responsible official of the Ministry, the Ministry carried out a public procurement procedure for the preparation of the aforementioned report. The procedure was delayed for several reasons: changes in the leadership of bodies in 2022, the requirement to conduct market research, and the need to gather information from universities and institutes that responded to the Ministry's query regarding the possibility of conducting analyses and research in the field of climate change. Additionally, the public procurement process was delayed and the report delivery was postponed due to differing opinions between the Climate Activities Service, which initiated the public procurement procedure, and the Procurement Implementation Service of the Ministry regarding one of the criteria for selecting bidders.

The Procurement Implementation Service sought additional clarifications from the Climate Activities Service and opinions from the Directorate for Trade and Public Procurement Policy. All of this contributed to delays in the preparation and submission of the report to the UNFCCC Secretariat.

The State Audit Office recommends timely submission of national and biennial reports on climate change to the UNFCCC Secretariat, to which the Republic of Croatia has committed itself as a party to the UNFCCC.

ASSESSMENT OF THE EFFECTIVENESS OF CLIMATE CHANGE ADAPTATION

The State Audit Office conducted an audit of the effectiveness of climate change adaptation in the Republic of Croatia. The audit subject was the Ministry. The main objective of the audit was to assess the effectiveness of the implementation of the Ministry's activities related to planning and implementing climate change adaptation activities after the signing of the Paris Agreement, i.e. the activities it undertakes to ensure that the Republic of Croatia is prepared to respond to the negative effects of climate change and to minimize the negative effects of climate change on the environment, society and economy and to take advantage of the potential positive effects of climate change. The specific objectives of the audit were to verify the establishment of a legal and institutional framework related to the planning and implementation of climate change adaptation activities, to assess the provision of effective and comprehensive climate change adaptation planning, and to assess the implementation of adaptation activities and the establishment of a system for monitoring and evaluating progress in the implementation of adaptation activities and reporting on implemented climate change activities.

Based on the facts established by the audit, applying the established criteria, the State Audit Office assessed that the Ministry has undertaken activities related to the establishment of a legislative framework that sets out adaptation objectives and obligations to implement adaptation measures, strategic and planning documents at the national, regional and local levels, and the obligation to align national development documents and development documents of individual areas and activities with the Adaptation Strategy. An institutional framework has been established, i.e. bodies dealing with adaptation issues and their responsibilities have been established. The Ministry has been established as a body with responsibilities for leading, directing and coordinating adaptation policy and for monitoring implementation, analyzing the effects of implementing measures and reporting on adaptation. Sectoral ministries and local and regional self-government units have been established as bodies responsible for implementing adaptation measures and reporting on implementation. The establishment of a Commission for Inter-sectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change is envisaged. The Ministry has undertaken activities to improve the integration of adaptation into sectoral policies and progress has been made in integration compared to the time before the adoption of the Adaptation Strategy. The Ministry has undertaken activities to inform and raise public awareness of the need for adaptation. A comprehensive Adaptation Strategy has been adopted, which provides an assessment of climate change by 2040 and 2070, an analysis of impacts and vulnerabilities to climate change, and proposes 83 adaptation measures for eight vulnerable sectors and two cross-sectoral areas. A climate change risk and vulnerability assessment has been carried out for all sectors that were identified as vulnerable at the time of the assessment, risks related to climate change impacts have been prioritized and possible responses to reduce high vulnerability (adaptation options) have been identified, adaptation measures have been identified to respond to the identified risks, impacts and vulnerabilities and have been grouped according to importance/priority. Certain activities and projects related to climate change adaptation are being implemented. In cooperation with the Fund, several public calls have been published to co-finance adaptation-related projects. The European Commission and the UNFCCC Secretariat are being reported on the implemented and planned actions to facilitate adaptation.

However, it was assessed that there are omissions related to the insufficient number of qualified persons employed in jobs related to adaptation, the Commission for Intersectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change and the Technical Working Group for Policy and Adaptation Measures have not been established. A vertical coordination mechanism that would enable effective cooperation with local and regional self-governments has not been established. In the process of adaptation planning, the groups that are most vulnerable to the impacts of climate change were not identified and they were not included in the decision-making process on the design and implementation of adaptation measures. Vulnerable groups have not been comprehensively included in the risk assessment, nor have appropriate measures been developed to mitigate climate change risks for vulnerable groups. The risk and vulnerability assessment has been partially updated, but it does not cover or identify all risks, climate change impacts, and vulnerabilities in all sectors that, according to the Law on Climate Change, are implementing adaptation measures. An adaptation action plan has not been adopted, which would define the implementation of measures, responsible bodies, deadlines for implementation, clear and measurable performance indicators, financial resources, and sources of funding. Bodies responsible for implementing adaptation measures, counties and the City of Zagreb, which perform environmental monitoring tasks, do not report to the Ministry on adaptation activities. A systematic and continuous data collection system on implemented adaptation activities has not been established, the implementation of adaptation measures is not being monitored, nor is the achievement of adaptation goals, i.e., the overall results and effects of the activities, and no indicators for the implementation of adaptation measures or performance indicators have been established. Certain climate change adaptation measures and activities are being implemented, but the Ministry does not have reliable information on the implementation status for all measures from the Adaptation Strategy. The Ministry reports to relevant international institutions and bodies about the adaptation activities undertaken, with some delays.

Based on the above, the State Audit Office assesses that the activities carried out by the Ministry related to climate change adaptation are **partially effective**, and the following recommendations are provided, according to the audit areas:

1. Legislative and institutional framework
 - 1.1. Urgently strengthen the capacities of the Ministry regarding climate change adaptation.
 - 1.2. Urgently propose to the Government of the Republic of Croatia the establishment of the Commission and a coordination and technical working groups to ensure high-level support for climate change adaptation activities and the necessary engagement of all stakeholders, and to establish clear procedures for its work.
 - 1.3. Given that there is a perceived lack of understanding of the concept of adaptation and a lack of education on the impact and risks of climate change, as well as better familiarization with the significance and content of the Adaptation Strategy and the role and tasks of individual bodies, plan and implement continuous education of employees of sectoral bodies, primarily bodies in which significant activities related to the integration of adaptation have not been undertaken (for example, through workshops, meetings, consultations, training, joint projects, partnerships and the like) on the importance of climate change adaptation.

- 1.4. Given that many adaptation interventions are carried out at the local and regional level, establish procedures that will determine the method of coordination of competent national, regional and local adaptation authorities in order to exchange specific knowledge of all levels for adopting adaptation policies and to support competent regional/local authorities in implementing activities related to the alignment of local policies with national adaptation policy.
- 1.5. Include representatives of all vulnerable groups in the decision-making process on climate change adaptation policy in order to ensure a just transition.

2. Climate change adaptation planning

- 2.1. Identify the groups most vulnerable to the impacts of climate change within vulnerable sectors, determine their needs, and conduct analysis and design adaptation measures for vulnerable groups in accordance with the legislative framework.
- 2.2. Given that the risk and vulnerability assessment is the basis for decision-making on adaptation measures and is an integral part of the Adaptation Strategy, in cooperation with the authorities responsible for the implementation of adaptation measures, initiate and coordinate activities of updating climate change risk and vulnerability assessments in order to monitor changes in existing risks and identify new risks and vulnerabilities in all relevant sectors.
- 2.3. Undertake activities to draft an Action Plan and submit the proposal to the Government of the Republic of Croatia for adoption, in which priority adaptation measures will be elaborated into specific activities and in which the competent authorities, their roles and responsibilities, implementation deadlines, clear and measurable implementation indicators, financial resources and sources of financing will be determined in order to accelerate and facilitate the implementation of adaptation measures, in accordance with the Law on Climate Change and the Adaptation Strategy.

3. Implementation of adaptation activities and monitoring, evaluation and reporting

- 3.1. Amend the provisions of the Law on Climate Change to identify all competent authorities for the implementation of adaptation measures and all authorities for reporting on adaptation-related activities.
- 3.2. Undertake activities to establish a systematic and continuous collection of high-quality, reliable and comprehensive data on the implemented/undertaken adaptation activities of the bodies responsible for the implementation of adaptation measures, data on the amount of funds spent on the implementation of the Strategy, and to take actions to develop indicators of the implementation of adaptation measures, in accordance with the Adaptation Strategy.

- 3.3. Request and collect data on adaptation activities from competent authorities and counties, i.e. the City of Zagreb, which are obliged to report to the Ministry within the deadlines set by the Law on Climate Change, which would contribute to increasing their responsibility for implementing adaptation activities and increase the amount of knowledge about adaptation.
- 3.4. Make public monitoring results in order to inform the public and decision-makers on progress in implementing and achieving the measures and activities of the Adaptation Strategy and to highlight areas where progress is being made and areas where progress is lacking or slow, in line with the European Commission Guidelines. This would allow the results to be used to improve adaptation policy, promote good practice and encourage implementation where it is slow or non-existent.
- 3.5. Timely submit national and biannual reports on climate change to the UNFCCC Secretariat, to which the Republic of Croatia has committed itself as a party to the UNFCCC.

The State Audit Office is of the opinion that by implementing the aforementioned recommendations, improvements would be achieved in connection with the establishment of the legislative and institutional framework for adaptation to climate change, planning of adaptation activities and implementation, monitoring, evaluation and reporting on implemented adaptation activities, which would increase the effectiveness of the adaptation of the Republic of Croatia to climate change, which would also contribute to the achievement of sustainable development goal 13, taking urgent action in the fight against climate change and its consequences.

STATEMENT OF THE MINISTRY

The Ministry commented on the Draft Performance Audit Report on Climate Change Adaptation in the Republic of Croatia. The Ministry states that it accepts the recommendations of the State Audit Office.

In connection with the recommendation to urgently strengthen the capacities of the Ministry related to adaptation to climate change, the Ministry states that recruitment processes are currently underway to fill job positions, and new ones are being planned to strengthen internal capacities for adaptation to climate change (2024-2025).

It also draws attention to the fact that during September 2024, it was decided to further strengthen the capacities of the Ministry in the part of the organizational unit of the Directorate for Climate Transition and the Institute for Environmental and Nature Protection, which, according to the Draft Final Proposal for the Law on Climate Change and Ozone Layer Protection, which is in the process of being adopted at the session of the Government of the Republic of Croatia, will perform the tasks of the central point for adaptation to climate change, i.e. the Centre for Adaptation to Climate Change. Therefore, the Centre for Adaptation to Climate Change will not be part of the CMHS.

The Ministry states that the recommendations are in line with the Ministry's work plan and that the capacities of the Directorate for Climate Transition for tasks related to adaptation to climate change have already been increased. In 2025, the project to establish the Centre for Adaptation to Climate Change will begin, the aim of which is to increase the effectiveness of the implementation of adaptation to climate change in the Republic of Croatia.

In connection with the recommendation to urgently propose to the Government of the Republic of Croatia the establishment of a Commission and a coordination and technical working group in order to ensure high-level support for adaptation activities and the necessary engagement of all stakeholders, as well as the establishment of clear procedures for its work, the Ministry states in the Statement that in the Annual Work Plan for 2025 it is planned to establish a Commission for Intersectoral Coordination for Policy and Measures for Mitigation and Adaptation to Climate Change with a coordination and technical working group as prescribed by the new Draft Final Proposal for the Law on Climate Change and Ozone Layer Protection.

In connection with the recommendation to plan and carry out continuous education of employees of sectoral bodies on the importance of adaptation to climate change, and primarily bodies in which no significant activities related to the integration of adaptation have been undertaken, except for the activities described in the report related to education on climate proofing and the publication of European Commission guidelines and national guidelines for the inclusion of climate change in assessments and strategic assessments of environmental impact, the Ministry states that it participated in the programming of the Competitiveness and Cohesion Programme 2021-2027.

Within the framework of the mentioned Programme, it planned the following activities:

- *the project Establishing a national centre for the coordinated implementation of climate change adaptation policy, through which it is planned to strengthen the internal capacities of the Ministry in part of the organizational unit of the Institute for Environmental and Nature Protection, which, according to Draft Final Proposal for the Law on Climate Change and Ozone Layer Protection, will perform the tasks of the central point for adaptation to climate change. The central point for adaptation to climate change has an important role in planning and conducting continuous education of employees of sectorial bodies, primarily bodies in which significant activities related to the integration of adaptation have not been undertaken*
- *call Strengthening applied research for measures of adaptation to climate change and risk management, through which investment activities in solutions for adaptation to climate change and disaster risk reduction will be carried out (continuation of the implementation of activities from the Adaptation Strategy OM-01-02 Program for financing research and development of innovative solutions for adaptation to climate change)*
- *call Development of a national network of climate officials, through which the strengthening of institutional capacities for integrating climate goals into projects and strategic and planning documents will be implemented.*

Furthermore, it states that Article 27 of the Draft Final Proposal for the Law on Climate Change and Ozone Layer Protection mandates the Ministry to strengthen the knowledge and skills necessary for climate transition and to achieve the goals of climate neutrality and adaptation to climate change through public awareness of climate change and ozone layer protection and the necessity of climate transition and the implementation of training programs on climate proofing. For this purpose, the Ministry will create an Action Plan for Communication and Education on Climate Change.

In connection with the recommendation to establish procedures that will determine the method of coordination of competent authorities for adaptation at the national, regional and local levels, the Ministry states that the Ministry's plan is to strengthen institutional capacities for integrating climate goals into projects and strategic and planning documents through the project Development of the National Network of Climate Officers from the Competitiveness and Cohesion Program 2021-2027, the purpose of which is to increase the capacity of the regional administration and improve vertical coordination for the implementation of the Adaptation Strategy, the Low Carbon Strategy development and the National Energy and Climate Plan.

In connection with the recommendation to include representatives of all vulnerable groups in the decision-making process on climate change adaptation policy in order to ensure just transition, it states that for this purpose, during the revision of the Adaptation Strategy, it plans to identify and additionally analyze vulnerable groups to climate change in the Republic of Croatia and include them in the further process of revising the Adaptation Strategy and decision-making on climate change adaptation policy.

In connection with the recommendation to determine the groups that are most vulnerable to the impacts of climate change within vulnerable sectors, determine their needs and carry out an analysis and devise adaptation measures, it states that during the revision of the Adaptation Strategy, vulnerable groups will be additionally analyzed and that when analyzing individual vulnerable sectors, vulnerable groups characteristic of that vulnerable sector will also be analyzed.

In connection with the recommendation that, in cooperation with the authorities responsible for the implementation of adaptation measures, activities to update the climate change risk and vulnerability assessment should be initiated and coordinated, the Ministry states in its Statement that Article 14 of the Draft Final Proposal for the Law on Climate Change and Ozone Layer Protection defines what adaptation to climate change is and that adaptation measures are defined on the basis of exposure analysis, sensitivity analysis, vulnerability analysis and risk assessment. During the revision of the Adaptation Strategy, sectoral assessments of vulnerability and risk from climate change will be made in cooperation with the competent authorities. Article 16 stipulates that long-term and medium-term acts of strategic planning of individual areas and activities that are relevant for the implementation of the Adaptation Strategy must be harmonized with the principles, basic goals and priorities established in the Adaptation Strategy. Also, long-term and medium-term strategic planning acts of individual areas and activities must go through the climate validation process for that area and activity, which minimally includes assessment of exposure to climate change, assessment of sensitivity, assessment of vulnerability, assessment of climate risks and proposal of adaptation measures, as well as assessment and description of achieving climate neutrality in accordance with national goals. With the establishment of the National Centre for Coordinated Implementation of Climate Change Adaptation Policy, various analyzes of climate risks will be prepared in cooperation with the authorities responsible for the implementation of adaptation measures.

In connection with the recommendation to undertake the activities of drafting an Action Plan proposal and sending the proposal to the Government of the Republic of Croatia for adoption, in which priority adaptation measures will be elaborated into concrete activities and in which competent bodies and their roles and responsibilities, implementation deadlines, clear and measurable indicators of implementation, financial resources and sources of financing will be established in order to speed up and facilitate the implementation of adaptation measures, the Ministry states that it has established a Working Group for the preparation of the Draft Action Plan for the Implementation of the Climate Change Adaptation Strategy in the Republic of Croatia for the period up to 2040 with a view to 2070. The working group consists of representatives of the Ministry, the Ministry of Finance, the Ministry of Agriculture, Forestry and Fisheries, the Ministry of Economy, the Ministry of Health, the Ministry of the Sea, Transport and Infrastructure, the Ministry of Physical Planning, Construction and State Assets, the Ministry of Regional Development and European Union Funds, the Ministry of Tourism and Sports, the Ministry of Science, Education and Youth, the Ministry of the Interior, the Croatian Meteorological and Hydrological Service, Croatian Waters, Croatian Forests, Hrvatska elektroprivreda JSCo and Hrvatski operator prijenosnog sustava d.o.o. (Croatian Transmission System Operator LLC). The first meeting of the working group was held on 23 January 2025, where the tasks were divided and the working method was agreed upon. Sectoral meetings are currently being arranged and an analysis of the activities carried out so far from the Adaptation Strategy is being prepared. The Ministry plans to submit the Action Plan to the Government of the Republic of Croatia for adoption by the end of 2025.

In connection with the recommendation to supplement the provisions of the Law on Climate Change, which will determine all competent authorities for the implementation of adaptation measures and all authorities for reporting on activities related to adaptation, it states that Articles 14, 15 and 16 of the Draft Final Proposal for the Law on Climate Change and Ozone Layer Protection establish all competent authorities for the implementation of adaptation measures and all authorities for reporting on activities related to adaptation.

In connection with the recommendation to undertake activities to establish a systematic and continuous collection of high-quality, reliable and comprehensive data on the implemented/undertaken adaptation activities of bodies responsible for the implementation of adaptation measures, data on the amount of funds spent on the implementation of the Strategy, and to undertake activities on the development of indicators for the implementation of adaptation measures, in accordance with the Adaptation Strategy, it states that the preparation of the project "Establishment of a central point for the coordinated implementation of the adaptation policy to climate change" is underway (National Centre for Harmonized Implementation of the Climate Change Adaptation Policy), which will be implemented in the Ministry, Institute for Environmental and Nature Protection.

The National Centre for Harmonized Implementation of Climate Change Adaptation Policy will have the following tasks:

- *various analyzes will be made in cooperation with the bodies responsible for the implementation of adaptation measures and all stakeholders relevant to adaptation to climate change*
- *a national information and education web platform on climate change adaptation (hereinafter: the Platform) will be established. The Platform will provide information on climate parameters and scenarios, including temperatures, precipitation and extreme weather events. It will also include projections for the future based on greenhouse gas emission scenarios. The Platform will monitor the impacts of climate change on vulnerable sectors such as agriculture, forestry, water resources, biodiversity, public health, spatial planning, tourism and infrastructure and will serve as a tool to assess the vulnerability of regions, sectors or communities to climate change, including risks from events such as floods, droughts or heat waves. Additionally, the Platform will present details of proposed and completed adaptation measures at local, regional and national levels. This will include descriptions of specific projects that contribute to adaptation, such as infrastructure improvements, sustainable agricultural practices, water management and urban planning. The Platform will offer educational materials, interactive maps and tools to raise awareness of climate change and adaptation options, and provide information on funding opportunities for adaptation projects, including EU funds, national funding programs and programs of international organizations. GIS tools and interactive maps on the Platform will enable users (general public and expert community) to visualize climate change data at the regional or local level and review different scenarios for planning adaptation measures for spatial planning or specific projects.*
- *monitoring the implementation of the Adaptation Strategy and action plans and for the purposes of reporting in accordance with national, EU and international obligations, as well as reporting according to Regulation (EU) 2018/1999 (Regulation on the Governance of the Energy Union and Climate Action)*
- *development of indicators and a system for monitoring and evaluating the implementation of the Climate Change Adaptation Strategy.*

In connection with the recommendation to request and collect data on adaptation activities from competent bodies and counties, i.e. the City of Zagreb, which are obliged to report to the Ministry within the deadlines stipulated by the Climate Change Act, which would contribute to increasing their responsibility for the implementation of adaptation activities and increase the amount of knowledge about adaptation, it states that every two years, in accordance with the deadlines for submitting reports in accordance with Article 19 of Regulation (EU) 2018/1999, the Ministry reports to the European Commission on activities related to adaptation to climate change.

During this process, it requests and collects data on adaptation activities from competent bodies and counties, i.e. the City of Zagreb, which are obliged to report to the Ministry according to Article 19 of the Law on Climate Change and Ozone Layer Protection. Reporting is underway for the period 2023 and 2024. The deadline for submitting the report is March 15, 2025.

In connection with the recommendation to publish the results of monitoring so that the public and decision-makers are aware of the progress in the implementation and realization of measures and activities from the Adaptation Strategy, it states that the preparation of the project Establishing a central point for the coordinated implementation of the adaptation policy to climate change, which will be carried out in the Ministry, Institute for Environmental and Nature Protection, is underway. Within the mentioned project, a Platform will be created that will, among other things, encourage cooperation between stakeholders, including the academic community, local authorities, the private sector and civil society, and will facilitate the exchange of best practices and innovations on adaptation. The Platform will allow monitoring the implementation of adaptation measures to ensure successful implementation and long-term sustainability, as well as evaluate the progress of adaptation policies and will use national adaptation indicators once they are in place.

In connection with the recommendation to timely submit national and biannual reports on climate change to the UNFCCC Secretariat, which the Republic of Croatia has committed to as a party to the UNFCCC, it states that recruitment process for filling positions are underway and new ones are planned in order to strengthen internal capacities for adaptation to climate change. By strengthening the capacity, delays in the performance of tasks will be reduced.