

**Strengthening the Capacity of the Ministry of Environmental Protection and Energy for  
Climate Change Adaptation and development of the Draft Strategy on Adaptation to  
Climate Change**

**SUBACTIVITY 2.6.3.:**

**DRAFT ACTION PLAN FOR IMPLMENTING THE STRATEGY ON ADAPTATION  
TO CLIMATE CHANGE IN THE REPUBLIC OF CROATIA FOR THE PERIOD  
FROM 2019 TO 2023**

**Zagreb, November 2017**



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Ulica grada Vukovara 284 (object C), Zagreb

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Charlesa Darwina 8, Zagreb

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Prepared by: **EPTISA Adria d. o. o.**

Proofreading: **Daša Farkaš, mag. ling. et mag. philol. bohem.**

Project Director: **Josip Ćorić, mag. ing. aedif.**

Signature: \_\_\_\_\_

Date: \_\_17/11/2017\_\_

Project Team Leader: **Vladimir Kalinski, PhD**

Signature: \_\_\_\_\_

Date: \_\_17/11/2017\_\_

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## Strategy on Adaptation to Climate Change

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### List of abbreviations and acronyms used

Abbreviation	Definition
<b>BAU</b>	Business As Usual
<b>DHMZ</b>	Meteorological and Hydrological Service ( <i>Državni hidrometeorološki zavod</i> )
<b>DUZS</b>	National Protection and Rescue Directorate ( <i>Državna uprava za zaštitu i spašavanje</i> )
<b>EEA</b>	European Environment Agency
<b>EFRR</b>	European Regional Development Fund ( <i>Europski fond za regionalni razvoj</i> )
<b>ESF</b>	European Social Fund
<b>ESIF</b>	European Structural and Investment Funds
<b>FLAG</b>	Fishery Local Action Group
<b>FZOEU</b>	Environmental Protection and Energy Efficiency Fund ( <i>Fond za zaštitu okoliša i energetske učinkovitost</i> )
<b>ha</b>	hectare
<b>HAH</b>	Croatian Food Agency ( <i>Hrvatska agencija za hranu</i> )
<b>HAOP</b>	Croatian Environment and Nature Agency ( <i>Hrvatska agencija za okoliš i prirodu</i> )
<b>HEP</b>	Croatian Electricity Company ( <i>Hrvatska elektroprivreda</i> )
<b>HERA</b>	Croatian Energy Regulatory Agency ( <i>Hrvatska energetska regulatorna agencija</i> )
<b>HGK</b>	Croatian Chamber of Economy ( <i>Hrvatska gospodarska komora</i> )
<b>HGI</b>	Croatian Geological Survey ( <i>Hrvatski geološki institut</i> )
<b>HHI</b>	Croatian Hydrographic Institute ( <i>Hrvatski hidrografske institut</i> )
<b>HKA</b>	Croatian Chamber of Architects ( <i>Hrvatska komora arhitekata</i> )
<b>HKIŠDT</b>	Croatian Chamber of Forestry and Wood Technology Engineers ( <i>Hrvatska komora inženjera šumarstva i drvne tehnologije</i> )
<b>HOPS</b>	Croatian Transmission System Operator d.o.o. ( <i>Hrvatski operator prijenosnog sustava</i> )
<b>HPA</b>	Croatian Agricultural Agency ( <i>Hrvatska poljoprivredne agencija</i> )
<b>HROTE</b>	Croatian Energy Market Operator Ltd. ( <i>Hrvatski operator tržišta energije</i> )
<b>HRZZ</b>	Croatian Sciercer Foundation ( <i>Hrvatska zaklada za znanost</i> )
<b>HŠ</b>	Croatian Forests company ( <i>Hrvatske šume</i> )
<b>HŠI</b>	Croatian Forestry Institute ( <i>Hrvatski šumarski institute</i> )
<b>HV</b>	Croatian Waters company ( <i>Hrvatske vode</i> )
<b>HZJZ</b>	Croatian Institute of Public Health ( <i>Hrvatski zavod za javno zdravstvo</i> )
<b>HZZO</b>	Croatian Health Insurance Fund ( <i>Hrvatski zavod za zdravstveno osiguranje</i> )
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IRB</b>	Ruđer Bošković Institute ( <i>Institut Ruđer Bošković</i> )
<b>IUCN</b>	International Union for Conservation of Nature
<b>IZOR</b>	Institute of Oceanography and Fisheries
<b>JLP(R)S</b>	Local and regional self-government unit ( <i>Jedinica lokalne i područne (regionalne) samouprave</i> )
<b>JUZP</b>	Public Institutions of Protected Areas ( <i>Javna ustanova za upravljanje zaštićenim područjima (Nacionalnim parkovima i Parkovima prirode)</i> )
<b>LAG</b>	Local action groups
<b>MGIPU</b>	Ministry of Construction and Physical Planning ( <i>Ministarstvo graditeljstva i prostornoga uređenja</i> )
<b>MMPI</b>	Ministry of the Sea, Transport and Infrastructure ( <i>Ministarstvo pomorstva, prometa i infrastrukture</i> )
<b>MP</b>	Ministry of Agriculture ( <i>Ministarstvo poljoprivrede</i> )
<b>MT</b>	Ministry of Tourism ( <i>Ministarstvo turizma</i> )
<b>MUP</b>	Ministry of the Interior ( <i>Ministarstvo unutarnjih poslova</i> )



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Abbreviation	Definition
<b>MZ</b>	Ministry of Health ( <i>Ministarstvo zdravstva</i> )
<b>MZOE</b>	Ministry of Environment and Energy ( <i>Ministarstvo zaštite okoliša i energetike</i> )
<b>NAPNAV</b>	National project of irrigation and management of agricultural land and water ( <i>Projekt navodnjavanja i gospodarenja poljoprivrednim zemljištem i vodama</i> )
<b>NP</b>	National Park
<b>OIE</b>	Renewable energy sources ( <i>obnovljivi izvori energije</i> )
<b>OPKK</b>	Operational Program Competitiveness and Cohesion 2014 – 2020 ( <i>Operativni program Konkurentnost i kohezija 2014.-2020.</i> )
<b>PP</b>	Nature park ( <i>Park prirode</i> )
<b>PRR</b>	The Rural Development Program of the Republic of Croatia for the period from 2014 to 2020 ( <i>Program ruralnog razvoja Republike Hrvatske za razdoblje 2014. – 2020.</i> )
<b>SPUO</b>	Strategic Environmental Impact Assessment ( <i>Strateška procjena utjecaja na okoliš</i> )
<b>SZO</b>	World Health Organization
<b>ŠF</b>	Faculty of Forestry ( <i>Šumarski fakultet</i> )
<b>UPUZ</b>	Employers' Association in Croatian Health Care ( <i>Udruga poslodavaca u zdravstvu Hrvatske</i> )
<b>ZZO</b>	Environmental Protection Act ( <i>Zakon o zaštiti okoliša</i> )
<b>ZZP</b>	Nature Protection Act ( <i>Zakon o zaštiti prirode</i> )
<b>ŽJUZUZDP</b>	County Public Institutions for the Management of Protected Areas of Nature ( <i>Županijske Javne ustanove za upravljanje zaštićenim dijelovima prirode</i> )



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### 1. INTRODUCTION

As defined by the Air Protection Act<sup>1</sup>, the Republic of Croatia has undertaken to initiate measures and actions to adapt to climate change, more precisely to pass Draft Strategy on Adaptation to Climate Change in the Republic of Croatia for the period until 2040 with a view to 2070 (hereinafter referred to as: Adaptation Strategy) and Draft Action Plan for implementing Strategy on Adaptation to Climate Change in the Republic of Croatia for the period until 2040 with a view to 2070 for a five-year period (hereinafter Action Plan). Mitigation and adaptation to climate change take one of the most important places in world strategic planning. Ahead of us there are highly demanding challenges of struggling and adapting with very serious adverse consequences resulting from climate change. The Republic of Croatia is certainly no exception - as described in detail in Adaptation Strategy. Following the entry into force of the Paris Climate Accord climate change adaptation is increasingly gaining attention at the international level, including in the Republic of Croatia.

The Adaptation Strategy is a fundamental, crucial document which establishes a framework for implementing all climate change adaptation measures at the level of the Republic of Croatia. The Strategy aims at:

- reducing the vulnerability of social and natural systems to negative effects of climate change, i.e. strengthening their resilience to change and ability to recover from the effects of these changes
- gathering all relevant institutional, political, economic and social stakeholders in order to create strong support for joint actions when implementing adaptation measures
- integrating the adaptation process, including the implementation of measures, into existing and new policies, programmes, plans and other strategic activities carried out at national and local levels of governing
- implementing and promoting scientific research in all vulnerable sectors in order to reduce the degree of uncertainty associated with the effects of climate change significantly
- raising the level of awareness of the importance of climate change and the inevitability of the adaptation process in decision-makers, in the public and in the wider circle of citizens, who are also the main beneficiaries of the positive effects of the process of adaptation to climate change.

The Action Plan was drafted following the guidelines of the Strategy on Adaptation to Climate Change. Adaptation Strategy provides vision and guidelines for the development of climate change adaptation up to 2040 with a view of 2070, while Action Plan contains priority measures derived from Strategy on Adaptation to Climate Change for the next five year period, i.e. from 2019 to 2023. This document contains defined measures by key (vulnerable) sectors.

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<sup>1</sup> (Official Gazette 47/2014, 130/11, 47/14, 61/17, 2014).



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### 2. PROCESS OF PRIORITIZING ACTION PLAN MEASURES AND ACTIVITIES

In the process of drafting the Adaptation Strategy on Adaptation to Climate Change a multi criteria approach was used in order to select priority measures of adaptation to climate change by involving as many key stakeholders as possible through specific sectors via the so-called sector workshops and meetings with interest groups in order to review the current condition in the sectors and to educate and raise public and professional awareness in climate change, climate change impacts, vulnerability of individual sectors and the possibility of adaptation to climate change. For the purpose of implementing the activity part of the workshop and facilitating the identification of potential measures of adaptation to climate change in a particular sector, before the workshop was held, a list of 10-20 proposed measures for climate change adaptation was prepared by project experts for stakeholders prior to the workshop. Thus sectoral workshops ensured the involvement of stakeholders in the process of defining climate change adaptation measures and initial information was gathered from stakeholders on a number of research questions:

- a) possible climate change adaptation measures in a particular sector, their relevance and urgency for implementing certain measures;
- b) possible criteria for evaluating individual measures within a sector.

The stakeholders therefore identified and ranked climate change adaptation measures proposed initially and establish the criteria to be used for their prioritization by sector. A total of 155 climate change adaptation measures were initially proposed. Based on the identified measures and their ranking by importance using the selected criteria, 81 climate change adaptation measures were selected and rated as medium, high or of very high importance out of 155 climate change adaptation measures initially proposed in the ranking process by the stakeholders at the workshops and after further consultations and amendments by sector experts. Only high-priority measures with the highest implementation priorities were selected for the Action Plan in the first five-year period. A set of high-priority measures was presented to the same stakeholder groups by communicating with interested groups and through public presentations of the draft Adaptation Strategy (the Green Paper). Afterwards comments on the Green Paper content and the proposed set of measures and activities within the measures were received. Based on these comments the first correction of the measures and their activities was conducted. The second, final, correction of measures and activities was carried out following the public announcement of the Draft of the Adaptation Strategy (White Paper) and the Action Plan. This Action Plan for the period from 2019 to 2023 contains a total of 42 measures, each of which has several activities.

The synergy among the sectors where multiple benefits of individual measures are clearly identified is also presented within the document by means of defined priorities. Achieving these synergies will require cross-sectoral collaboration both at expert level and management levels, which will provide opportunities for more effective and often cost-effective actions that will have to be undertaken. Implementation will also require a corresponding measured data for a better assessment of the start and scope of implementing specific measures, particularly those relating to structural measures. In this respect, cross-sectoral cooperation can provide resource saving and other potential environmental and social benefits. Although the challenges of this cross-sectoral co-operation and action traditionally exist, it is noteworthy that (for example, through discussions at project workshops) awareness already



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exists. Existing sectoral practices and policies could be significantly improved if knowledge networking and data exchange occur, which would result in effective responses from the Republic of Croatia.

Given that the revision of programming documents for the use of European Structural and Investment Funds (ESIF) for the period from 2014 to 2020 takes place in 2018, the possibility of partly providing funding of priority measures and activities from the Adaptation Strategy for the period up to 2020 has been realized. This primarily relates to the use of funds from the European Regional Development Fund (ERDF), the European Agricultural Fund for Rural Development (EAFRD) and the European Social Fund (ESF) where the financing of climate change adaptation measures is defined in thematic objectives, priority axes, investment priorities and concrete measures.

In the long term, it is necessary to set up a strategic financial framework and provide funding from a variety of sources - both public and private - for climate change adaptation measures and activities – using all the benefits provided by ESI funds in the period from 2021 to 2028 in order to ensure timely allocation of funds for individual measures and activities and ensure maximum amounts of co-financing.



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### 3. PRIORITY MEASURES AND ACTIVITIES

The majority of measures and their activities mentioned are the result of multi-criteria analysis conducted in cooperation with key stakeholders from vulnerable sectors covered by the Adaptation Strategy. A certain number of measures and their activities are the result of suggestions and comments received by stakeholders after public discussion of the draft version of the Adaptation Strategy (the Green Paper). This process is in line with the criteria of implementing multi criteria analysis. Priority measures and their activities are described in this chapter, while Chapter 4 provides a detailed elaboration of all activities.

#### 3.1. Hydrology, water and sea resources management

Measure designation	Measure title	Activity designation and title
HM-01	Strengthening the capacity for the implementation of non-structural measures for protection against the harmful effects of water in the occurrence of extreme hydrological opportunities whose increase in intensity and frequency of occurrence is conditioned by climate change	<p><b>HM-01-01.</b> Development of models for the prediction of extreme precipitation in the broader catchment areas and their local occurrence</p> <p><b>HM-01-02.</b> Development of models of large water simulation in the wider catchment areas and small torrential streams</p> <p><b>HM-01-03.</b> Preparation of a forecast study on flood propagation, determination of flood zones and risks and opportunities for the provision of natural flood retention areas and their inclusion in spatial planning documentation</p> <p><b>HM-01-04.</b> Drafting of revisions to existing protection projects against the harmful effects of water and high sea levels</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>This measure refers to management activities in the catchment areas of watercourses in terms of protection against adverse effects of water, such as floods, erosion and so on.</p> <p>The measure refers to unstructured activities (actions) such as:</p> <ul style="list-style-type: none"> <li>• Development of models for predicting extreme precipitation in the wider catchment areas and their local occurrence</li> <li>• Development of models of large water simulation in the wider catchment areas and small torrential streams</li> <li>• Forecasting flood propagation</li> <li>• Setting up flood zones and risks and including them into spatial planning documentation</li> <li>• Revision of existing projects of protection against adverse effects of water</li> <li>• Organization of operational protection, etc.</li> </ul>		<ul style="list-style-type: none"> <li>• The level of knowledge of climate change impacts on water resources raised</li> <li>• Improved planning of structural measures</li> <li>• Established vulnerable areas in basins</li> </ul>
HM-02	Strengthening the capacity to build, reconstruct and upgrade the system for protection against harmful effects of water and related multi-purpose hydro-technical systems (structural measures) and lowland	<b>HM-02-01.</b> Preparation of project documentation for the construction and upgrading of existing accumulation and retention systems within multifunctional hydro-technical systems



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Measure designation	Measure title	Activity designation and title
	natural floodplains flooded in a controlled fashion	<p><b>HM-02-02</b> Construction of new and upgrading of existing accumulation and retention systems within multifunctional hydro-technical systems</p> <p><b>HM-02-03.</b> Preparation of project documentation for the construction, reconstruction and upgrade of protective embankments, dikes and similar facilities and multipurpose systems for protection from harmful effects of water</p> <p><b>HM-02-04.</b> Construction, reconstruction and extension of protective embankments, dikes and similar multifunctional facilities related to the protection against harmful effects of water</p> <p><b>HM-02-05.</b> Development of “green infrastructure” - arrangement of watercourse sections with natural flow characteristics or according to eco-remediation principles of river restoration and provision of natural lowland areas for controlled flooding and retention / reduction of large water - measures of “flood adaptation”</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>By building new accumulation systems and multipurpose hydro-technical systems and considering the possibility of reconstructing and extending the existing ones, new reserves of water for various uses (protection against flood, water supply, irrigation, hydropower, protection of aquatic ecosystems of downstream areas) will be provided. In general, these are large hydro engineering structures with multipurpose use. The retention basin is used to reduce peak flow, i.e. to protect against adverse effects of water, as well as embankments, which will have to be made higher because of the increased risk of extreme water occurrence and the reduction of drainage capacity in coastal areas due to the impact of sea due to the expected increase in its level due to climate change impacts, are also used to this purpose. The development of “Green Infrastructure” – landscaping of watercourse sections with natural flow characteristics or eco-remediation principles of flow restoration and providing natural lowlands for flooding in a controlled way and retention / reduction of large water - measures of “adapting to floods” is also anticipated.</p>		<ul style="list-style-type: none"> <li>• Reinforced capacities of water resources for climate change.</li> <li>• Raising the level of protection against flood.</li> </ul>
HM-03	Strengthening research and management capacities for assessing the occurrence and risk of adverse impacts of climate change and adaptation of freshwater and marine water systems in existing and future climate conditions.	<p><b>HM-03-01.</b> Provision of education for specifically chosen target groups both in the form of thematic workshops for experts and interested members of the public as well as thematic units within the regular curricula of the primary, secondary and university education populations</p> <p><b>HM-03-02.</b> Support of research on the possible scenarios of climate change at the national and regional level (for research and management institutions), with the aim of identifying the impacts of climate change, analysing their impact on water and sea resources, and reversing</p>



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Measure designation	Measure title	Activity designation and title
		<p>and influencing these changes in the environment, urban areas, infrastructure, protected areas and human activity to a greater extent related to water (water supply, agriculture, hydropower, etc.).</p> <p><b>HM-03-03.</b> Improvement of monitoring system of quantitative status and quality of inland water and the condition of the Adriatic Sea and the public availability of their results (measurement, information)</p> <p><b>HM-03-04</b> Development of international cooperation in the implementation of monitoring of the state of the inter-state watercourses and the Adriatic Sea with the aim of sustainable management and protection</p> <p><b>HM-03-05</b> Implementation of the initial activities necessary for the realization of measures whose implementation is planned in the next phases of realization in the area of water use, protection of water and sea resources and protection from harmful effects of water</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>In order to optimize the adoption of adaptation measures, it is necessary to strengthen the capacity of research institutions, as well as sectoral institutions and institutions dealing with monitoring quantitative status of water and sea (meteorology, climatology, hydrology, hydrography, oceanology), and institutions dealing with the protection of the water environment, management and use of water in order to quantify possible changes with different scenarios of their mitigation, taking into account the effects of adaptation measures undertaken previously.</p> <ul style="list-style-type: none"> <li>Encouraging scientific and professional research projects related to the analysis of possible scenarios of climate change at the national and regional level, the analysis of their impact on water and sea resources, and, in reverse, the impact of these changes on the environment, urban areas, infrastructure, protected areas and human activity connected to water to a greater extent (water supply, agriculture, hydropower etc.).</li> <li>Improvement of the monitoring system and the public availability of their results.</li> <li>Development of international cooperation in research implementation.</li> <li>Implementing education for all levels of population in the Republic of Croatia, both in the form of theme workshops for experts from institutions related to the issues of water environment protection, management and use of water as well as theme units within curricula taught to primary, secondary and university population and professional associations.</li> </ul>		<ul style="list-style-type: none"> <li>Strengthened capacities of research institutions for assessing possible climate change scenarios and their impact on water and sea resources.</li> <li>Improved system of monitoring climatic, hydrological (surface and groundwater) and hydrographic and oceanologic features of water and sea resources.</li> <li>Scientists, experts, pupils, students and the general public educated in and aware of climate change adaptation issues in the domain of water and sea resources.</li> <li>Research results contained in documents which represent the basis for planning the realization of measures whose implementation is foreseen in the later phases</li> </ul>



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### 3.2.Fisheries

Measure designation	Measure title	Activity designation and title
RR-01	Strengthening the sector by investing in development of new markets and expanding the range of products offered	<b>RR-01-01.</b> Implementation of research on the acceptability of new types of breeding organisms and products by consumers
<b>MEASURE DESCRIPTION</b>		<b>EXPECTED RESULTS</b>
Fish migration and reduction of primary production results in reduced catch of common species in a specific area. Also, the cultivation of common species will be reduced due to changes in environmental factors. In order to increase the resilience of the fisheries sector to the fluctuation in farming and catch and competition from third countries, new markets will be developed and offer extended with new, farmed species and products with added value.		<ul style="list-style-type: none"> <li>• Survey conducted on the acceptability by consumers of new types of organisms and products farmed</li> <li>• Increased resilience to fluctuations in catch of traditional fish species due to climate change.</li> <li>• Increased profitability of the sector.</li> <li>• Fisheries sector capacity strengthened by expending the offer of catch species.</li> </ul>
RR-02	Strengthening the capacity for assessing the future state of the sector due to the impact of climate change	<b>RR-02-01.</b> Encouraging the development of application models for forecasting the movement of fish biomass in the future
<b>MEASURE DESCRIPTION</b>		<b>EXPECTED RESULTS</b>
In order to mitigate the negative effects of climate change on the fisheries sector, the capacities of scientific institutions dealing with climate modelling and production of application models for fisheries sector will be strengthened. The capacities of institutions involved in monitoring the condition of bio-resources will also be strengthened.		<ul style="list-style-type: none"> <li>• Developed application models for forecasting the condition of fish biomass in the future.</li> <li>• Strengthened capacities of scientific institutions for assessing possible scenarios of climate change and their impacts on marine and freshwater ecosystems.</li> <li>• Improved system for forecasting the condition of fish biomass in the future.</li> <li>• Improved systems of monitoring aquatic bio-resources.</li> </ul>
RR-03	Strengthening the resilience of natural resources through adaptive fisheries management	<b>RR-03-01.</b> Develop the monitoring system of the state of bio-resources in marine and fresh water that will also encompass monitoring of the food chain of marine organisms
<b>MEASURE DESCRIPTION</b>		<b>EXPECTED RESULTS</b>
In order to achieve ecological, economical and socially sustainable fishing, it is necessary to strengthen the capacities of adaptive management because fishing effort should be aligned with the actual condition of bio-resources.		<ul style="list-style-type: none"> <li>• The system of monitoring the condition of bio-resources which will also include monitoring the condition of food chain developed</li> <li>• General resilience of bio-resources strengthened.</li> <li>• The capacity of adaptive management strengthened.</li> </ul>
RR-04	Increasing the involvement of fishermen in the tourism sector	<b>RR-04-01.</b> Education of fishermen to carry out tourism activities <b>RR-04-02.</b> Supporting fishermen to reconstruct vessels for the purpose of carrying out tourism activities
<b>MEASURE DESCRIPTION</b>		<b>EXPECTED RESULTS</b>
The reduction of fishing profitability due to climate change increases the likelihood of fishermen abandoning this activity. In order to maintain the participation of fishermen and their remaining in the sector, it is necessary to find the possibilities of their additional income in the tourism sector.		<ul style="list-style-type: none"> <li>• Fishermen educated to perform tourism activities.</li> <li>• Fishermen granted support for reconstructing vessels for the purpose of performing tourism activities.</li> <li>• Additional earnings resulted in fishermen remaining in the fisheries sector.</li> <li>• Increased tourist offer of the local community.</li> </ul>



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Measure designation	Measure title	Activity designation and title
Fishing is mostly a seasonal activity so vessels, with the necessary technical modifications, may be used for tourist services.		
RA-01	Strengthening aquaculture capacity by breeding more organisms at lower trophic levels and new forms of breeding	<p><b>RA-01-01.</b> Implementation of a programme to encourage shellfish farming</p> <p><b>RA-01-02.</b> Implementation of a programme for supporting controlled farming of shellfish in hatcheries instead of collecting them in nature</p> <p><b>RA-01-03.</b> Preparation of a study on the feasibility of growing aquatic plants and their acceptance on the market</p> <p><b>RA-01-04.</b> Development and implementation of an educational programme on the benefits and uses of integrated breeding of aquatic organisms</p> <p><b>RA-01-05.</b> Awareness raising of the general public about the benefits of shellfish, aquatic plants and non-meat species of fish</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
Further development of breeding of carnivorous species of fish is uncertain due to climate change impact on the global supply of fishmeal and fish oil, which represent basic raw materials for ready-to-eat food. Therefore, it is necessary to strengthen the aquaculture capacities by encouraging the breeding of organisms at a lower trophic level (shellfish, aquatic plants) as well as non- carnivorous species of fish whose diet does not depend on the supply of fishmeal and fish oil.		<ul style="list-style-type: none"> <li>• Implemented program for determining the position of shellfish breeding.</li> <li>• Implemented program of encouraging controlled breeding of juvenile shellfish.</li> <li>• Drafted study on the possibilities of growing aquatic plants and their acceptance on the market.</li> <li>• Breeders educated about the benefits and advantages of integrated farming of aquatic organisms.</li> <li>• Increased public awareness of the benefits of greater consumption of shellfish, aquatic plants and non-carnivorous species of fish.</li> </ul>
RA-02	Strengthening aquaculture capacity through breeding in recirculation systems	<p><b>RA-02-01.</b> Analysis of the possibility of using recirculation breeding systems in fisheries</p> <p><b>RA-02-02.</b> Development and implementation of an educational programme on the benefits of recirculation breeding systems</p> <p><b>RA-02-03.</b> Implementation of research related to the use of recirculation systems for certain stages of farming and for breeding new species of fish in recirculating systems</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
Climate change results in reduced river flow, which threatens fish farming in flow systems. Due to the increase in water temperature, the risk of developing and spreading diseases in farmed fish increases as well. Using recirculating systems of breeding increases aquaculture resilience to reduced flow water availability, maximizes the resilience to the onset and spread of disease and increases resilience to changes in the physic and chemical parameters of water. Land recirculation systems will increase mariculture resilience to changes in seawater and reduce conflicts with other sectors in a specific area.		<ul style="list-style-type: none"> <li>• Produced analysis of the possibilities of using recirculating system in fish farming</li> <li>• Breeders educated on advantages of farming in recirculating system.</li> <li>• Implemented research related to the use of recirculation system for certain stages of farming only and for breeding new species of fish.</li> </ul>
RA-03	Strengthening aquaculture capacity by breeding new species of fish	<p><b>RA-03-01.</b> Making amendments to the legislative framework for the cultivation of new (alien) fish species</p> <p><b>RA-03-02.</b> Study on the possibilities of breeding new</p>



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Measure designation	Measure title	Activity designation and title
		(alien) fish species <b>RA-03-03.</b> Market research to determine the possibility of accepting new (alien) fish species by consumers
MEASURE DESCRIPTION		EXPECTED RESULTS
The increase in water temperature will limit the possibility of breeding some of today's species of fish. By breeding new (alien) species which like the altered climatic conditions, the resilience and maintain the profitability of aquaculture will be increased. It may imply breeding the already bred species (e.g. gilthead sea bream), species from the southern Adriatic (e.g. grouper or bluefish) or foreign species from warmer seas.		<ul style="list-style-type: none"> <li>Amendments made to the legislative framework related to breeding foreign species.</li> <li>Produced study on the possibilities of breeding new (alien) species of fish.</li> </ul>

### 3.3.Agriculture

Measure designation	Measure title	Activity designation and title
P-01	Implementation of an experimental climate change adaptation programme in agriculture	<b>P-01-01.</b> Preparation for the implementation of a climate change adaptation research programme in agriculture <b>P-01-02.</b> Implementation of the research programme on adaptation to climate change in agriculture <b>P-01-03.</b> Transfer and promoting the achievements of the climate change adaptation research programme in agriculture
MEASURE DESCRIPTION		EXPECTED RESULTS
The measure consists of the following actions: <ul style="list-style-type: none"> <li>defining the objectives, priority themes and conditions for implementing experimental and research programme on adapting to climate change in agriculture, which consists of two components: (1) production of a simulation model (or models) of predicting climate change impact on agriculture; (2) five-year implementation ("field trials") and research on the success of measures of adapting to climate change in agriculture</li> <li>conducting a public tender for the allocation of funds</li> <li>producing and testing a simulation model and applying and scientifically documenting the success of implementing selected measures of adapting to climate change in agriculture for five years on sites where „field trials“ are conducted</li> <li>organizing a complementary promotional and educational program to share the experience and results of the simulation model and “field trials” with advisers and farmers</li> <li>publishing research results in scientific journals and popular manuals for farmers; creating</li> </ul>		<ul style="list-style-type: none"> <li>Selected measures of adapting to climate change in agriculture tested in practice.</li> <li>Published results of simulation model and “field trials”, and advisers and farmers familiarized with them.</li> <li>The capacities for understanding and applying measures of adapting to climate change in agriculture strengthened in scientific-research institutions, advisory services and farmers for the five year duration of the program.</li> </ul>



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Measure designation	Measure title	Activity designation and title
	<p>appropriate video and other promotional and experimental materials</p> <ul style="list-style-type: none"> <li>establishing a systematic monitoring and evaluation of the implementation of the entire programme.</li> </ul>	
P-02	Increasing the water absorption capacity of agricultural soil	<p><b>P-02-01.</b> Development of an operation for increasing the absorption capacity of agricultural soil and inclusion in the Rural Development Program of the Republic of Croatia for the Period 2014 - 2020</p> <p><b>P-02-02.</b> Design and implementation of a promotional and educational programme of popularisation of the implementation of the operation of increasing water absorption capacity of agricultural soil among farmers</p> <p><b>P-02-03.</b> Implementation of operations for increasing the water absorption capacity of agricultural soil</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>The measure consists of the following actions:</p> <ul style="list-style-type: none"> <li>defining agro technological operations and requirements for increasing the carrying capacity of agricultural soil to water</li> <li>making calculations of the level of payments for implementing individual measures</li> <li>including measures for increasing the carrying capacity of soil to water into the rural development program and allocate enough funds for implementing them to an average of 200,000 hectares per year</li> <li>implementing promotional and educational program popularizing the application of the above measures among the farmers</li> </ul>		<ul style="list-style-type: none"> <li>Increased interest in implementing measures for increasing the carrying capacity of agricultural soil to water.</li> <li>Beneficiaries of rural development programmes of implementing measures for increasing the carrying capacity of agricultural soil to water implement measures on 200,000 ha of agricultural land (on average per year).</li> <li>The carrying capacity of soil to water increased on 200,000 ha of agricultural land (on average per year), enabling better adaptation of the agricultural sector to the lack of moisture in the soil.</li> </ul>
P-03	Application of soil conservation tillage	<p><b>P-03-01.</b> Development and implementation of a promotional and educational programme of popularization of soil conservation tillage among farmers</p> <p><b>P-03-02.</b> Implementation of soil conservation tillage</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>The measure consists of the following actions:</p> <ul style="list-style-type: none"> <li>start implementing promotional and educational program popularizing the application of conservation soil tillage among the farmers</li> <li>start applying conservation soil tillage in practice</li> </ul>		<ul style="list-style-type: none"> <li>At least 2,000 pieces of machinery / equipment for conservation soil tillage in use at least 100,000 ha.</li> <li>Reduced soil compaction, both carrying capacity of soil to water and the humus level at 100,000 ha increased, thus enabling a better adaptation of the agricultural sector to a lack (but also surplus) of moisture in the soil.</li> </ul>
P-04	Breeding of species and cultivars of agricultural crops and breeds of domestic animals that are more resilient to climate change	<p><b>P-04-01.</b> Development of an operation for the breeding of species and sorts of agricultural crops and breeds of farm animals that are more resilient to climate change and its inclusion into the Rural Development Programme of the Republic of Croatia for the Period 2014–2020</p> <p><b>P-04-02.</b> Development and implementation of a promotional and educational programme of popularization among farmers of cultivation of agricultural crops and breeds of domestic animals that are more resilient to climate change</p> <p><b>P-04-03.</b> Implementation of the operation for cultivating species and varieties of agricultural crops and breeds of</p>



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Measure designation	Measure title	Activity designation and title
		domestic animals that are more resilient to climate change
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>The measure consists of the following actions:</p> <ul style="list-style-type: none"> <li>including research on growing species, varieties and breeds more resilient to climate change into experimental research program of adaptation to climate change in agriculture (P-01) as well</li> <li>testing certain species, varieties and breeds' possibilities of adaptation to climate change in practice</li> <li>documenting scientifically the success of selected species, varieties and breeds in adapting to climate change</li> <li>organizing a complementary promotional and educational program to share the experience and research results to advisors and farmers</li> <li>publishing research results in scientific journals and popular manuals for farmers; creating appropriate video and other promotional and experimental materials.</li> </ul>		<ul style="list-style-type: none"> <li>The possibilities of adaptation to climate change of certain species, varieties and breeds tested in practice.</li> <li>Research results published and advisors and farmers familiarized with them.</li> <li>Strengthened capacities for understanding and growing species, varieties and breeds more resilient to climate change in scientific and research institutions, advisory services and farmers.</li> <li>A better adaptation of the agriculture sector to climate change.</li> </ul>
P-05	Construction of reservoirs for irrigation	<p><b>P-05-01.</b> Development and implementation of a promotional and educational programme popularizing the construction of reservoirs for irrigation among farmers</p> <p><b>P-05-02.</b> Implementation of reservoir construction for irrigation</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>The measure consists of the following actions:</p> <ul style="list-style-type: none"> <li>start implementing promotional and educational program popularizing the construction of reservoirs for irrigation among the farmers</li> <li>start construction of reservoirs for irrigation</li> </ul>		<ul style="list-style-type: none"> <li>At least 200 reservoirs of an average reception capacity of 30,000 m<sup>3</sup> built</li> <li>Enabled better adaptation of the agricultural sector to the lack of moisture in the soil</li> </ul>

### 3.4.Forestry

Measure designation	Measure title	Activity designation and title
ŠU-01	Incorporation of adaptation measures into key documents pertaining to forests and forestry sectors	<b>ŠU-01-01.</b> Incorporate measures of adaptation to climate change into Forestry Sector Strategy and Forest Act as well as other legal regulations concerning forests and forestry sector, including implementation indicators
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>The measure implies incorporating adaptation measures into key documents of forestry policies to ensure their implementation.</p>		<ul style="list-style-type: none"> <li>Defined measures of adaptation to climate change integrated into Forestry Sector Strategy and national forestry program and implementation indicators.</li> <li>Enacted production and implementation of custom forest management in the Mediterranean area which are identified as bearing high risk of forest fires in order to reduce the amount of fuel mass.</li> </ul>



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Measure designation	Measure title	Activity designation and title
ŠU-02	Research on species and provenance of forest trees that are more resilient to climate change	ŠU-02-01. Implementation of research of species and provenance of forest trees that are resilient to climate change
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>It is assumed that climate change will affect certain tree species in the sense that unfavourable conditions will arise for their survival, which results in increased stress to the plant and ultimately a possible shift in their distribution. Given that we do not yet have enough information on our commercial species' ability to adapt to climate change, further research is needed in this regard with the aim of identifying the adaptability of the target species population. The measure implies the announcement of tenders and the conduct of research on selected species.</p>		<ul style="list-style-type: none"> <li>• Research implemented.</li> <li>• Species with highest yield identified.</li> <li>• Species genetically best adapted to the impact of climate change identified.</li> </ul>
ŠU-03	Strengthening the capacity for systematic monitoring of forest ecosystem conditions as a prerequisite for informed planning and implementation of climate change adaptation	<p>ŠU-03-01. Evaluation of the existing forest ecosystem monitoring system with identification of advantages and disadvantages and development of guidelines for its improvement</p> <p>ŠU-03-02. Creating a registry of monitoring, experiments, and research conducted by state institutions that are not part of systematic monitoring, their evaluation, and proposal for inclusion of selected items in the monitoring system</p> <p>ŠU-03-03. Upgrading and integration of selected existing monitoring / experimentation / research into the monitoring system of forest ecosystem status monitoring and enabling the availability of results in accordance with the INSPIRE Directive</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>Forest ecosystems are very complex, which makes it difficult to estimate climate change impacts. The only way to gather all the necessary data on the condition and trend of forest ecosystems is a precise, systematic and often long-term monitoring of different elements and processes (soil and groundwater condition, streams of carbon, nitrogen and other nutrients, growth, seed production, damage, invasive foreign species and pests, genetic diversity, phenology and forest regeneration). In addition to the systematic monitoring within "ICP Forests", which has been implemented in the Republic of Croatia for a number of years, the measure aims at integrating a whole range of other research in forestry sector not part of systematic monitoring. In order to increase monitoring efficiency, it is necessary to implement capacity for systematic monitoring and integration of existing infrastructure of experiment and research conducted by institutions owned by the Republic of Croatia</p>		<ul style="list-style-type: none"> <li>• Strengthened capacity of institutions owned by the Republic of Croatia for systematic monitoring of forest ecosystem condition.</li> <li>• The system of monitoring forest ecosystem condition improved.</li> <li>• The register of data on monitoring / experiments / research related to forest species of trees and forests created.</li> <li>• The system of results dissemination according to the INSPIRE directive improved.</li> </ul>
ŠU-04	Strengthening capacity for fire protection	<p>ŠU-04-01. Improvement of the system of early warning for forest fires</p> <p>ŠU-04-02. Develop models of the spreading of forest fires and predictive models entailing all elements of fire</p>



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Measure designation	Measure title	Activity designation and title
		prediction and relevant risks <b>SU-04-03.</b> Development of a plan and raising public awareness on the importance of implementation of preventive measures to prevent forest fires <b>SU-04-04.</b> Maintenance of existing fire roads in the Mediterranean and Sub-Mediterranean zone and construction of new ones
MEASURE DESCRIPTION		EXPECTED RESULTS
The measure implies upgrading the existing fire protection system by introducing a model of spreading and predicting forest fire occurrence, establishing the system of early warning of forest fires with a great risk of forest fire occurrence, constructing and maintaining forest infrastructure as one of the preventive measures of fire protection and raising public awareness regarding forest fire prevention.		<ul style="list-style-type: none"> <li>• A better prediction of the risk of forest fires occurrence and improvement of early warning.</li> <li>• Plan and materials produced and public awareness regarding forest fire prevention raised</li> <li>• Priority fire roads maintained and new ones built.</li> </ul>

### 3.5.Biodiversity

Measure designation	Measure title	Activity designation and title
B-01	Preserving traditional agriculture in natural ecosystems	<b>B-01-01.</b> Continuation of inventory of traditional varieties and breeds <b>B-01-02.</b> Development of models of restoration of traditional agriculture in natural ecosystems <b>B-01-03.</b> Develop and implement a program of encouraging traditional agriculture and placements of value added products <b>B-01-04.</b> Establishment of systemic monitoring of natural ecosystems covered in the programme of traditional agriculture
MEASURE DESCRIPTION		EXPECTED RESULTS
Traditional agriculture represents a sustainable way of exploiting natural ecosystems and contributes to the preservation of traditional landscapes, diversity of habitats and increase in biodiversity. In addition to contributing to the optimal condition of habitats, well-conditioned grass, forest and freshwater habitats are a refuge for species sensitive to climate change, while good agricultural practices reduce population and spreading of invasive species. Some endangered wild species have already become part of the agricultural ecosystem, while some will in the case of climate change. Measures should be implemented by the Ministry responsible for agriculture and the Ministry responsible for regional development and European Union funds and other responsible institutions, primarily HPA, in cooperation with the Ministry responsible for nature		<ul style="list-style-type: none"> <li>• An inventory list of the entire agro-biodiversity of the Republic of Croatia created.</li> <li>• Established, elaborated and implemented models of traditional agriculture in natural ecosystems.</li> <li>• Established models of financing, supporting and marketing the products produced through models of traditional agriculture in natural ecosystems.</li> <li>• Elaborated and continuous monitoring of the status of habitats and associated biodiversity through systematic monitoring of natural ecosystems used through traditional agriculture</li> </ul>



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Measure designation	Measure title	Activity designation and title
B-02	Establishment of a climate monitoring and early warning system for protected areas and ecological network of the Republic of Croatia and monitoring of protected wild habitat types and wild species	<p><b>B-02-01.</b> Establish a monitoring and early warning system for all protected areas and areas of the ecological network of the Republic of Croatia</p> <p><b>B-02-02.</b> Establish expert monitoring of natural habitat types and wild species for monitoring the impacts and consequences of climate change, in accordance with regulations on the protection of nature</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>For all protected areas and areas of ecological network, especially for those most endangered by climate change, it is necessary to install stationary measuring devices connected to the information network and thus establish a systematic monitoring of key microclimatic and ecological factors, establish an early warning system in case of significant changes and especially occurrence of climate extremes. Based on the established protocols, define the indicator climate factors in order to enable monitoring the impacts of climate change. For natural habitat types and wild species covered by a regulation governing nature protection, it is necessary to establish continuous professional monitoring. Measures should be implemented by the Ministry responsible for climate change in cooperation with DHMZ and Ministry responsible for nature</p>		<ul style="list-style-type: none"> <li>Improved and continuous monitoring of climate situation in protected areas and areas of ecological network and established information network for monitoring and analysis of climate factors in natural ecosystems.</li> <li>Established systematic monitoring of natural habitat types and wild species covered by a regulation governing nature protection.</li> <li>These established systems make up the basis for timely design and implementation of mitigation measures and adaptation to climate change</li> </ul>
B-03	Improvement of knowledge and creation of databases of natural ecosystems and biodiversity	<p><b>B-03-01.</b> Update the map of land-based non-forest and map of forest habitats of the Republic of Croatia</p> <p><b>B-03-02.</b> Update of habitat map with elements of vulnerability to climate change</p> <p><b>B-03-03.</b> Completion of inventory of flora and fauna and implementation of inventory of fungi</p> <p><b>B-03-04.</b> Cataloguing of invasive species particularly aggressive in the climate change process with repression and control measures and cataloguing of habitats, taxonomic groups and species particularly vulnerable to climate change</p> <p><b>B-03-05.</b> Updating the List of Speleological Objects of the Republic of Croatia</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>Implementation of research as a complement to current knowledge of natural ecosystems and their services as well as the impact of climate change on them and biodiversity creation of databases with the aim of quality preparation, elaboration and implementation of measures to mitigate and adapt to the negative effects of climate change. Measures should be implemented by the Ministry responsible for nature in cooperation with Croatian Environment Agency (HAOP), cooperating companies and associations: Croatian Forests company (Hrvatske šume d.o.o. - HŠ), speleological associations and certain experts.</p>		<ul style="list-style-type: none"> <li>A detailed habitat map of the Republic of Croatia. created</li> <li>Initiated collection of data and analysis for the purpose of updating the map of habitats with a detailed elaboration of the condition and vulnerability of the habitat created.</li> <li>An inventory list of all three kingdoms created - flora, fauna and mycobiota - including dominant macro-organisms.</li> <li>Created database of invasive species dangerous in case of climate change and the most sensitive habitats, taxonomic groups and species.</li> <li>A database with defined indicators of climatic factors of all protected areas and ecological network</li> </ul>



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Measure designation	Measure title	Activity designation and title
		<ul style="list-style-type: none"> <li>Updated List of Speleological Objects of the Republic of Croatia with microclimatic data</li> </ul>
B-04	Integrated management of freshwater resources for the conservation and revitalization of natural ecosystems and biodiversity	<p><b>B-04-01.</b> Ensure combined flood protection and protection from loss of biodiversity by restoring natural floodplains</p> <p><b>B-04-02.</b> Creation of retention basins for freshwater, wetland and hygrophilic ecosystems</p> <p><b>B-04-03.</b> Prevention of salinization of coastal sources and wetland habitats by building dams, embankments and by other measures</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>The greatest impact of climate change is expected by deterioration of natural freshwater ecosystems and of all other ecosystems consequently. It is therefore necessary to introduce integrated river and other freshwater resources management via restoring natural floodplains, creating retention basins for the most valuable aquatic and hygrophilous ecosystems and by preventing the salting of coastal water sources. Measures should be implemented by the Ministry responsible for water management and Croatian waters - a legal entity for water management, in cooperation with the Ministry responsible for water and regional government authorities.</p>		<p>Established natural floodplains, retention basins, technical barriers and other measures of integrated management of freshwater resources by maintained habitats and associated biodiversity of freshwater, wetland and hygrophilic ecosystems (e.g. Lonjsko polje, mires, Vransko jezero, Pantan, etc.). particularly vulnerable to climate change</p>

### 3.6.Energy

Measure designation	Measure title	Activity designation and title
E-01	Strengthening the resilience of production facilities through the storage of electrical energy	<p><b>E-01-01.</b> Conducting a vulnerability analysis of currently important production plants to adverse climate change impacts to define the most vulnerable ones and make a priority list</p> <p><b>E-01-02.</b> Analysis of the possibilities of the construction of energy storage facilities</p> <p><b>E-01-03.</b> Preparation of project documentation for construction of a test facility for energy storage</p> <p><b>E-01-04.</b> Construction of a test facility for energy storage</p> <p><b>E-01-05.</b> Development of a study on the possibilities of building small autonomous energy systems on islands and rural areas, based on the integration of wind energy, photovoltaic and battery power storage systems</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>In order to create preconditions for improving the resilience of existing production plants to the effects of climate change, we have to foresee building of energy storage facility with the aim of providing safe supply with a sufficient amount of energy, irrespective of extreme weather and climate</p>		<ul style="list-style-type: none"> <li>Preconditions created for implementing measures to increase the resilience of the existing power system (EES) to the effects of extreme and climate hazards and expected climate change.</li> <li>Preconditions created for implementing measures to increase the flexibility of the existing power system</li> </ul>



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Measure designation	Measure title	Activity designation and title
hazards and climate change.		<p>to the effects of expected climate change.</p> <ul style="list-style-type: none"> <li>• Preconditions for implementing measures to increase safe energy supply.</li> <li>• Additional benefit: greater integration of wind power plants and solar power plants into the system is enabled by the future implementation of measure.</li> </ul>
E-02	Strengthening the capacities and ensuring of an incentivizing legal framework to increase the capacity of renewable energy and distributed sources	<p><b>E-02-01.</b> Development of a map of the climate potential (positive and negative) of Croatian regions for the production of energy from alternative sources in different climatic scenarios</p> <p><b>E-02-02.</b> Development of a study of possibilities of development of diversified energy sources with emphasis on exploitation of alternative (renewable) energy sources in the territory of the Republic of Croatia</p> <p><b>E-02-03.</b> Development of a study on the possibilities of using renewable energy sources in rural areas such as agricultural micro-installations</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>In order to create preconditions for improving the resilience of existing power system to the effects of climate change, it is necessary to take account of diversification of sources and increase decentralized production, such as small hydro power plants, wind power plants, solar power plants, high-efficiency cogeneration using renewable fuels and the like, with the aim of providing safe supply with a sufficient amount of energy, irrespective of extreme weather and climate hazards and climate change. When designing and building new OIE capacities it is also necessary to bear in mind the possible negative impacts of climate change on OIE capacities.</p>		<p>Ensuring the incentive framework, i.e. the preconditions for building RES in line with the estimated effects of climate change, with the aim of diversification of sources and increasing decentralized production.</p>
E-03	Strengthening the resilience of current facilities for the production of electricity and thermal energy	<p><b>E-03-01.</b> Development of preliminary analysis on the vulnerability of existing thermal power plants related to the occurrence of extreme weather and climate hazards and reduced precipitation in order to define the most vulnerable power plants and create a list of priorities</p> <p><b>E-03-02.</b> Development of a detailed analysis of vulnerability for the most vulnerable thermal power plants with proposed measures which will involve technical and economic analysis</p> <p><b>E-03-03.</b> Development of preliminary analysis of the vulnerability of existing hydro power plants related to the occurrence of extreme weather and climate hazards and the reduction of rainfall in order to define the most vulnerable hydro power plants and to create a list of priorities</p> <p><b>E-03-04.</b> Development of detailed vulnerability analysis for the most vulnerable hydroelectric power plants with proposed of measures which will involve technical and economic analysis</p> <p><b>E-03-05.</b> Development of project documentation for the revitalisation of parts of settlements in urban areas connected to the central heating system (CHS) by</p>



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Measure designation	Measure title	Activity designation and title
		introducing a low-temperature regime to heating pipes, increasing cost-effectiveness of the CHS <b>E-03-06.</b> Revitalization of urban areas connected to the central heating system (CHS) through introducing a low-temperature regime in hot-water pipelines, thus increasing the profitability of CHS
MEASURE DESCRIPTION		EXPECTED RESULTS
Climate hazards include droughts, floods and generally all extreme weather conditions, such as the increase in river / seawater temperature used in the cooling system of thermal power plants. In order to create preconditions for improving the resilience of existing production capacities (thermal power plants, hydro power plants and thermal power plants –heating plants) to the effects of climate change, development plans should anticipate the reconstruction and revitalization of existing plants by strengthening their resilience and providing safe supply with a sufficient amount of energy, irrespective of extreme weather and climate hazards and climate change.		<ul style="list-style-type: none"> <li>Capacities strengthened for assessing the impact of climate hazards.</li> <li>Preconditions created for implementing measures to increase the resilience of the existing thermal power plants, hydro power plants and thermal power plants – heating plants to the effects of extreme and climate hazards and expected climate change</li> <li>Preconditions created for implementing measures to increase safe supply of electricity and heating (in CTS by providing cooling services) in the summer period where we expect increased energy consumption due to temperature rise</li> <li>Preconditions created for implementing measures for expansion of the system for the supply of heat energy through CTS in the winter period, where we expect a reduction in energy consumption due to temperature rise, thus influencing CTS profitability directly, which will result in an increase in the price of heat energy</li> <li>Additional benefit: the energy efficiency of hydro power plants, thermal power plants and central heating system (CTS) increases by the future implementation of measure, thus contributing to the reduction of greenhouse gas emissions and affects the mitigation of climate change</li> </ul>

### 3.7.Tourism

Measure designation	Measure title	Activity designation and title
T-01	Integration of climate change into the tourism development strategy	<b>T-01-01.</b> Definition of the impact of climate change on tourism <b>T-01-02.</b> Definition of guidelines for the development of Croatian tourism in accordance with adaptation to climate change <b>T-01-03.</b> Development of plans for protection of tourism infrastructure against the impacts of climate change and weather extremes <b>T-01-04.</b> Development of plans for the construction of future tourism infrastructure, more resilient to weather extremes <b>T-01-05.</b> Continuous monitoring of the state of tourism infrastructure
MEASURE DESCRIPTION		EXPECTED RESULTS
This measure encompasses the elaboration of the overall problem of adapting the tourism sector to		Guidelines accepted for the development of Croatian tourism and plans for protecting / building tourist



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Measure designation	Measure title	Activity designation and title
	climate change. In the first place, it is necessary to make an assessment of the impacts of climate change on specific geographic areas and their effect on the segments of tourist offer. Subsequently, specific guidelines for tourism development under new conditions are elaborated in accordance with the concept of adaptation. Since tourism depends in part on the available tourist infrastructure, it is necessary to make plans to protect the existing tourist infrastructure and to build a new custom infrastructure which will withstand the future unfavourable climatic conditions. It is necessary to monitor continuously all of this, that is, to track in order to avoid possible negative impacts.	infrastructure. So defined guidelines and plans for the development of Croatian tourism adapted to climate change are result of this measure.
T-02	Raising awareness of persons involved in the tourism sector on the possibilities of adaptation to climate change	<b>T-02-01.</b> Organisation of workshops for interested tourism professionals in order to learn about specific climate risks, their likelihood of occurrence, and adaptation options <b>T-02-02.</b> Printing of promotional materials and other advertising activities to spread awareness of the necessity for adaptation – directed towards tourism subjects
MEASURE DESCRIPTION		EXPECTED RESULTS
One of preconditions for successful implementation of adaptation to climate change in tourism is raising awareness in people involved in the tourism sector. This can be achieved by organizing workshops and printing promotional brochures for those people who will not be able to participate in education.		Easier and more successful implementation of the adaptation measures in the tourism sector.
T-03	Strengthening the competencies of high school and university students	<b>T-03-01.</b> Education of teaching personnel on climate change and adaptation measures in the tourism sector <b>T-03-02.</b> Climate change and adaptation in the tourism sector - basic or elective subject / course in secondary schools and colleges geared towards tourism
MEASURE DESCRIPTION		EXPECTED RESULTS
One of preconditions for successful implementation of adaptation to climate change is increasing competencies and general knowledge of the topic. First, it is necessary to train a large number of people (experts/scientists) to deal with this issue. After that it is necessary to draw up syllabuses and introduce them into the curriculum.		A more successful drafting and implementing adaptation measures of the tourism sector. Likewise, the result is an increased level of knowledge and quantity of research (in terms of number and quality of scientific projects) on the possibilities of adapting the tourist sector to climate change.
T-04	Strengthening the resilience of tourism infrastructure to different weather extremes	<b>T-04-01.</b> Development of specific destination offers adapted to climatic and spatial characteristics <b>T-04-02.</b> Construction of public tourism infrastructure adapted to climate change
MEASURE DESCRIPTION		EXPECTED RESULTS
Starting from drafted guidelines and plans for the development of tourist infrastructure adapted to climate conditions (T-01), it is necessary to develop concrete forms of tourism products by defined geographical areas. It is also necessary to invest certain funds in the construction of a tourist and green infrastructure which will enable the development of those products.		Expected results of this measure will be presented in a customized tourist offer and tourism infrastructure that will be able to respond to changed climate conditions. Such adapted tourist offer and infrastructure will enable increased tourist effects and greater competitiveness of Croatian tourism.



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### 3.8. Health

Measure designation	Measure title	Activity designation and title
ZD-01	Establishment of a system for calculating health-economic indicators for climate change-related conditions	<p><b>ZD-01-01.</b> Development of a calculation system of health-economic indicators by selecting priority diagnoses according to the International Classification of Diseases and Related Health Problems that can be linked to the impact of meteorological or climatic parameters</p> <p><b>ZD-01-02.</b> Establishment of network of persons conducting health and economic analyses</p> <p><b>ZD-01-03.</b> Establishment of an automated calculation within the central information healthcare system / health-ecological / public health subsystem</p> <p><b>ZD-01-04.</b> Establishment of a networked database and authorized stakeholders in the evaluation and monitoring of health and economic indicators related to climate change</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
Identifying and monitoring connection between health conditions and environmental impacts associated with climate change. Establishing a system based on the calculation of health and economic indicators within an integrated information system for the purpose of prioritization and more efficient management		<ul style="list-style-type: none"> <li>• Diseases and health conditions associated with climate change defined.</li> <li>• Established stakeholders and monitoring of indicators such as disability-adjusted life year (DALY), quality-adjusted life year (QALY) and years of life lost (YLL) etc. in health information system for diseases associated with climate change.</li> <li>• Established more efficient healthcare load assessment system due to the impact of climate change.</li> </ul>
ZD-02	Integration of various information systems within healthcare to monitor indicators associated with climate change	<p><b>ZD-02-01.</b> Defining and positioning of key stakeholders within the central health IT system of health institutes, primary health care system, hospital system, emergency reception system, veterinary supervision system and others</p> <p><b>ZD-02-02.</b> Expansion of knowledge base through scientific and expert definition of health indicators associated with climate change</p> <p><b>ZD-02-03.</b> Creation of a network of meteorological information systems and air quality monitoring system with preventive, hospital, and primary health care systems</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
Connecting primary, secondary and tertiary health care systems, including hospital system, emergency room systems and the Public Health Institute through an integrated information system for the purpose of monitoring health indicators for the conditions related to effects and consequences of climate change.		<ul style="list-style-type: none"> <li>• Strengthened health system capacities for assessing meteorological and climate impacts on the health of general population.</li> <li>• Strengthened health system capacities for assessing meteorological and climate impacts on the health of specific population risk subgroups.</li> <li>• Increased resilience to the influence of climate factors as a result of adapting preventive health programmes and interventions based on an integrated knowledge base.</li> <li>• Increased response capacity level of preventive and</li> </ul>



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Measure designation	Measure title	Activity designation and title
		curative (therapeutic) part of the health system.
ZD-03	Establishment of a framework for the implementation of human biomonitoring for tracking environmental factors related to climate change	<b>ZD-03-01.</b> Selection of authorized stakeholders for human biomonitoring <b>ZD-03-02.</b> Collection of epidemiological / descriptive population data and analysing environmental factors related to climate change amongst people <b>ZD-03-03.</b> Publication of research findings and creation of a national knowledge base
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>Strengthening the capacity of key existing public health laboratories toward human bio-monitoring, with the aim of integrating epidemiological data with the results of analysis in environmental and human samples (hair, serum, urine, etc.).</p> <p>Strengthening capacity to assess human exposure to and load by environmental factors associated with climate change.</p> <p>The purpose of the measure is to expand the capacity of institutions with the existing (human, analytical, spatial) base for scientific approach by increasing knowledge base and bio-indicators related to the impact of climate change on health.</p>		<ul style="list-style-type: none"> <li>Increased level of effective health assessment of risk against physical, biological and chemical factors from the environment possibly harmful to human health, which may be associated with climate change.</li> <li>Established infrastructure for the strategic implementation of human bio-monitoring research.</li> <li>Established more effective system for selecting health policies and preventive campaigns and interventions.</li> <li>An increase in the number of papers from Croatia published in relevant international journals.</li> </ul>

### 3.9.Spatial planning and management of the coastal area

Measure designation	Measure title	Activity designation and title
PP-01	Strengthening of the knowledge base, as well as the monitoring and evaluation system	<b>PP-01-01.</b> Implementation of targeted research on the impact of sea level rise on the most vulnerable parts of the coast as a basis for the preparation of priority intervention plans <b>PP-01-02.</b> Implementation of an integrated multi-disciplinary assessment of the vulnerability of coastal areas to extreme sea levels, including social and economic aspects as well as cost estimates and the benefits of adaptation options <b>PP-01-03.</b> Implementation of targeted research on climate change impacts related to spatial planning decisions in the function of tourism development <b>PP-01-04.</b> Implementation of an assessment of vulnerability to the occurrence of thermal islands and extreme precipitation in settlements, with emphasis on connection with spatial planning solutions <b>PP-01-05.</b> Ensuring availability of research results through current information systems of spatial planning, protection of the environment and waters or Open Data Portal i.e. Geoportal of National Spatial Data Infrastructure
MEASURE DESCRIPTION		EXPECTED RESULTS
The task of this measure is to intensify monitoring, research and assessment of climate change pressures, their impact on the coast, the built		The first result of this measure is to provide an incentive environment for conducting targeted monitoring and research activities with the purpose of strengthening the



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Measure designation	Measure title	Activity designation and title
	environment and infrastructure. The research will include integral analysis of vulnerability and possible adaptation measures, especially those that have to be planned by spatial plans. Priority areas of research are related to the impact of extreme sea levels, the impact of thermal waves, i.e. thermal islands in settlements and the impact of extreme precipitation in settlements. The general theme of these research and monitoring programmes is to identify and eliminate barriers within the spatial planning and environment system, which hamper planning and implementing adaptation measures that are part of the spatial plans.	knowledge base. Implementing activities from this measure will enable a better understanding of climate processes and scenarios as well as their impacts that will be the basis for making decisions related to adaptation measures, especially those that are part of spatial planning and those involving significant investment activities. As a result of this measure, it will be easier to remove barriers within the spatial planning system and in the environment, which hamper planning and implementing adaptation measures. Finally, this measure will contribute to strengthening of the adaptive capacity of society to climate change through well-thought-out and practicable adaptation measures in spatial plans, especially those related to the planning of built environment of settlements and tourist areas as resilient to climate as possible, as well as planning of spatial development of the narrow coastal area.
PP-02	Strengthening human and institutional capacities of professional stakeholders in the spatial planning system	<b>PP-02-01.</b> Strengthening of continuing professional training program for spatial planners concerning the application of climate change adaptation measures
MEASURE DESCRIPTION		EXPECTED RESULTS
This measure will ensure the strengthening of the capacity of institutions and stakeholders in the spatial planning system, primarily spatial planners, who are expected to contribute directly or indirectly (education, vocational training, regulation, monitoring and evaluation) to the development of spatial plans where they will use all available knowledge regarding climatic vulnerability of different regions of Croatia, especially coastal area, as well as adequate adaptation measures. The measure also includes a targeted improvement of capacity for implementing SPUO procedure for spatial plans related to climate vulnerability analysis and implementation of adaptation measures.		The first result of this measure is the development and implementation of educational programmes as well as programmes of permanent professional training related to implementing measures of adaptation to climate change in spatial planning. Implementation of these programmes, permanent professional training in particular, will lead to an increase in the number of specialists in the spatial planning system with adequate knowledge of planning measures of adaptation in spatial plans and managing the system towards encouraging the application of these measures. Professional capacities for implementing SPUO procedure for spatial plans will also be strengthened.
PP-03	Integration of adaptation measures into the spatial planning system	<b>PP-03-01.</b> Amendments to the legal framework to develop adaptation measures to climate change in spatial planning <b>PP-03-02.</b> Development and strengthening of Integrated Spatial Planning Methodology and Strategic Environmental Impact Assessment with emphasis on applying climate change adaptation measures <b>PP-03-03.</b> Development of the programme and guidelines for strengthening inter-sectoral coordination in the spatial planning procedure, with emphasis on the planning of climate change adaptation measures <b>PP-03-04.</b> Analysis and elaboration of methods of monitoring and evaluating the efficiency and effectiveness of spatial plans in the implementation of climate change adaptation measures
MEASURE DESCRIPTION		EXPECTED RESULTS
The task of this measure is to provide conditions for integrating and implementing necessary spatial		The first result is an amended legal framework of the spatial planning system which prescribes or encourages



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Measure designation	Measure title	Activity designation and title
	planning measures of adaptation in spatial plans and strategic documents of spatial planning. Activities within this measure include amending the legal framework of the spatial planning system, improving spatial planning methodology related to using measures of adaptation, better and more rational integration with SPUO procedure, strengthening cross-sectoral coordination regarding planning measures of adaptation and elaborating and applying methods of monitoring and evaluating the efficiency and effectiveness of spatial plans in implementing measures of adaptation to climate change. These activities will directly enable and ensure that new generations of spatial planners plan measures of adaptation to climate change more fully and more reasonably.	the planning and use of measures of adaptation to climate change in spatial plans. Practical methodological steps of vulnerability analysis and appropriate applying of measures of adaptation will be developed and will be better integrated with SPUO procedures, enabling their rationalization. The role of spatial planning as the most responsible resource for ensuring quality coordination and partnership between sectors in spatial development planning, including measures of adaptation planning, will be strengthened. This measure, along with the important contribution of other measures, will directly enable better and more viable spatial plans in the segment related to planning measures of adaptation to climate change.
PP-04	Raising awareness of the public and decision-makers at all levels	<b>PP-04-01.</b> Design and implementation of public information and education programmes focusing on targeted groups in vulnerable areas <b>PP-04-02.</b> Design and implementation information programmes for decision-makers at all levels of government <b>PP-04-03.</b> Raising awareness of social responsibility in the banking and insurance sector regarding climate change
MEASURE DESCRIPTION		EXPECTED RESULTS
The primary task of this measure is raising awareness of the inevitability of climate change and the negative impact they will bring. This measure involves providing durable funding sources for the realization of various targeted programmes and forms of information for the wider public as well as for all those involved in making decisions on planning and implementing measures of adaptation, from national to local level (JLS), including economic entities exposed to the impact of climate change. Within this measure, efforts will be made to raise awareness of the social responsibility of banking and insurance sector regarding climate change.		The first result is a better general understanding of the problem of climate change in the general public, as well as a factor influencing most decision-makers which will be further reinforced by the inevitable media presence of this problem related to frequent extreme weather conditions. At the same time, we expect a targeted awareness-raising on exposure to climate impacts and on possible measures of adaptation for all those living in vulnerable areas, and whose health, property and other resources may be endangered. From the point of practical strengthening of the adaptive capacities of society, it is particularly important to strengthen understanding of climate change and awareness of their inevitability in decision-makers at all levels. Finally, the result of this measure will be a more active role of banking and insurance sector in stimulating avoiding or minimizing climate risks.



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### 3.10. Risk management

Measure designation	Measure title	Activity designation and title
UR-01	Mapping of water sources outside the public water supply system	<p><b>UR-01-01.</b> Mapping of water sources outside the public water supply system (private wells, spring-water intakes, etc.)</p> <p><b>UR-01-02.</b> Water testing and initial health risk assessment and application in the mapped water sources outside the public water supply system</p> <p><b>UR-01-03.</b> Comprehensive assessment of health risk and application based on results of field inspections, documentation, and laboratory analysis</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>Mapping water sources which are out of control and outside the public water supply system.</p> <p>Purposeful evaluation and increase in source exploitation based on initial and comprehensive additional risk assessment in the event of hydro-meteorological influences such as flood, forest fires, drought, etc.</p> <p>The measure's contribution to the adaptation process is expected to result in more effective management during disasters, major accidents, extraordinary events or incident / crisis situations in case regularly available water resources for human consumption and other purposes are exploited.</p>		<ul style="list-style-type: none"> <li>• Increase in the level of exploitation and use of sources outside the public water supply system in the event of disasters, major accidents, extraordinary events or incident / crisis situations.</li> <li>• Increased community resilience in the event of insufficient water resources for human consumption and other types of water.</li> </ul>
UR-02	Multi-sectoral risk assessment for various threat / risk scenarios associated with climate change	<p><b>UR-02-01.</b> Expansion of relevant working groups and persons responsible for certain types of threats / risks related to climate change</p> <p><b>UR-02-02.</b> Development of algorithms and action guidelines for handling various scenarios at all levels</p> <p><b>UR-02-03.</b> Amendments to the legislative framework related to decentralisation and centralisation of management functions depending on the type of threat / risk</p> <p><b>UR-02-04.</b> Linking of information systems of key stakeholders</p> <p><b>UR-02-05.</b> Connection of civil, security, and defence services in interventions</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>Establishing multi-sectoral risk assessment task force in the event of various threats / risks related to climate change will raise response level.</p> <p>The measure's contribution to the adaptation process is expected to result in more effective management on the basis of institutionally coordinated actions.</p>		<ul style="list-style-type: none"> <li>• Formed responsible bodies for individual threats / risks related to climate change</li> <li>• Appointed key stakeholders and responsible persons by type of event.</li> <li>• Available algorithms of action by type of event.</li> <li>• Established national guidelines by type of event.</li> <li>• Decentralized and more effective crisis management.</li> <li>• Connected information systems.</li> </ul>
UR-03	Expansion of the <i>Croatian Platform for Disaster Risk Reduction</i> to include climate change-related indicators for the development of an early warning system	<p><b>UR-03-01.</b> Establishment of an integrated database on climate-change related threats / risks and strengthening the role of the Croatian Platform for Disaster Risk Reduction</p> <p><b>UR-03-02.</b> Development of an integrated database and training platform for key stakeholders</p>



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Measure designation	Measure title	Activity designation and title
		<b>UR-03-03.</b> Integration of the results of health and environmental databases and state databases: number of bush fires and forest fires, flood areas or sea level rise areas, condition of crops or of the soil characteristics etc., at the site of disasters or emergency incidents
<b>MEASURE DESCRIPTION</b>		<b>EXPECTED RESULTS</b>
<p>Integrating the results of all measurements of possibly adverse factors in the environment (water, food, air and soil) associated with climate change along with multidisciplinary monitoring enables a more accurate assessment of the scope of consequences.</p> <p>Platform containing results of all measurements available to authorized stakeholders and the public with different levels of authority for monitoring and acting is crucial for raising the level of community response and resilience.</p> <p>The importance of the measure is to strengthen the capacity of a rapid, professionally based and predefined response to various hydro-meteorological threats.</p>		<ul style="list-style-type: none"> <li>Strengthened capacities for assessing the impact of hydro-meteorological threats on the consequent increase in the environment of physical, biological and chemical factors potentially harmful for human health.</li> <li>Strengthened capacities for responding in the event of the impact of hydro-meteorological threats to an increased level of contaminants in the environment and an increased level of impact on the health of the general population and the risk subgroups.</li> </ul>

### 3.11. Supra-sectoral measures

Measure designation	Measure title	Activity designation and title
KM-01	Strengthening human and technical capacities for implementing research and applied activities in the area of climate modelling, analysis, and interpretation of observed and expected climatic changes	<p><b>KM-01-01.</b> Involvement of new human capacities in the development of climate models on spatial resolutions 1 – 4 km and drafting climatic scenarios for the wider area of Croatia</p> <p><b>KM-01-02.</b> Involvement of new human capacities in the development of combined climate models (atmosphere-ocean-soil) and drafting climatic scenarios for the Adriatic and Mediterranean area</p> <p><b>KM-01-03.</b> Support to the development of applied sector models and capacity-building for the use of these models</p>
<b>MEASURE DESCRIPTION</b>		<b>EXPECTED RESULTS</b>
<p>It will be provided through higher (university) education, professional and scientific training and practical (operational) work of an adequate number of employees, by strengthening the professional capacity of institutions whose activities are related to monitoring and analysis of climate and climate change and by implementing climate modelling. It also enables professional and scientific sectoral institutions to develop human and technical capacity for applied sector modelling. An important component of capacity building is training in related foreign institutions reputed as centres of excellence in climate modelling. In this way, available knowledge and experience in improving available climate models, generating and interpreting the scenarios for future climate change for the Republic</p>		<p>The immediate result of this measure is the inclusion of new highly educated experts in working with existing regional high-resolution climatic models and reaching satisfactory technical capacities in order to implement basic climate modelling and applied sector modelling. A step further is training new experts on the development of climatic scenarios of regional scales and the analysis and interpretation of the results of climate models with an emphasis on sectoral needs of the Croatian economy. The next phase is working on combined ocean and atmospheric models focusing on climate change analysis in the Mediterranean and Adriatic. This activity is highly demanding and would go beyond timeframe of the action plan. Also, within certain sectors, the development and expansion of applied sectoral</p>



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Measure designation	Measure title	Activity designation and title
	of Croatia would be used and applied.	models would be developed, enabling better adaptation of individual segments of the climate change sector
RP-01	Development of impact indicators of the implementation of the adaptation strategy for vulnerable sectors and society	<p><b>RP-01-01.</b> Preparation of a project task that includes the identification of potential sources of data necessary for the calculation of adaption indicators and the involvement of the required organizations in the implementation of activities. In addition to adaptation indicators recommended by the Adaptation Strategy in line with new findings, identification of the need for developing additional adaptation indicators</p> <p><b>RP-01-02.</b> A detailed elaboration of all adaptation indicators including indicator definition, the methodology of indicator production, the corresponding sub-indicators, connection to other indicators, data sources, frequency of data collection, the institution (s) responsible for indicator production and reporting as well as reporting frequency and schedule.</p>
MEASURE DESCRIPTION		EXPECTED RESULTS
<p>The manner of indicator production by means of indicator definition, the corresponding sub-indicators and related indicators, methodology of indicator production, the manner of displaying the indicator, indicator measurement unit, the institutions responsible for indicator production and reporting as well as reporting frequency is elaborated in detail for each of the indicators of effects of implementation of the Adaptation Strategy in vulnerable sectors and society.</p>		<p>A permanent system of monitoring and reporting on the status of adaptation indicators has been established, enabling decision-makers (the Government of the Republic of Croatia, the Parliament) and organizations involved in the process of adaptation to climate change to assess the effectiveness of their programmes and ensure that adaptation reaches desired goals, such as reducing vulnerability to climate change. From the financial point of view, evaluating the adaptation program will help justify the finances spent on adaptation measures and get maximum value for invested funds.</p>



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### **4. DEVELOPMENT OF TOP PRIORITY MEASURES AND THEIR ACTIVITIES IN VULNERABLE SECTORS AND CROSS-SECTORAL AREAS - ACTION PLAN 2019 – 2023**

#### **4.1. Action plan activities description**

Activities are described and elaborated in tables below which would have to be conducted in the upcoming years in order to implement the Action Plan. The measures have been selected based on comprehensive discussions with experts and stakeholders within each sector and based on a professional analysis of the current state of affairs and future needs. A detailed description of the activities below includes the following information:

- activity description / implementation method
- implementation period – in some cases the activities continue for an indefinite period of time and after the end of the five-year period
- the responsible authority and associates in implementing the measure / activity
- an estimate of the total cost over a five year period by years of implementation
- possible sources of funding
- indicators of implementation (indicators) that can be used to assess the success of the implementation of the activity.

Each activity description contains a priority designation within the Adaptation Strategy as follows:

P1 – Providing a sustainable regional and urban development

P2 – Providing preconditions for economic development of rural areas, coastal areas and islands

P3 – Providing sustainable energy development

P4 – Strengthening of management capacity through networked monitoring and early warning system

P5 – Providing continuity of research activities.

In addition, each activity is categorized according to the type of measure and activity of adaptation to climate change as follows:

RE – Regulatory and administrative measures / activities

PR – Implementing measures / activities

ED – Measures / activities of educating and raising public awareness

IR – Research and development measures / activities.



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### 4.2. Hydrology, water and sea resources management

4.2.1. HM-01 - Strengthening the capacity for the implementation of non-structural measures for protection against the harmful effects of water in the occurrence of extreme hydrological opportunities whose increase in intensity and frequency of occurrence is conditioned by climate change

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
<b>HM-01-01.</b> Development of models for the prediction of extreme precipitation in the broader catchment areas and their local occurrence	P5	Analysis of precipitation regime and better forecast of future precipitation scenarios which generate extreme hydrological situations.	2019 – 2021	DHMZ  Faculties and other scientific and research institutions	4.5	1.5	1.5	1.5	0	0	The number of catchment areas for which the models of occurrence of extreme precipitation have been realized
	IR				National and EU funds, HV						
<b>HM-01-02.</b> Development of models of large water simulation in the wider catchment areas and small torrential streams	P5	Analysis of flow regime on larger and smaller catchment areas, especially from the aspect of new (future) climatic scenarios, flow conditions, etc.	2020 – 2022	HV  DHMZ, faculties and other scientific and research institutions	4.5	0	1.5	1.5	1.5	0	The number of catchment areas for which the models of occurrence of extremely high water have been realized
	IR				HV, national and EU funds						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
<b>HM-01-03.</b> Preparation of a forecast study on flood propagation, determination of flood zones and risks and opportunities for the provision of natural flood retention areas and their inclusion in spatial planning documentation	P5	Establishing flood zones and risks and possibilities of providing natural flood retention areas in catchment areas and their inclusion in spatial planning documentation for protection against adverse effects of water.	2020 –2022	HV	4.5	0	1.5	1.5	1.5	0	The number of catchment areas for which the studies of establishing flood zones have been realized and their inclusion in spatial planning documentation implemented
	IR,PR				HV, national and EU funds						
<b>HM-01-04.</b> Drafting of revisions to existing protection projects against the harmful effects of water and high sea levels	P1	Revision of existing project documentation and implemented technical solutions to new and evaluated future climate and hydrological conditions along with prioritizing the areas where the risks of possible adverse consequences of	2020 – 2022	HV	6.0	0	2.0	2.0	2.0	0	A number of revised existing projects of protection against adverse effects of water
	PR				HV, national and EU funds						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
		climate change have increased.									



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### 4.2.2. HM-02 - Strengthening the capacity to build, reconstruct and upgrade the system for protection against harmful effects of water and related multi-purpose hydro-technical systems (structural measures) and lowland natural floodplains flooded in a controlled fashion

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
<b>HM-02-01.</b> Preparation of project documentation for the construction and upgrading of existing accumulation and retention systems within multifunctional hydro-technical systems	P2, P3	Designing new or increasing the volume of existing accumulation with a view to obtaining larger water reserves for various purposes (protection against flood, water supply, irrigation, hydropower, protection of aquatic ecosystems of downstream areas). Designing new or reconstructing existing retention basins for the reduction of peak flow.	2019 – 2022	HV, HEP Program Sava d.o.o.	24.0	5.0	7.0	7.0	5.0	0	Number of new accumulation projects
	PR				HV National and EU funds						Number of existing accumulation reconstruction projects Number of new retention basins projects Number of existing retention basins reconstruction projects



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
<b>HM-02-02.</b> Construction of new and upgrading of existing accumulation and retention systems within multifunctional hydro-technical systems	P2, P3	By building new accumulation systems and / or extending existing ones, water reserves will be obtained for different uses, that is for „covering“ future needs for drinking water as well as water for other public needs (providing an environmentally friendly flow, providing natural self-purification processes in watercourses.	2021 – 2023	HV, HEP, Program Sava d.o.o.	600.0	0	0	100.0	200.0	300.0	Number of new accumulation systems built
	PR	By building new retention basins and / or extending existing ones, the level of protection against high waters in the downstream part of the catchment area increases.			HV, HEP, national and EU funds						Number of existing accumulation systems reconstructed or extended  Number of new retention basins built  Number of existing retention basins reconstructed



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
<b>HM-02-03.</b> Preparation of project documentation for the construction, reconstruction and upgrade of protective embankments, dikes and similar facilities and multipurpose systems for protection from harmful effects of water	P2	Designing new or extending existing embankments with the aim of raising the level of protection against flood, especially due to the expected increase in high water.	2020 – 2022	HV	4.5	0	1.5	1.5	1.5	0	Number of new embankment projects  Number of existing embankment reconstruction projects
	PR				HV, national and EU funds						
<b>HM-02-04.</b> Construction, reconstruction and extension of protective embankments, dikes and similar multifunctional facilities related to the protection against harmful effects of water	P2	By building new or extending (reconstructing) existing embankments, the level of protection against floods at the catchment area is achieved.	2020 – 2022	HV	80.0	0	20.0	30.0	30.0	0	Number of new embankment built  Number of existing embankments reconstructed
	PR				HV, national and EU funds						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
<b>HM-02-05.</b> Development of “green infrastructure” - arrangement of watercourse sections with natural flow characteristics or according to eco-remediation principles of river restoration and provision of natural lowland areas for controlled flooding and retention / reduction of large water - measures of “flood adaptation”	P1	Maintaining watercourse sections with natural flow characteristics or regulating by eco-remediation principles watercourse sections with natural flow characteristics or eco-remediation principles“.	2020 – 2023	HV Program Sava d.o.o.	16.0	0	3.0	3.0	5.0	5.0	Number of watercourse regulation projects  Number of controlled flood area projects
	PR				HV, national and EU funds						



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### 4.2.3. HM-03 - Strengthening research and management capacities for assessing the occurrence and risk of adverse impacts of climate change and adaptation of freshwater and marine water systems in existing and future climate conditions

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
<b>HM-03-01.</b> Provision of education for specifically chosen target groups both in the form of thematic workshops for experts and interested members of the public as well as thematic units within the regular curricula of the primary, secondary and university education populations	P1	Education of experts in water management, students of hydro-technical, hydrogeological, geographic, oceanological, geodetic and similar profiles, secondary and primary schools pupils involved in various additional classes related to environmental awareness with the aim of pointing to climate change and expected impacts on environment, economy and the like.	2019 – 2023	Ministry responsible for water  HV  Education and Teacher Training Agency, Universities	1.0	0.2	0.2	0.2	0.2	0.2	Number of workshops held
	ED				European Social Fund (ESF), national and EU funds						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
<b>HM-03-02.</b> Support of research on the possible scenarios of climate change at the national and regional level (for research and management institutions), with the aim of identifying the impacts of climate change, analysing their impact on water and sea resources, and reversing and influencing these changes in the environment, urban areas, infrastructure, protected areas and human activity to a greater extent related to water	P5	Strengthening the capacity of national and regional institutions in order to initiate and coordinate all research, managing, planning and other processes, to make adaptation at the national level as successful as possible. Active operational work on research projects related to assessments of climate change impacts on water and sea resources. Research projects would be conducted on the basis of a tender by the responsible Ministry and	2019 – 2023	Ministry responsible for science  HV	25.0	5.0	5.0	5.0	5.0	5.0	Number of trained government or regional officials involved in the monitoring of research projects and their results  Number of researchers from research institutions actively involved in research projects  Number of realized research projects
	IR				European Regional Development Fund(EFRR), national and EU funds						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
(water supply, agriculture, hydropower, etc.)		would involve including a larger number of educated younger experts and scientists in such projects, capable of providing quantified estimates of possible changes and impacts.									
<b>HM-03-03.</b> Improvement of monitoring system of quantitative status and quality of inland water and the condition of the Adriatic Sea and the public availability of their results (measurement, information)	P4	Extending systematic monitoring of quantitative status and quality of inland water and the condition of the Adriatic Sea as a basic platform for assessing the impacts of climate change by providing additional resources from responsible institutions to	2019. – 2023.	HV, Institute of Oceanography and Fisheries, Croatian Hydrographic Institute, Ruđer Bošković Institute, HZJZ and County Institutes for Health Protection	25.0	5.0	5.0	5.0	5.0	5.0	Number of additional field research and monitoring programmes
	PR				EFRR, national and EU funds						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible sources of funding	2019	2020	2021	2022	2023	
		this purpose.									
<b>HM-03-04.</b> Development of international cooperation in the implementation of monitoring of the state of the inter-state watercourses and the Adriatic Sea with the aim of sustainable management and protection	P5	Expanding and intensifying international cooperation, both within the framework of existing institutional frameworks (Sava Commission, bilateral cooperation with the surrounding countries), and within the framework of future European projects. The basic aspects of improving such cooperation would be related to holding joint workshops and network platforms displaying results obtained.	2019. – 2023.	HV, Institute of Oceanography and Fisheries, Croatian Hydrographic Institute, Ruđer Bošković Institute, HZJZ and County Institutes for Health Protection	15.0	3.0	3.0	3.0	3.0	3.0	Number of transnational workshops / meetings / round tables etc.  Number of joint research, projects, etc.
	IR				EFRR, national and EU funds						



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### 4.3.Agriculture

#### 4.3.1. P-01 – Implementation of the Pilot Climate Change Adaptation Programme in agriculture

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>P-01-01.</b> Preparation for the implementation of a climate change adaptation research programme in agriculture	P5	Definition of objectives, activities and expected results of the Pilot Climate Change Adaptation Programme in agriculture.  Preparation tender documentation.  Announcement of a call for proposals.  Selection of the best bidder.  Contracting project implementer.	2019	Ministry responsible for agriculture  Ministry responsible for science and education  Croatian Science Foundation	0.1	0.1	0	0	0	0	Announced call for proposals for project implementation.  Selected and contracted project implementer.
	RE				Ministry responsible for agriculture  Ministry responsible for science and education  Croatian Science Foundation  Environmental Protection and Energy Efficiency Fund (EPEEF)  Horizon 2020 (EU Fund)  ERDF: Operational Programme Competitiveness and Cohesion						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
					2014 – 2020						
<b>P-01-02.</b> Implementation of the research programme on adaptation to climate change in agriculture	P5	Although programme activities will be elaborated on in detail during the preparation phase, it is recommended that the programme consist of two basic components – theory and practice:  - Design and testing of one or more simulation model(s) for predicting climate change impacts on agriculture  - Implementation of “field tests” for scientific testing and monitoring of the effectiveness of individual	2020 – 2023	Universities  Scientific research institutes  Private sector	5.0	0.0	2.0	1.0	1.0	1.0	Functional simulation model for predicting climate change impacts on agriculture.  Key climate change adaptation measures in agriculture scientifically tested in practice.
	IR				Ministry responsible for agriculture  Ministry responsible for science and education  Croatian Science Foundation  EPEEF  Horizon 2020 (EU Fund)  ERDF: Operational Programme Competitiveness and Cohesion 2014 – 2020						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		climate change adaptation measures in agriculture (e.g. implementation of different crop rotations and fertilisation regime; testing different methods of soil treatment, irrigation, anti-erosion measures, agrotechnical equipment for the protection from hailstorm and frost, testing carbon storage in soil by different methods of growing grass-clover mixtures and other agricultural crops, etc.). "Field tests" are mandatory for testing the results of the three adaptation									



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		measures, the implementation of which is proposed below:  - P-02 – Increasing the water absorption capacity of agricultural soil  - P-03 – Application of soil conservation tillage  - P-04 – Breeding of species and cultivars of agricultural crops and breeds of domestic animals that are more resilient to climate change									
<b>P-01-03.</b> Transfer and	P5	The implementation	2022 – 2023	Universities	4.0	0	0	0	1.5	2.5	Research results published in at



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
promoting the achievements of the climate change adaptation research programme in agriculture	ED	<p>of the Pilot Climate Change Adaptation Programme in agriculture should be scientifically documented and the results promoted among scientists, agricultural advisors and farmers. This can be achieved by the following activities:</p> <ul style="list-style-type: none"> <li>- Publish the research results in scientific research journals, books, etc.</li> <li>- Publish the research results in popular text-books for farmers, popular journals, etc.</li> <li>- Design posters, videos and other</li> </ul>		<p>Scientific research institutes</p> <p>Private sector</p> <p>Croatian Advisory Service</p>	<p>Ministry responsible for agriculture</p> <p>Ministry responsible for science and education</p> <p>Croatian Science Foundation</p> <p>EPEEF</p> <p>Horizon 2020 (EU Fund)</p> <p>ERDF: Operational Programme Competitiveness and Cohesion 2014–2020</p>						<p>least 10 scientific papers (in at least 7 scientific journals or books).</p> <p>At least 5 popular text-books printed in the total printing run of 5000 copies.</p> <p>At least 5 videos filmed and at least 5 posters printed in the total printing run of 5000 copies.</p> <p>Participation of at least 100 advisors and 1000 farmers in the educational programme</p>



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		promotional materials.  - Implement a promotional and educational programme presenting the experiences and results of the simulation model and “field tests” to advisors and farmers.									



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### 4.3.2. P-02 – Increasing the water absorption capacity of agricultural soil

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>P-02-01.</b> Development of an operation for increasing the absorption capacity of agricultural soil and inclusion in the Rural Development Program of the Republic of Croatia for the Period 2014 - 2020	P2	Definition of agrotechnological interventions of the operation to increase the absorption capacity of agricultural soil for water (e.g. by increasing the humus content in soil by growing grass-clover mixtures or long-lasting legumes; by regular use of manure and green fertilisation, etc.)	2019.	Ministry responsible for agriculture  in co-operation with  Faculty of Agriculture in Zagreb  Faculty of Agriculture in Osijek  Agricultural scientific research institutes	0.1	0.1	0	0	0	0	The operation of increasing the absorption capacity of agricultural soil for water included in Measure 10 (M10): Agriculture, environment and climate changes in the Rural Development Programme of the Republic of Croatia for the Period 2014 - 2020
	RE										
		Definition of the implementation method, grant amounts, eligible beneficiaries and other administrative procedures for the implementation of the operation.									
		Inclusion of the operation of									



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		increasing the absorption capacity of agricultural soil for water in Measure 10 (M10): Agriculture, environment and climate changes in the Rural Development Programme of the Republic of Croatia for the Period 2014 – 2020									
<b>P-02-02.</b> Design and implementation	P2	Design of posters, videos and other promotional	2020 – 2023	Consulting firms  Environmental	4.0	0	1.0	1.0	1.0	1.0	A promotional video filmed and



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
of a promotional and educational programme of popularisation of the implementation of the operation of increasing water absorption capacity of agricultural soil among farmers	ED	materials.  Carry out the promotional and educational programme among farmers at workshops or by visits to „field tests“ from P-01 and farmers who have been implementing the operation, etc.		associations and agricultural producer associations  Croatian Advisory Service	Ministry responsible for agriculture  Rural Development Programme of the Republic of Croatia for the Period 2014–2020  EPEEF						a poster printed (printing run of 5000 copies)  Participation of at least 100 advisors and 5000 farmers in the educational programme.  Increased interest in the implementation of the operation of increasing the absorption capacity of agricultural soil for water (evident from the increased number of grant beneficiaries for operation implementation and increased number of surfaces covered by the operation).
<b>P-02-03.</b>	P2	Implement the	2019 – 2022	Farmers	740.0	0	40.0	100.0	200.0	400.0	Operation of



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
Implementation of operations for increasing the water absorption capacity of agricultural soil	PR	operation of increasing the absorption capacity of agricultural soil for water in accordance with the requests.  Monitoring of operation implementation by the Paying Agency for Agriculture, Fisheries and Rural Development.		Ministry responsible for agriculture  Paying Agency for Agriculture, Fisheries and Rural Development	Rural Development Programme of the Republic of Croatia for the Period 2014–2020						increasing the absorption capacity of agricultural soil for water will have been implemented in 2022 on 200,000 hectares of agricultural land.  Increased absorption capacity of soil for water on 200,000 hectares of agricultural land and enabled better adaptation of the agricultural sector to lack of moisture in the soil.



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### 4.3.3. P-03 - Application of soil conservation tillage

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>P-03-01.</b> Development and implementation of a promotional and educational programme of popularization of soil conservation tillage among farmers	P2	Design posters, videos and other promotional materials.  Carry out the promotional and educational programme among farmers at workshops, by visits to "field tests" from P-01 and farmers who have been implementing the operation, etc.	2020 – 2023	Consulting firms  Environmental and agricultural producer organisations  Croatian Advisory Service	2.0	0	0.5	0.5	0.5	0.5	A promotional video filmed and a poster printed (total printing run of 1000 copies).  At least 100 advisors and 1000 farmers participated in the educational programme.  Increased interest in the implementation of soil conservation treatment (evident from the increased number of grant beneficiaries for the purchase of equipment/mechanisation for the soil conservation treatment).
	ED				Ministry responsible for agriculture  Rural Development Programme of the Republic of Croatia for the Period 2014-2020  EPEEF						
<b>P-03-02.</b> Implementation of soil conservation	P2	Procurement of equipment/mechanisation for soil conservation treatment	2020 – 2023	Farmers  Ministry responsible	740.0	0	40.0	100.0	200.0	400.0	The soil conservation treatment will have been conducted in 2022 using 2000



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
tillage	PR	in accordance with administrative procedures.  Monitoring procurement of equipment/mechanisation for the soil conservation treatment by the Paying Agency for Agriculture, Fisheries and Rural Development.		for agriculture  Paying Agency for Agriculture, Fisheries and Rural Development	Rural Development Programme of the Republic of Croatia for the Period 2014–2020						mechanisation tools for soil conservation treatment, on at least 100,000 hectares of agricultural land.  Reduced soil compaction and increased humus level on 100,000 hectares, enabling better adaptation of the agricultural sector to lack (but also excess) moisture in the soil.



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### 4.3.4. P-04 – Breeding of species and cultivars of agricultural crops and breeds of domestic animals that are more resilient to climate change

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>P-04-01.</b> Development of an operation for the breeding of species and sorts of agricultural crops and breeds of farm animals that are more resilient to climate change and its inclusion into the Rural Development Programme of the Republic of Croatia for the Period 2014–2020	P2	Defining the species and sorts of agricultural crops and breeds of farm animals that are more resistant to climate change.	2019	Ministry responsible for agriculture  in co-operation with  Faculty of Agriculture in Zagreb  Faculty of Agriculture in Osijek  Agricultural scientific research institutes	0.1	0.1	0	0	0	0	The operation for the breeding of species and sorts of agricultural crops and breeds of farm animals that are more resistant to climate change included in Measure 10 (M10): Agriculture, environment and climate changes in the Rural Development Programme of the Republic of Croatia for the Period 2014 - 2020.
	RE	Definition of the implementation method, grant amounts, eligible beneficiaries and other administrative procedures for the implementation of the operation.  Inclusion of the operation for breeding of species and sorts of agricultural crops and breeds of farm animals that are more resistant to climate change in									



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		Measure 10 (M10): Agriculture, environment and climate changes in the Rural Development Programme of the Republic of Croatia for the Period 2014 - 2020									
<b>P-04-02.</b> Development and implementation of a promotional and educational programme of popularization among farmers of cultivation of agricultural crops and breeds of domestic animals that are more resilient to climate change	P2	Design posters, videos and other promotional materials.	2020 – 2023	Consulting firms  Environmental and agricultural producer organisations  Croatian Advisory Service	2.0	0	0.5	0.5	0.5	0.5	A promotional video filmed and a poster printed (printing run of 5000 copies).  Participation of at least 100 advisors and 2000 farmers in the educational programme.  Increased interest in the implementation of the operation for the breeding of species and sorts of
	ED	Carry out the promotional and educational programme among farmers at workshops and by visits to “field tests” from P-1 and among farmers who have been implementing the operation, etc.			Ministry responsible for agriculture  Rural Development Programme of the Republic of Croatia for the Period 2014–2020  EPEEF						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
											agricultural crops and breeds of farm animals that are more resistant to climate change (evident from increased number of grant beneficiaries).
<b>P-04-03.</b> Implementation of the operation for cultivating species and varieties of agricultural crops and breeds of domestic animals that are more resilient to climate change	P2	Implementation of the operation for breeding of species and sorts of agricultural crops and breeds of farm animals that are more resistant to climate change in accordance with administrative procedures.  Monitoring of the implementation of the operation by the Paying Agency for Agriculture, Fisheries and Rural	2020 – 2023.	Farmers  Ministry responsible for agriculture  Paying Agency for Agriculture, Fisheries and Rural Development	74.0	0	4.0	10.0	20.0	40.0	Operation for breeding of species and sorts of agricultural crops and breeds of farm animals that are more resistant to climate change will have been implemented in 2022 by at least 1000 farmers. .
	PR				Rural Development Programme of the Republic of Croatia for the Period 2014–2020.						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		Development.									



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### 4.3.5. P-05 - Construction of reservoirs for irrigation

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>P-05-01.</b> Development and implementation of a promotional and educational programme popularizing the construction of reservoirs for irrigation among farmers	P2	Design posters, videos and other promotional materials.	2020 – 2023	Consulting firms  Environmental and agricultural producer organisations  Croatian Advisory Service	2.0	0	0.5	0.5	0.5	0.5	A promotional video made and a poster printed (total printing run of 1000 copies).  Participation of at least 100 advisors and 1000 farmers in the educational programme.  Increased interest in the construction of irrigation reservoirs (evident from increased number of grant beneficiaries for the construction of irrigation reservoirs).
	ED	Carry out the promotional and educational programme among farmers at workshops and visits to farmers who have been implementing the operation, etc.			Ministry responsible for agriculture  Rural Development Programme of the Republic of Croatia for the Period 2014–2020  EPEEF						
<b>P-05-02.</b>	P2	Construction of	2020 – 2020 -	Farmers	300.0	0	40.0	60.0	80.0	120.0	Constructed at



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
Implementation of reservoir construction for irrigation		irrigation reservoirs in accordance with administrative procedures.  Monitoring the construction of irrigation reservoirs by the Paying Agency for Agriculture, Fisheries and Rural Development.	2023	Ministry in charge of agriculture  Paying Agency for Agriculture, Fisheries and Rural Development	Rural Development Programme of the Republic of Croatia for the Period 2014-2020.						least 200 irrigation reservoirs of average absorption capacity of 30,000 m <sup>3</sup> used to irrigate 3000 hectares.  Improved adaptation of the agricultural sector to lack of moisture in the soil.



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### 4.4.Forestry

#### 4.4.1. ŠU-01 – Incorporation of adaptation measures into key documents pertaining to forests and forestry sectors

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
ŠU-01-01. Incorporate measures of adaptation to climate change into Forestry Sector Strategy and Forest Act as well as other legal regulations concerning forests and forestry sector, including implementation indicators	P1	To ensure the implementation of the climate change adaptation measures in the forestry sector, forestry policy documents need to be harmonised with the strategy and the climate change adaptation action plan.	2019 – 2023	Ministry responsible for forestry	0.5	0.1	0.1	0.1	0.1	0.1	<p>Completed amendments to the Forest Act and regulations.</p> <p>Number of amended documents of the forestry policy.</p> <p>Climate change adaptation measures included in the forestry sector strategy and the national forestry programme and defined implementation indicators.</p> <p>Prescribed design and implementation of adapted forest management principles in the Mediterranean</p>
	RE	The Ministry forms a working group and consults with stakeholders in forestry on the basis of which the working group drafts a proposal of amendments to the Forest Act, the forestry sector strategy and the ordinance related to the proposed		Croatian Forests company, Croatian Forest Research Institute, Faculty of Forestry, Forestry Advisory Service, Croatian Chamber of Forestry and Wood Processing Engineers, representatives of private forest owners, Croatian Forestry Society, Academy of Forestry	State Budget						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		amendments.		Sciences							area that are identified as those with high risk of forest fires, aiming to reduce combustible mass quantities.



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### 4.4.2. ŠU-02 – Research on species and provenance of forest trees that are more resilient to climate change

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
ŠU-02-01. Implementation of research of species and provenance of forest trees that are resilient to climate change	P5	Ministries in consultation with stakeholders in forestry define public call for project proposals.  Ministries & the Croatian Science Foundation announce public calls intended for research institutes.	2019 – 2023	Ministries responsible for forestry and nature protection  Croatian Science Foundation	25.0	5.0	5.0	5.0	5.0	5.0	Drawn up and announced public call for project proposals.  Number of projects selected for funding.  Number of species selected for the research.  Number of implemented projects.
	IR	The applied projects are sent to an evaluation process resulting in the decision on the projects selected for funding.  The conducted research include setting up a greenhouse experiment for the selected species of		Scientific community (Croatian Forest Research Institute, Faculty of Forestry)  Croatian Forests company d.o.o.	Croatian Science Foundation, Operational Programme Competitiveness and Cohesion 2014 - 2020, ERDF Forestry levy						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		economic significance (e.g. common oak, sessile oak, common beech, common fir, common spruce, and ash), monitoring the crop over the next 10 years and continuing the research with species producing the highest yield; carrying out genetic tests in real environmental conditions that include DNA analyses, soil analysis, photosynthesis monitoring, water potential measurement, etc.									



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### 4.4.3. ŠU-03 – Strengthening the capacity for systematic monitoring of forest ecosystem conditions as a prerequisite for informed planning and implementation of climate change adaptation

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
ŠU-03-01. Evaluation of the existing forest ecosystem monitoring system with identification of advantages and disadvantages and development of guidelines for its improvement	P4 and P5	It is necessary to identify which of the past and present activities have been useful so that they can be continued or re-launched, which provides a basis for proposed improvements in order for this monitoring system to provide a study of climate change impacts on forest ecosystems in the future. In order to determine the current state, it is necessary to produce an elaboration that will identify the advantages and disadvantages of the current system of monitoring of the state of forest	2019 –2020	Ministry responsible for forestry	1.0	0.5	0.5	0	0	0	Formed project assignment.  Announced public call.  Produced elaborate identifying the advantages and disadvantages of the current monitoring system of the state of forest ecosystems and developed guidelines for the improvement of the current system.
	RE or PR				ERDF, State Budget						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		ecosystems on the basis of which improvement guidelines are to be developed. The ministry responsible for forestry defines a project assignment prescribing the goals and methodology of elaborate compilation, the required type of experts and their expertise as well as expected results. Afterwards, the ministry announces a public tender for the compilation of the elaborate to which bidders apply. The selected bidder produces the elaborate and the ministry is in charge of quality control.									



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
ŠU-03-02. Creating a registry of monitoring, experiments, and research conducted by state institutions that are not part of systematic monitoring, their evaluation, and proposal for inclusion of selected items in the monitoring system	P4 and P5	The purpose of the monitoring register is to list all prior and current monitoring, experiments and other research related to forest ecosystems and to define the needs for future monitoring and climate- change related research that will be part of the monitoring system. This, among other things, adds value to the existing infrastructure, increases visibility of high-quality research facilities (experiments, infrastructure, equipment), thus providing the opportunity to apply for funding of their continuity since, as a rule,	2019 – 2021	Croatian Science Foundation  Ministry responsible for forestry  HAOP	1.5	0.5	0.5	0.5	0	0	<p>Defined contents of the register.</p> <p>Created register of monitoring, experiments and research that are not part of systemic monitoring.</p> <p>Announced call for evaluators and selected evaluators.</p> <p>Evaluators have provided an evaluation of data quality in the register.</p>
	RE or PR				ERDF						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		<p>their establishment requires significant funds.</p> <p>The monitoring register was initially established on the initiative of the Croatian Science Foundation.</p> <p>The Croatian Science Foundation, the ministry responsible for forestry and the Croatian Environment and Nature Agency in consultation with scientific research institutes from the forestry field define the contents of the register (what and how to record in the register) and whether and in what manner will</p>									



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		<p>those who will share their monitoring and research in the register be rewarded to motivate them to do so.</p> <p>The Croatian Science Foundation invites the institutions that have conducted and/or are currently conducting monitoring and research to start filling in the register.</p> <p>The Croatian Science Foundation announces a call for appointment of evaluators who will evaluate the quality of the entered data.</p>									



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		The Croatian Science Foundation is in charge of the data collection in the register, and the Croatian Environment and Nature Agency for the dissemination of data entered in the register in accordance with the INSPIRE Directive.									
ŠU-03-03. Upgrading and integration of selected existing monitoring / experimentation / research into the monitoring system of forest ecosystem status monitoring and enabling the availability of results in accordance with the INSPIRE	P4 and P5	The ministry responsible for forestry forms a working group and consults with the stakeholders from the forestry sector to establish the needs for future monitoring and research (which data are necessary, which institutions could/should perform the task, the need for	2021 – 2023	Ministry responsible for forestry  Croatian Environment and Nature Agency, Croatian Forest Research Institute, Croatian Forests company, Faculty of Forestry,	12.0	0	0	5	3.5	3.5	Defined needs for the expansion of current monitoring and research.  Designed data collection protocols.  Continuous data collection and processing.  Monitoring and research results are available in
	PR				ERDF, State Budget						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
Directive		additional labour force for field work; thus, data collection protocols have been designed).  Defined and extended research conducted in the field.		Forestry Advisory Service							accordance with the INSPIRE Directive.  The monitoring system of the state of forest ecosystems has been improved and functional.



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### 4.4.4. ŠU-04 - Strengthening capacity for fire protection

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
ŠU-04-01. Improvement of the system of early warning for forest fires	P4	Conduct a needs analysis for the improvement of the current forest fire early warning system.	2019 – 2023	Ministry responsible for forestry	3.5	6.1	6.1	6.1	6.1	6.1	<p>Conducted needs analysis.</p> <p>Identified priority forest areas with high risk of forest fires.</p> <p>Developed implementation plan for improving the forest fire early warning system in the selected forest areas.</p> <p>Installed cameras for surveillance and early detection of forest fires at 100 surveillance locations.</p>
	PR	<p>Identify priority forest areas with high risk of forest fires where it is necessary to improve the current early warning system.</p> <p>Develop an implementation plan.</p> <p>Install cameras for surveillance and early detection of forest fires (IPNAS system) in the identified forest areas</p>		Croatian Forests company, Faculty of Mechanical Engineering and Naval Architecture Split, National Protection and Rescue Directorate (NPRD), Meteorological and Hydrological Service, Croatian Firefighting Association, local and regional government	INTERREG or other EU programmes / funds						
ŠU-04-02. Develop	P4 and P5	Conduct an analysis of	2019 – 2023	Scientific research	1.5	0.3	0.3	0.3	0.3	0.3	At least 2 persons



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
models of the spreading of forest fires and predictive models entailing all elements of fire prediction and relevant risks	PR and IR	available and relevant data for the functioning of the model for the identified priority forest areas with high risk of forest fires.  Simulation and modelling of fire spreading should be developed for the identified priority forest areas with high risk of forest fires.		institutes carrying out forest fire modelling.	EU funds / programme, Croatian Science Foundation						employed and educated and in charge of modelling of spreading and prediction of forest fires.  Conducted simulation and modelling of forest fire spreading in the selected forest areas.
ŠU-04-03. Development	P4	Analysis of the needs and	2019 – 2023	National Protection and	1.0	0.2	0.2	0.2	0.2	0.2	Identified population



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
of a plan and raising public awareness on the importance of implementation of preventive measures to prevent forest fires	ED	development of a public awareness raising plan on the importance of implementation of preventive measures to prevent forest fires.  Ordering the design of a media campaign.  Carrying out the media campaign.		Rescue Directorate, Croatian Forests company, Croatian Firefighting Association	ESF						segments for which it is necessary / a priority to conduct awareness-raising activities.  Developed plan and materials for raising public awareness.  Carried out media campaign.
ŠU-04-04. Maintenance of existing fire roads in the Mediterranean and Sub-Mediterranean zone and construction of new ones	P4	Maintenance of existing roads	2019 – 2023	Croatian Forests company	60.0	12.0	12.0	12.0	12.0	12.0	The existing priority roads have been maintained.  200 km of fire-fighting roads have been built.
	RE	Construction of fire-fighting roads		Ministry responsible for forestry  Forestry Advisory Service	Forestry levy  EU funds / programmes						



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### 4.5.Fisheries

#### 4.5.1. RR-01 – Strengthening of the sector by investing into development of new markets and offer expansion

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>RR-01-01.</b> Implementation of research on the acceptability of new types of breeding organisms and products by consumers	P2	Using the media to promote the benefits of consuming newly bred organisms and products.	2019 – 2023	Croatian Chamber of Economy  Ministry responsible for fisheries  Local and regional government  Breeders	1.0	0.2	0.2	0.2	0.2	0.2	One workshop a year carried out in larger towns (Zagreb, Varaždin, Zadar, Split, Rijeka, and Osijek).  One show per year broadcast on the radio/television about the new species of bred organisms and products.  Distributed printed/digital materials in the form of brochures and surveys.  Organised sales promotion of new species of bred organisms and products.
	PR	Organising workshops to survey public opinion.  Design of printed/digital material in the form of brochures and surveys to inform and survey the public opinion.  Sales promotion of new species of bred organisms and products.			State Budget						



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### 4.5.2. RR-02 – Strengthening the capacity for the estimation of the future state of the sector as a consequence of climate change impacts

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>RR-02-01.</b> Encouraging the development of application models for forecasting the movement of fish biomass in the future	P2	Employment and training of experts in the field of application modelling. Implementation of application models for economically important fish species using the outputs of developed joint models (KM 01-02).	2019 – 2023	Institute of Oceanography and Fisheries  Ruđer Bošković Institute  Meteorological and Hydrological Service	1.5	0.3	0.3	0.3	0.3	0.3	<p>At least two newly employed and trained experts at the Institute of Oceanography and Fisheries / Ruđer Bošković Institute</p> <p>Developed application model for predicting the state of bioresources of economically important fish species on the wider Croatian territory.</p> <p>The models use the outputs of projections of future climate obtained by joint models developed in the framework of Measure KM 01-02.</p>
	PR				State Budget						



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### 4.5.3. RR-03 – Strengthening the resilience of natural resources through adaptive fisheries management

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>RR-03-01.</b> Develop the monitoring system of the state of bioresources in marine and fresh water that will also encompass monitoring of the food chain of marine organisms	P2	Carry out monitoring of stocks of economically important inshore, demersal, and deep-sea types of fish <sup>2</sup> twice a year.	2019 – 2023	Institute of Oceanography and Fisheries  Ruđer Bošković Institute  Faculty of Agriculture	7.5	1.5	1.5	1.5	1.5	1.5	Established indicators of the state of bioresources of economically important inshore, demersal, and deep-sea types of fish.  Established indicators of the state of food chains in the Adriatic Sea.  Established indicators of the state of bioresources of freshwater fish.
	PR	Monitor the state of the food chain in the Adriatic Sea twice a year.  Monitor the state of bioresources in fresh waters.			State Budget EU funds						

<sup>2</sup> Refers to two annual boat expeditions for sample collection, sample processing and their analysis.



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### 4.5.4. RR-04 – Increasing the involvement of fishermen in the tourism sector

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>RR-04-01.</b> Education of fishermen to carry out tourism activities	P2	Organisation and holding workshops to educate fishermen on carrying out tourism activities.	2019 – 2023	Ministry responsible for fisheries	0.5	0.1	0.1	0.1	0.1	0.1	One workshop a year held in larger fishing settlements aiming to educate fishermen.  Designed and distributed educational materials for fishermen in the form of a brochure or digital material.
	ED	Design and distribution of educational materials, brochures or digital materials.		Croatian Chamber of Economy  Local self-government units  Fishermen	State Budget						
<b>RR-04-02.</b> Supporting fishermen to reconstruct vessels for the purpose of carrying out tourism activities	P2	Defining the necessary technical alterations on fishing boats to fulfil the conditions for the performance of tourism activities.	2019 – 2023	Ministry responsible for fisheries	1.0	0.2	0.2	0.2	0.2	0.2	Defined necessary technical alterations on fishing boats for carrying out tourism activities.  Specified cost of alterations to fishing boats.  Paid out grant for 10 boats per year.
	PR	Specify the cost of the necessary technical alterations on fishing boats.		Croatian Chamber of Economy  Local self-government units  Fishermen	State Budget  EU funds						



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### 4.5.5. RA-01 – Strengthening aquaculture capacity by breeding more organisms at lower trophic levels and new forms of breeding

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>RA-01-01.</b> Implementation of a programme to encourage shellfish farming	P2	Holding a workshop to educate current and potential farmers about shell-farming benefits.	2019 – 2023	Ministry responsible for fisheries Croatian Chamber of Economy Local government Breeders	10.0	2.0	2.0	2.0	2.0	2.0	One workshop a year carried out in larger fishing settlements to educate current and new farmers.  Designed educational - promotional material on the benefits of shell-farming.  Paid out grants to current farmers for increasing shell-farming.  Paid out grants to new farmers for the opening of new shell farms – approximately 10 per year.
	PR	Design of educational - promotional materials.  Provision of financial support to farmers who have transferred to shell-farming.  Provision of financial support for the opening of new shell farms.			EU funds State Budget						
<b>RA-01-02.</b> Implementation of a	P2	Analysis of current research on controlled	2019 – 2023	University of Dubrovnik Institute of	0.5	0.1	0.1	0.1	0.1	0.1	Defined biological conditions for



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
programme for supporting controlled farming of shellfish in hatcheries instead of collecting them in nature	PR	juvenile shellfish farming.  Conducting additional research about technological and biological conditions for juvenile shellfish farming.  Specifying costs of controlled juvenile farming.		Oceanography and Fisheries  Ruđer Bošković Institute  Breeders	EU funds  State Budget						farming.  Developed technology of controlled juvenile farming.  Specified costs of controlled juvenile shellfish farming.
<b>RA-01-03.</b> Preparation of a study on the feasibility of growing aquatic plants and their acceptance on the market	P2	Conducting research on the requirements for aquatic plant breeding in the Republic of Croatia.  Economic feasibility study of aquatic plant	2019 – 2023	Ruđer Bošković Institute  University of Dubrovnik  Institute of Oceanography and Fisheries  Croatian	1.0	0.2	0.2	0.2	0.2	0.2	Explored requirements for aquatic plant breeding in the Republic of Croatia.  Established profitability of aquatic plant breeding as a



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
	PR	breeding for consumption and as an alternative form of fuel.  Analysis of the market and market perspectives.  Organisation of a workshop/lecture to inform and survey public opinion about the use of aquatic plants for consumption and other purposes.		Chamber of Economy  Ministry responsible for fisheries	EU funds  State Budget						source of nutrients i.e. an alternative form of fuel.  Conducted market analysis.  Organised 1 workshop per year on the possibilities and benefits of the use of aquatic plants.
<b>RA-01-04.</b> Development and implementation of an educational	P2	Design of promotional materials on integrated breeding of aquatic	2019 – 2023	Ruder Bošković Institute  University of	1.0	0.2	0.2	0.2	0.2	0.2	At least one educational workshop a year carried out in each of the selected



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
programme on the benefits and uses of integrated breeding of aquatic organisms	ED	organisms to educate breeders based on current materials.  Preparation and carrying out educational workshops in places where fisheries are the main production activity		Dubrovnik  Institute of Oceanography and Fisheries  Ministry responsible for fisheries	State Budget  EU funds						locations.  Designed and distributed promotional-educational materials (brochures, leaflets, digital materials).
<b>RA-01-05.</b> Awareness raising of the general public about the benefits of shellfish, aquatic plants and non-meat species of fish	P2	Organisation and carrying out of an open workshop to educate the general public.  Design and distribution of the promotional - educational	2019 – 2023	Ministry responsible for fisheries  Croatian Chamber of Economy  Scientific institutions  Local self-	1.5	0.3	0.3	0.3	0.3	0.3	1 workshop a year carried out in larger cities.  Designed and distributed promotional - educational materials.  1 article per year published in the



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
	ED	materials in the form of brochures or leaflets.  Education of the general public through the media, including the Internet.		government units  Media	State Budget						main printed media.  One radio and television show broadcast per year.



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### 4.5.6. RA-02 – Strengthening aquaculture capacity through breeding in recirculation systems

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>RA-02-01.</b> Analysis of the possibility of using recirculation breeding systems in fisheries	P2	Conduct research on the breeding possibility of the most important marine and freshwater types of fish for the Republic of Croatia in a recirculating breeding system. <sup>3</sup>	2019 – 2023	University of Dubrovnik  Institute of Oceanography and Fisheries  Ruđer Bošković Institute  Faculty of Agriculture  Breeders  Ministry responsible for fisheries	1.0	0.2	0.2	0.2	0.2	0.2	Established technological and technical conditions for breeding in recirculating systems for specific fish species.  Identified breeding characteristics of species provided for breeding.  Estimated breeding costs for individual fish species.
	PR	Based on previous and new research, establish technological and technical conditions of breeding and breeding characteristics of the bred species.  Estimation of breeding costs for individual			EU funds  State Budget						

<sup>3</sup> Number of species will be determined in the scope of the research.



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		fish species.									
<b>RA-02-02.</b> Development and implementation of an educational programme on the benefits of recirculation breeding systems	P2	Based on current insights, introducing the breeders to the benefits of the recirculating breeding system of aquatic organisms.	2019 – 2023	Ministry responsible for fisheries  Institute of Oceanography and Fisheries  University of Dubrovnik  Ruder Bošković Institute  Faculty of Agriculture  Breeders	1.0	0.2	0.2	0.2	0.2	0.2	At least one educational workshop carried out at least once a year at each of the selected locations.  Designed and distributed promotional-educational materials (brochures, leaflets, digital materials).
	ED	Preparing and carrying out educational workshops in places where fisheries are the main production activity.  Design of promotional materials to educate breeders.			State Budget  EU funds						
<b>RA-02-03.</b> Implementation of research related to the use of recirculation systems for	P5	Scientific research on the benefits of early breeding in a recirculating system for the most important	2019 – 2023	University of Dubrovnik  Institute of Oceanography and Fisheries  Ruder Bošković	0.5/ per 1 fish species	0.1/ per 1 fish species	0.1/ per 1 fish species	0.1/ per 1 fish species	0.1/ per 1 fish species	0.1/ per 1 fish species	Identified indicators of possibilities and benefits of breeding the most important fish species at an early
	IR				EU funds  State						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
certain stages of farming and for breeding new species of fish in recirculating systems		bred fish species. <sup>4</sup>  Research on breeding requirements, breeding technology and breeding costs for new fish species.		Institute  Faculty of Agriculture  Ministry responsible for fisheries	Budget						breeding phase in a recirculating system.  Developed technology for the breeding of new fish species in the recirculating system.  Specified costs of breeding of new fish species in the recirculating system.

<sup>4</sup> Number of species will be determined in the scope of the research.



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### 4.5.7. RA-03 – Strengthening aquaculture capacity by breeding new species of fish

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>RA-03-01.</b> Making amendments to the legislative framework for the cultivation of new (alien) fish species	P2	Based on current scientific insights, producing a proposal of amendments to the legislation related to the legislative framework related to the breeding of aquatic organisms.	2020 – 2023	Ministry responsible for fisheries	Cost is specified by the Ministry	NA	NA				Amended legislation regulating the breeding of new (alien) species of aquatic organisms.
	RE			Scientific institutions Breeders	State Budget						
<b>RA-03-02.</b> Study on the possibilities of breeding new (alien) fish species	P2	Based on current insights, selection of new fish species for breeding. <sup>5</sup>	2019 – 2023	Institute of Oceanography and Fisheries	0.25 / per 1 species	0.05/ per 1 species	0.05/ per 1 species	0.05/ per 1 species	0.05/ per 1 species	0.05/ per 1 species	Selected new (alien) fish species for breeding.  Identified breeding requirements for the selected species.  Developed technology for the breeding of new (alien) fish species.
	PR	Conducting research on breeding requirements for the selected new fish species.  Estimation of breeding costs of new fish species.		University of Dubrovnik Ruđer Bošković Institute Ministry responsible for fisheries	State Budget EU funds						

<sup>5</sup> The number of breeding species will be determined based on the findings.



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
											Estimated breeding costs of new (alien) fish species.
<b>RA-03-03.</b> Market research to determine the possibility of accepting new (alien) fish species by consumers	P2	Pointing out the benefits of consuming new (alien) fish species.	2019 – 2023	Croatian Chamber of Economy  Ministry responsible for fisheries  Local government  Breeders	1.0	0.2	0.2	0.2	0.2	0.2	One workshop per year carried out in larger cities.  Broadcast radio/television show about new species once a year.  Distributed printed/digital materials in the form of brochures and surveys.  Organised sales promotion of new (alien) fish species.
	PR	Organising of workshops to conduct a public opinion survey.  Design printed/digital materials in the form of brochures and surveys to provide information and survey the public opinion.  Sales promotion of new (alien) fish species.			EU funds  State Budget						



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### 4.6. Biodiversity

#### 4.6.1. B-01 - Preservation of traditional agriculture in natural ecosystems

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>B-01-01.</b> Continuation of inventory of traditional varieties and breeds	P2	Inventory traditional cultivated plant sorts and breeds of farm animals as a part of total biodiversity and basis of preservation of traditional agriculture in natural ecosystems.	2019 – 2021	Ministry responsible for agriculture	1.5	0.5	0.5	0.5	0	0	Completed inventory studies of traditional cultivated plant sorts and breeds of farm animals according to regions and thus inventoried total agrobiodiversity of the Republic of Croatia with elements of resilience to climate conditions, especially drought and other extremes, availability of seeds and planting material.  Defined needs for
	PR	Conduct inventories for specific geographical areas, primarily the current biogeographical regions: the Pannonian biogeographical region – Slavonia and Baranja;		Ministry responsible for regional development and EU funds  with other responsible institutions, primarily Croatian Agricultural Agency  in co-operation with Ministry responsible for nature	Primary funding through the Rural Development Programme of the Republic of Croatia for the Period 2014-2020 – Measures 5, 7, 10, and 11.						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		Continental biogeographical region – NW Croatia; Alpine biogeographical region – Lika and Gorski Kotar, and the Mediterranean biogeographical region – Istria, Kvarner and Dalmatia.									multiplication of seeds and plant materials or formed collection of trees.
<b>B-01-02.</b> Development of models of restoration of traditional agriculture in natural ecosystems	P2	Development of a traditional agriculture regeneration model in natural ecosystems, especially in the ecological network areas (Natura 2000).  Development of at least 5 models for individual units, i.e. biogeographical regions: Pannonian	2020 – 2023	Ministry responsible for agriculture  in co-operation with  Ministry responsible for regional development and EU funds  Croatian Agricultural Agency  Ministry responsible for	6.0	0	1.5	1.5	1.5	1.5	Completed studies of traditional agriculture regeneration model in natural ecosystems (Natura 2000) and launched pilot-projects (at least 5 per specific unit).  Study results integrated in short-term and long-term development
	PR				Primary funding through the Rural Development Programme of the Republic of Croatia for the Period 2014-2020 – Measures 5, 7, 10, and 11.						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		biogeographical region – e.g. Kopački Rit Nature Park; Continental biogeographical region, e.g. Lonjsko Polje Nature Park, Alpine biogeographical region – e.g. Plitvice Lakes National Park, and the Mediterranean biogeographical region with two models – e.g. Krka National Park and Mljet National Park.		nature	Own funds of national parks and nature parks.						plans of individual protected areas.  Developed models applicable to similar protected areas in the same or similar geographical or biogeographical regions.
<b>B-01-03.</b> Develop and implement a program of encouraging traditional agriculture and placements of	P2	Development of a Programme of stimulation of traditional agriculture and placement of value-added products for all natural	2019 – 2023	Ministry responsible for agriculture	62.0	5.0	10.0	12.0	15.0	20.0	Established funding and stimulation models and placement of products produced through traditional
	PR			Ministry responsible for regional development and EU funds	Primary funding through the Rural Development Programme of the						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
value added products		<p>ecosystems, especially the most valuable protected areas in the Natura 2000 ecological network, and primarily for national parks and nature parks, always in co-operation with responsible LAGs and the existing producer organisations.</p> <p>Achieving active co-operation with public institutions in the protected areas for the promotion and placement of value-added products in the park area.</p>		<p>Croatian Agricultural Agency</p> <p>in co-operation with</p> <p>Ministry responsible for nature</p> <p>LAGs (local action groups),</p> <p>Public institutions in the protected areas</p> <p>Producer organisations</p>	Republic of Croatia for the Period 2014-2020 – all available measures						<p>agriculture models in natural ecosystems.</p> <p>Range of traditional agricultural value-added products as well as producer networks joined in LAGs and producer organisations.</p> <p>Achieved placement and promotion of traditional agricultural products in national parks, nature parks, and other protected areas.</p> <p>Created brand of value-added products produced in the most valuable natural</p>



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
											ecosystems of the Republic of Croatia.
<b>B-01-04.</b> Establishment of systemic monitoring of natural ecosystems covered in the programme of traditional agriculture	P2	Elaboration, establishment and execution of systemic monitoring of agricultural ecosystems and their interactions with other natural ecosystems with continuous improvement measures.	2019 – 2023 (ongoing)	Ministry responsible for agriculture  in co-operation with  Ministry responsible for nature	2.5	0.25	0.5	1.25	0.25	0.25	Officially designed, established and carried out programmes of monitoring of natural ecosystems covered in the programme of traditional agriculture.  Established criteria for the monitoring of the state of agricultural ecosystems.
	PR	Initial establishment of the monitoring system through LAGs and public institutions in protected areas assisted by experts, it should later be carried out to a large extent by			Primary funding through the Rural Development Programme of the Republic of Croatia for the Period 2014 - 2020 – Measure 19 and own funds of specified national parks and						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		LAG employees and professional services in the protected areas.			nature parks.						



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### 4.6.2. B-02 - Establishment of a climate monitoring and early warning system for protected areas and ecological network of the Republic of Croatia and monitoring of protected wild habitat types and wild species

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>B-02-01.</b> Establish a monitoring and early warning system for all protected areas and areas of the ecological network of the Republic of Croatia	P4	Installation of permanent stationary measurement probes for the monitoring of microclimate factors in all protected areas and areas in the ecological network of the Republic of Croatia and establishment of GIS monitoring, aggregation, instantaneous information and warning system.  Based on the analysis of the obtained data, monitoring of climate change at the global level for the Republic of Croatia, but also at microclimate	2019 – 2023	Ministry responsible for climate change  in co-operation with  Meteorological and Hydrological Service  and  Ministry responsible for nature  in co-operation with  public institutions in the protected areas and those at the county and local level  as well as  using services of specialised	15.0	3.0	3.0	3.0	3.0	3.0	Established microclimate factor monitoring and early warning system for all protected areas.  The priority in the first 3 years are national parks and nature parks, followed by other protected areas: 743 areas of importance for the conservation and maintenance of favourable conditions of other wild species and their habitats, as well as natural habitat types of interest for the European Union and 38 areas of importance for the conservation
	PR				EU funds for Natura 2000 ecological network						



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		level for each sensitive protected area.  The monitoring and early warning system should initially be set up through professional firms, and later carried out to a large extent by educated employees of professional public institutions services in the protected areas.		firms							and maintenance of the favourable status of wild species of birds of interest to the European Union as well as their habitats and areas important for the conservation of migratory species of birds, particularly wetlands of international importance, i.e. establishment for 156 areas per year in the period of 5 years.
<b>B-02-02.</b> Establish expert monitoring of natural habitat types and wild species for monitoring the impacts and consequences of climate change, in accordance with regulations on the protection of	P4	Establishment of professional monitoring of natural habitat types and wild species for the monitoring of the effects and impacts of climate change in accordance with the regulation governing nature protection that primarily include continuous monitoring and	2019 -2023	Ministry responsible for nature  in co-operation with public institutions in the protected areas and those at the county and local level using services of specialised firms.	10.0	2.0	2.0	2.0	2.0	2.0	Developed monitoring protocols and established monitoring for all 743 areas of importance for the conservation and maintenance of favourable conditions of other wild species and their habitats, as well as natural habitat types of interest for the European Union and 38 areas of
	RE				EU funds for Natura 2000 ecological network						



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nature		analysis of the state of the ecological network, i.e. Natura 2000 habitats and species in the framework of areas of importance for the conservation and maintenance of favourable conditions of other wild species and their habitats, as well as natural habitat types of interest for the European Union and areas of importance for the conservation and maintenance of the favourable status of wild species of birds of interest to the European Union as well as their habitats and areas important for the conservation of migratory species of birds, particularly wetlands of international importance.									importance for the conservation and maintenance of the favourable status of wild species of birds of interest to the European Union as well as their habitats and areas important for the conservation of migratory species of birds, particularly wetlands of international importance , i.e. for about 156 areas per year in the period of 5 years.
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### 4.6.3. B-03 - Improvement of knowledge and creation of databases of natural ecosystems and biodiversity

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>B-03-01.</b> Update the map of land-based non-forest and map of forest habitats of the Republic of Croatia	P2	Improving the map of habitats of the Republic of Croatia based on the current map of non-forest habitats in the Republic of Croatia and conducting further professional field analysis for the completion of the map of forest habitats.	2019 – 2021	Ministry responsible for nature in co-operation with All public institutions and those at the county and local level  Using services of specialised firms	3.0	1.0	0.5	0.5	0.5	0.5	Produced detailed and improved map of habitats in the Republic of Croatia
	PR				EU funds for Natura 2000 ecological network						
<b>B-03-02.</b> Update of habitat map with elements of vulnerability to climate change	P2	Upgrade of the Habitat Map with elements of distribution, endemism, sensitivity, and potential threats to particular habitats regarding climate change	2019 – 2020	Ministry responsible for nature in co-operation with Public institutions in the protected areas and those at the county and local level	1.0	0.25	0.25	0.25	0.25	0	Established upgraded national classification system with elements of distribution, endemism, sensitivity, and potential threats to certain habitats.
	PR				EU funds for Natura 2000 ecological network						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
				Services of specialised firms, associations or individual experts.							
<b>B-03-03.</b> Completion of inventory of flora and fauna and implementation of inventory of fungi	P2	Definition of targeted flora and fauna inventory through the selection of insufficiently explored areas and carrying out professional inventory through the analysis of data from literature and the most important herbaria.  Defining a statistically justified fauna inventory by selecting the largest taxonomic groups of invertebrates	2019 – 2021	Ministry responsible for nature through Croatian Agency for the Environment and Nature in co-operation with current experts	15.0	3.0	3.0	3.0	3.0	3.0	Completed flora inventory and statistically justified fauna inventory and inventoried mushrooms, thus completed total inventory and biogeographical distribution of macroorganisms: plants, mushrooms and animals as a basis for the insight in the total biodiversity of the Republic of Croatia.
	PR				EU funds for Natura 2000 ecological network						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		with regard to number of varieties and carrying out professional inventory by analysing data from the literature and other collected data and the most important museum collections.  Carrying out professional inventory of the mushroom kingdom by analysing data from the literature and other collected data and the most important museum collections.									
<b>B-03-04.</b> Cataloguing of invasive species particularly aggressive in the	P2	Carrying out professional cataloguing of the current and potentially	2019 – 2020	Ministry responsible for nature through the Croatian Environment	1.0	0.5	0.5	0	0	0	Completed Catalogue of Invasive Alien Species with prevention
	PR				EU funds for Natura 2000 ecological						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
climate change process with repression and control measures and cataloguing of habitats, taxonomic groups and species particularly vulnerable to climate change		invasive species that are particularly aggressive in the climate change process by analysing data from the literature with prevention and management measures and cataloguing the habitats, taxonomy groups and species that are particularly sensitive to climate change.		and Nature Agency in co-operation with current experts	network						measures and a list of potentially most endangered autochthonous habitats and species.
<b>B-03-05.</b> Updating the List of Speleological Objects of the Republic of Croatia	P2	Based on the current protocols, defining and continuing the compilation of the Cadastre of Speleological Objects of the Republic of Croatia in order to inventory and define current	2021 – 2023	Ministry responsible for nature and HAOP  in co-operation with  speleological associations	2.5	0.5	0.5	0.5	0.5	0.5	Compiled Cadastre of Speleological Objects of the Republic of Croatia with all elements including definition of natural underground ecosystems, their microclimate and ecology and
	PR				EU funds for Natura 2000 ecological network						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		underground habitats and their microclimate.  The activities are primarily related to areas under the jurisdiction of county public institutions for the management of protected areas (ŽJUZUZDP).									biodiversity.



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### 4.6.4. B-04 - Integrated management of freshwater resources for the conservation and revitalization of natural ecosystems and biodiversity

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>B-04-01.</b> Ensure combined flood protection and protection from loss of biodiversity by restoring natural floodplains	P1	Forming a working group and conducting analysis of the requirements for protection from floods and biodiversity loss through restoration of natural floodplains.	2021– 2023	Ministry responsible for water management  HV – legal person for water management  in co-operation with  Ministry responsible for nature  Units of regional self-government.	40.0	0	0	15.0	15.0	10.0	Established combined protection from floods and biodiversity loss by restoration of natural floodplains.
	PR	Compilation of professional elaborates and carrying out restoration of natural floodplains in climatically endangered areas (e.g. Lonjsko Polje Nature Park and Kopački Rit Nature Park).			HV – legal person for water management  and other sources (EU structural funds)						
<b>B-04-02.</b> Creation of retention basins for freshwater, wetland and hygrophilic	P2	Based on the definition of the most endangered freshwater habitats and potential retentions, development of a	2021 – 2023	Ministry responsible for water management  and  HV – legal	30.0	0	0	10.0	10.0	10.0	Constructed retentions for the most endangered and most valuable freshwater standing, wetland, and hygrophilic
	PR				HV – legal person for water management  and other						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
ecosystems		programme and carrying out the construction of retentions for endangered freshwater standing, wetland and hygrophilic ecosystems (e.g. all mires).		person for water management  in co-operation with  Ministry responsible for nature and units of regional self-government	sources (EU structural funds)						ecosystems.
<b>B-04-03.</b> Prevention of salinization of coastal sources and wetland habitats by building dams, embankments and by other measures	P2	Having defined the most endangered coastal sources and wetland habitats (e.g. Vransko Jezero, Palud), construction of dams, embankments and carrying out other measures to prevent salinization and destruction of habitats.	2021 –2023	Ministry responsible for water management and HV – legal person for water management  in co-operation with Ministry responsible for nature  and units of regional self-	30.0	0	0	10.0	10.0	10.0	Built dams, embankments and other measures carried out for the most endangered and most valuable coastal sources and wetland habitats.
	PR				HV - legal person for water management  and other sources (EU structural funds)						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
				government							

### 4.7. Energy

#### 4.7.1. E-01 - Strengthening the resilience of production facilities through the storage of electrical energy

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>E-01-01.</b> Conducting a vulnerability analysis of currently important production plants to adverse climate change impacts to define the	P1,P2, P3	Conducting a detailed vulnerability analysis for all important production plants using the available climate models.	2019 –2020	HEP Group / other energy operators	7.5	3.5	4.0	0	0	0	Conducted detailed vulnerability analysis of currently important production plants to adverse climate change impacts.  Compiled list of



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
most vulnerable ones and make a priority list	IR, PR	Identifying priority plants based on analysis results.			HEP Group / other energy operators and/or ERDF						priority plants depending on vulnerability.
<b>E-01-02.</b> Analysis of the possibilities of the construction of energy storage facilities	P1,P2, P3	Compiling a study with analysis of the possibility of construction of energy storage facilities taking into	2020	HEP Group / relevant energy operators	1.0	0	1.0	0	0	0	Compiled study on the possibility of constructing an energy storage facility.  Selected location for the construction of a test facility and produced feasibility study for the construction.
	IR, PR	consideration the results of a more detailed vulnerability analysis (E-07-01)			HEP Group / relevant energy operators and/or ERDF						
<b>E-01-03.</b> Preparation of project	P1, P2, P3	Production of the preliminary and general	2020 – 2021	HEP Group / relevant energy	3.0	0	1.0	2.0	0	0	Drawn up project documentation required for the



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
documentation for construction of a test facility for energy storage	PR	design including all required approvals, detailed plans, and studies.  Production of the final design.		operators	HEP Group / relevant energy operators and/or ERDF						construction of the experimental energy storage facility.  Obtained all required approvals and licences for beginning of construction works.
<b>E-01-04.</b> Construction of a test facility for energy storage	P1, P2, P3	Procuring equipment, contracting and carrying out works.	2021 – 2022	HEP Group / relevant energy operators	46.0	0	0	16.0	30.0	0	Constructed experimental energy storage facility.  Experimental facility put into operation.
	PR				HEP Group / relevant energy operator and/or ERDF						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>E-01-05.</b> Development of a study on the possibilities of building small autonomous energy systems on islands and rural areas, based on the integration of wind energy, photovoltaic and battery power storage systems	P1,P2, P3	Producing a study that takes into consideration the analysis of vulnerability of the electric power system to climate changes in island areas and other rural areas away from the main corridors.	2019 – 2021	HEP Group  HOPS d. o. o., local and regional government	8.0	3.0	2.5	2.5	0	0	Conducted vulnerability analyses of the electric power system on islands and in rural areas away from the main corridors <sup>6</sup> .  Selected adequate locations and produced feasibility studies on the construction of small autonomous energy systems with the selected technical and technological solutions.
	IR, PR	Producing feasibility studies on the construction of small autonomous energy system at several selected locations, including the proposal of a technical and technological solution.			HEP Group, Croatian Transmission System Operator Ltd., local and regional self-government units and/or ERDF						

<sup>6</sup>One study is planned aiming to provide a comprehensive overview. It is thus possible to select the most adequate, i.e. most useful locations for further activities.



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### 4.7.2. E-02 – Strengthening the capacities and ensuring of an incentivizing legal framework to increase the capacity of renewable energy and distributed sources

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>E-02-01.</b> Development of a map of the climate potential (positive and negative) of Croatian regions for the production of energy from alternative sources in different climatic scenarios	P1,P2, P3	Analysis of the climate potential of Croatian regions for energy production from alternative sources based on developed and available climate models.  Display of all relevant results in the form of an interactive map of the Republic of Croatia.	2019 – 2020	Ministry responsible for the energy industry, Croatian Energy Regulatory Agency, HROTE	10.0	4.0	6.0	0	0	0	Conducted analysis of the potential of Croatian regions to produce energy from alternative sources.  Designed interactive map of the climate potential of Croatian regions.  Interactive map publically available to all interested natural and legal persons.
	IR, PR				State Budget, EPEEF and/or ERDF						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>E-02-02.</b> Development of a study of possibilities of development of diversified energy sources with emphasis on exploitation of alternative (renewable) energy sources in the territory of the Republic of Croatia	P1,P2, P3	Producing a study of possibilities of development of diversified energy sources based on renewable sources taking into account the study of vulnerability of electricity system to climate change.	2019 – 2021	Ministry responsible for the energy industry, Croatian Energy Regulatory Agency, HROTE, HOPS, local and regional self-government units	8.0	3.0	2.5	2.5	0	0	Produced study of development possibilities of diversified energy sources based on renewable sources.  Selected adequate locations and produced feasibility studies of construction of small diversified, renewable energy sources with the selected technical and technological solutions.
	IR, PR	Produce a feasibility study on the construction of small diversified, renewable energy sources at several selected locations including the proposal of a technical and technological solution.			State Budget, EPEEF and/or ERDF						
<b>E-02-03.</b> Development of a study on the possibilities of using renewable energy sources in rural areas	P1,P2, P3	Producing a study of the possibilities of exploitation of micro renewable energy sources. The study encompasses analysis of all rural areas and proposes	2019 – 2020	Ministry responsible for the energy industry, ministry responsible for agriculture, Croatian Energy Regulatory	4.0	2.0	2.0	-	-	-	Compiled study of the possibilities of exploitation of renewable energy sources in rural areas.  The study is publically
	IR, PR				State Budget, EPEEF and/or						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
such as agricultural micro-installations		optimal opportunities for every vulnerable area and provides a proposal of a technical and technological solution.		Agency, Croatian Energy Market Operator Ltd, local and regional self-government units	ERDF						available to all interested natural and legal persons.

### 4.7.3. E-03 - Strengthening the resilience of current facilities for the production of electricity and thermal energy

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>E-03-01.</b> Development of preliminary analysis on the vulnerability of existing thermal power plants to	P3	Conducting a vulnerability analysis of current thermo-electric power plants using the available climate models.	2019	HEP Group	4.0	4.0	0	0	0	0	Produced vulnerability analysis of current thermo-electric power plants to adverse impacts of climate changes.



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
the occurrence of extreme weather and climate hazards and reduced precipitation in order to define the most vulnerable power plants and create a list of priorities	PR	Identification of priority plants based on the analysis results.			HEP Group and/or ERDF						Compiled list of priority plants depending on vulnerability.
<b>E-03-02.</b> Development of a detailed analysis of vulnerability for the most vulnerable thermal power plants with proposed measures which will involve technical and economic analysis	P3	Conducting a detailed analysis for the most endangered power plants according to the priority list. The analysis will provide proposals for increasing resilience including techno-economic analysis.	2020	HEP Group	6.0	0	6.0	0	0	0	Conducted detailed analysis for the most endangered power plants according to the priority list. The analysis provides proposals for increasing resilience including techno-economic analysis.
	PR				HEP Group and/or ERDF						
<b>E-03-03.</b> Development of preliminary analysis of the	P3	Conducting a vulnerability analysis of current hydroelectric	2019	HEP Group	6.0	6.0	0	0	0	0	Conducted vulnerability analysis of current hydroelectric



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
vulnerability of existing hydro power plants related to the occurrence of extreme weather and climate hazards and the reduction of rainfall in order to define the most vulnerable hydro power plants and to create a list of priorities	PR	power plants to the occurrence of extreme weather and climate hazards and precipitation reduction in order to define the most endangered hydroelectric power plants and make a priority list.			HEP Group and/or ERDF						power plants to negative impacts of climate change.  Compiled list of priority plants depending on vulnerability.
<b>E-03-04.</b> Development of detailed vulnerability analysis for the most vulnerable hydroelectric power plants with proposed of measures which will involve technical and economic analysis	P3	Conduct a detailed analysis for the most endangered power plants according to the priority list. The analysis will provide proposals for increasing resilience including techno-economic analysis	2020	HEP Group	8.0	0	8.0	0	0	0	Conducted detailed analysis for the most endangered power plants according to the priority list. The analysis provides proposals for increasing resilience including techno-economic analysis.
	PR				HEP Group and/or ERDF						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>E-03-05.</b> Development of project documentation for the revitalisation of parts of settlements in urban areas connected to the central heating system (CHS) by introducing a low-temperature regime to heating pipes, increasing cost-effectiveness of the CHS	P3	Preparation of the implementation of activities in co-operation with owners of apartment buildings, building managers and CHS operators.	2019 – 2023	Ministry responsible for construction and spatial planning, ministry responsible for the energy industry, CHS operators, building managers, co-owners in apartment buildings	15.0	3.0	3.0	3.0	3.0	3.0	Produced project documentation for 100 settlements connected to the CHS of the average surface of 15,000 m <sup>2</sup> per settlement (the price of project documentation drafting per settlement amounts to 150,000 kuna ).
	PR	Carrying out a promotional campaign.  Drawing up standardised public calls or tender documents for co-funding of energy certificates and draw up project documentation.			ERDF						
<b>E-03-06.</b> Revitalization of urban areas connected to the	P3	Preparation of the implementation of activities in co-operation with	2020 – 2023	Ministry responsible for construction and spatial	1.500.0	0	300.0	400.0	400.0	400.0	Conducted revitalisation of 100 settlements in urban areas



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
central heating system (CHS) through introducing a low-temperature regime in hot-water pipelines, thus increasing the profitability of CHS	PR	owners of apartment buildings, building managers and CHS operators.  Carrying out a promotional campaign.  Drawing up standardised public calls or tender documents for co-funding of the revitalisation of settlements in urban areas connected to the CHS.		planning, ministry responsible for the energy industry, CHS operators, building managers, co-owners in apartment buildings	ERDF						connected to the CHS by introducing a low-temperature regime to heating pipes. The average surface amounts to 15 000 m <sup>2</sup> per settlement (the revitalisation amount is 1000 kuna/m <sup>2</sup> ).



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### 4.8. Tourism

#### 4.8.1. T-01 – Integration of climate change into the tourism development strategy

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>T-01-01.</b> Definition of the impact of climate change on tourism	PI	Producing an assessment of climate change impact on the following geographical areas of the Republic of Croatia: islands and the coastal area (special emphasis to be placed on the North, Middle and South Adriatic), continental and mountainous Croatia. Conduct analysis of the expected climate change impact on all forms (segments) of the tourist offer.	2019	Ministry responsible for tourism	1.5	1.5	0	0	0	0	Obtained expected climate change parameters in the form of climate elements important for tourism in the defined geographical areas (e.g. temperature, max. temperature, clouds, wind direction and velocity, etc.).  Defined positive/negative climate change impacts on current tourist products and services.
	RE				EU funds, ministry responsible for tourism						
<b>T-01-02.</b> Definition of guidelines for the development of Croatian tourism in	PI	Based on defined projections (defining climate change impact on tourism), Croatian tourism development	2019	Ministry responsible for tourism	0.8	0.8	0	0	0	0	List and elaboration of development guidelines for individual segments of the tourist offer in
	RE				EU funds, ministry responsible for tourism						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
accordance with adaptation to climate change		guidelines need to be developed with integrated adaptation measures. The guidelines should relate to all forms of the tourist offer and previously defined geographical areas (islands and the coastal area – the North, Middle and South Adriatic, continental and mountainous Croatia).									different geographical areas.
<b>T-01-03.</b> Development of plans for protection of tourism infrastructure against the impacts of climate change and weather extremes	P1	Protection plans define the manner in which the current tourist infrastructure should be adapted to the forecasted climate change. The plans should be made at the following levels; the islands and the coastal area (special emphasis is to be placed on the North, Middle and South	2020 – 2021	Continental and Adriatic Croatia according to NUTS 02 classification	2.0	0	1.0	1.0	0	0	A set of proposals for tourist infrastructure adaptation measures.  Defined framework of possible tourist infrastructure development.  Adopted two tourist infrastructure protection plans
	RE				EU funds						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		Adriatic), continental and mountainous Croatia									for Continental and Adriatic Croatia.
<b>T-01-04.</b> Development of plans for the construction of future tourism infrastructure, more resilient to weather extremes	PR	Resilience to climate extremes must become a part of every planned tourist infrastructure. The tourist infrastructure construction plans define the measures and manners of infrastructure construction that will ensure resilience to the expected climate change. The plans should be made at the following levels: the islands and the coastal area (special emphasis is to be placed on the North, Middle and South Adriatic), continental and mountainous Croatia.	2020 – 2023	Continental and Adriatic Croatia according to NUTS 02 classification	2.8	0	0.7	0.7	0.7	0.7	Set of measures for the most effective manner of tourist infrastructure construction resistant to climate change.  Integrated climate change and adaptation in the adopted plans.
	RE				EU funds						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>T-01-05.</b> Continuous monitoring of the state of tourism infrastructure	P1	In order to carry out continuous adaptation, it is also necessary to conduct permanent monitoring of the process of supervision and analysis of the state of the tourist infrastructure. For the performance of these tasks, it is necessary to form a body that will be established by agents of activities T-01-03 and T-01-04.	2020 – 2023	Continental and Adriatic Croatia according to NUTS 02 classification	2.0	0	0.5	0.5	0.5	0.5	Report on the implementation of annual plans for the construction of tourist infrastructure.  Report on the implementation of annual plans for the protection of tourist infrastructure.
	RE				EU funds, counties and county tourist boards						



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### 4.8.2. T-02 - Raising awareness of persons involved in the tourism sector on the possibilities of adaptation to climate change

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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>T-02-01.</b> Organisation of workshops for interested tourism professionals in order to learn about specific climate risks, their likelihood of occurrence, and adaptation options	P1	Workshops presenting topics such as climate risks, climate projections, adaptation possibilities, will serve for awareness-raising of stakeholders and creating foreknowledge on adaptation possibilities.  It is necessary to organise 5 workshops per year in different geographical areas, continuously over the period of 5 years.	2019 – 2023	Ministry responsible for tourism  Croatian Chamber of Economy  Regional and local tourist boards	1.25	0.25	0.25	0.25	0.25	0.25	25 workshops carried out <sup>7</sup> .  Generally achieved higher level of knowledge, skills and competence leading to better adaptation.  500 persons attending the workshops <sup>8</sup> .  Increased number of experts dealing with adaptation of the tourist offer to new climate conditions.  Increased number of new tourist products and services.
	ED				EU funds						

<sup>7</sup> 5 geographical areas (regions) during the period of 5 years – 25 workshops

<sup>8</sup> Based on up to 20 persons per workshop. The workshops are designed for a broader profile of employees in tourism.



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>T-02-02.</b> Printing of promotional materials and other advertising activities to spread awareness of the necessity for adaptation – directed towards tourism subjects	P1	The printed materials will in a simple manner provide information about the subject matter of adaptation to climate change in tourism and provide the possibility of development of new products and services in line with future climate conditions. Besides, the information about adaptation to climate change will be disseminated through the media.	2019 – 2023	Ministry responsible for tourism	0.75	0.15	0.15	0.15	0.15	0.15	Number of interested stakeholders for adaptation to climate change in tourism.
	ED			Croatian Chamber of Economy  Regional and local tourist boards  Croatian Tourist Board	EU funds						



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### 4.8.3. T-03 - Strengthening the competencies of high school and university students

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>T-03-01.</b> Education of teaching personnel on climate change and adaptation measures in the tourism sector	P1	Secondary schools and faculties primarily conducting research on tourism and economic faculties that have a chair for tourism should employ at least one educated and trained expert/scientist for the studying of tourism adaptation to climate change. This activity implies training through various forms of education and stimulation of research through the funding of research	2020 – 2023	Ministry responsible for science and education	4.0	0	1.0	1.0	1.0	1.0	12 scientists / experts studying the above-mentioned subject matter in secondary schools and at faculties.  Increased number of scientific / professional papers covering adaptation to climate change. <sup>9</sup>
	ED				EU funds						

<sup>9</sup>It is impossible to define the necessary number of published papers considering that the publication of a scientific/professional paper does not only depend on the will and knowledge of the author, but also a number of other factors which are difficult to influence.



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		projects.									
<b>T-03-02.</b> Climate change and adaptation in the tourism sector - basic or elective subject / course in secondary schools and colleges geared towards tourism	P1	Introduction of courses into secondary schools and faculties providing tourism and hospitality courses will provide studies of adaptation to climate change in the tourism sector and enable expansion of competence and knowledge for more secondary school and university students who will work in the tourism sector in the future. The resources are related to employees' salaries and development of working programmes.	2020 – 2023	Ministry responsible for science and education	6.0	0	1.5	1.5	1.5	1.5	Increased number of young people included in the problem matter of adaptation to climate change. Raised awareness about the necessity of adaptation to climate change.
	ED			Ministry responsible for tourism	EU funds						



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### 4.8.4. T-04 – Strengthening the resilience of tourism infrastructure to different weather extremes

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>T-04-01.</b> Development of specific destination offers adapted to climatic and spatial characteristics	P1	This measure relates to development of specific forms of tourism, i.e. tourist offer in a certain area (North, Middle, South Adriatic, continental and mountainous Croatia) taking into account its geographical and climate characteristics. Based on the activity T-01-02 (defining Croatian tourism development guidelines in line with adaptation to climate) development of the best form of tourist offer needs to be adapted to the projected climate change and spatial limitations. The products need to be	2021 – 2023	Regional and local self-government units	3.0	0.0	0.0	1.0	1.0	1.0	New tourist products.  Increased competitiveness of Croatian tourism.  Increased number of employees in the tourism sector.  Generated income from tourism  Tourist offer is resistant to new climate conditions. Extension of the tourist season.
	PR				EU funds, ministry responsible for tourism, tourist entities, local government						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		continuously developed and adapted.									
<b>T-04-02.</b> Construction of public tourism infrastructure adapted to climate change	P1	In the process of construction of public tourist infrastructure (hotels, beaches, ski and cycling routes...) it is necessary to take into account the expected climate change in order to avoid the possible negative impacts and financial losses. It is also necessary to adapt the current tourist infrastructure so that it could adapt to the expected climate change. For adaptation purposes, it is also necessary to create and use green infrastructure around tourist facilities.	2020 – 2023	Regional and local self-government units	662.0	0	10.0	207.0	217.0	228.0	Investment in tourist infrastructure that will be resistant to climate change.
	PR				EU funds, tourist entities, local self-government units						
	PR				EU funds tourist entities, local community						



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### 4.9. Health

#### 4.9.1. ZD-01 - Establishment of a system for calculating health-economic indicators for climate change-related conditions

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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>ZD-01-01.</b> Development of a calculation system of health-economic indicators by selecting priority diagnoses according to the International Classification of Diseases and Related Health Problems that can be linked to the impact of meteorological or climatic parameters	P4	Forming a priority list (a diagnosis or group of diagnoses).  Preparation of tender documentation, public procurement and selection of a service provider for the analysis of the state at the national level.	2019 – 2023 (ongoing)	Croatian Health Insurance Fund (HZZO)  Ministry responsible for health care, Croatian Institute of Public Health and a network of county institutes of public health, Croatian Health Employers Association	1.65	0.33	0.33	0.33	0.33	0.33	Formed list of priority diagnoses and list of possible indicators for the information system at county levels.  Selected at least 10 national priority diagnoses and lists of indicators for the information system. Prepared tender documentation for information service providers.
	PR				ERDF						
<b>ZD-01-02.</b> Establishment of network of persons conducting	P4	Appointment of members of committees.	2019 – 2023 (ongoing)	Croatian Health Insurance Fund, ministry responsible for health care,	34.6 <sup>10</sup>	6.93 <sup>11</sup>	6.93	6.93	6.93	6.93	Appointed committee of provider representatives (Ministry of
	RE	Networking and			State						

<sup>10</sup> 1.65 million kuna x 21 county

<sup>11</sup> 0.33 million kuna per unit of measure (local (regional) self-government units)



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
health and economic analyses		strengthening capacities. Education of at least 5 persons at the national level.		Croatian Institute of Public Health and a network of county public health institutes, Croatian Health Employers Association	Budget ERDF OPCC						<p>Health, Croatian Health Insurance Fund and health care institutions).</p> <p>Appointed at least 5 experts at the county level and 11 experts at the national level for the evaluation of the selected diagnoses (annual fee and reimbursement of travel costs and expense allowances provided in the budget).</p> <p>Concluded legal and financial agreement between the Ministry of Health, / Croatian Health Insurance Fund and providers of health-economic analyses.</p>



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
											At least two workshops carried out at county levels on the application of health-economic analyses (reimbursement of travel costs and expense allowances provided in the budget).
<b>ZD-01-03.</b> Establishment of an automated calculation within the central information healthcare system / health-ecological / public health subsystem	P4	Preparation of specification for the connection of data from the health system with data on climate change and state of the environment (0.33x21=6.93 million).  Completed public procurement, evaluation of submitted bids and service provider	2019 – 2023 (ongoing)	Croatian Health Insurance Fund, Ministry responsible for health care, Croatian Institute of Public Health and a network of county institutes of public health, Croatian Health Employers Association	32.93	22.93 <sup>12</sup>	2.5	2.5	2.5	2.5	Selected service providers.
	PR				State Budget ERDF OPCC						Established test system at the level of at least one county / the City of Zagreb.  Conducted annual evaluation of health-economic indicators for at least 5 diagnoses at the level of the selected county/city until 2020.

<sup>12</sup> 6.93 + 16 = 22.93



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		selection. Establish a test system at the level of a single county / the City of Zagreb. Preparation of annual evaluation of indicators at the test-area level at the national level (26 million kuna).									Conducted annual evaluation of health-economic indicators for at least 5 diagnoses at the national level until 2022.
<b>ZD-01-04.</b> Establishment of a networked database and authorized stakeholders in the evaluation and monitoring of health and economic indicators related to climate change	P4	Appointments of committees at the county and national level.	2019 – 2023 (ongoing)	Croatian Health Insurance Fund (HZZO)	35.65	6.93 <sup>13</sup>	7.93 <sup>14</sup>	6.93	6.93	6.93	Appointed at least 5 experts at the county level for the selection of diagnoses for monitoring. Appointed committee of at least 11 experts at the national level for the evaluation of the selected diagnoses Carried out at least 3 five-day courses on the use of the database
	PR	Enabling access to subsystem interface to authorised stakeholders (public procurement of services, selection of bidder and interface administrator).		Ministry responsible for health care  Croatian Institute of Public Health and a network of county public health institutes, Croatian Health Employers	ERDF						

<sup>13</sup> 0.33 million kuna per unit of measure (local (regional) self-government unit)

<sup>14</sup> 0.33 million kuna per (local (regional) self-government unit + 1.0 million kuna to allow access to subsystem interface for experts and committee members.



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		Education of authorised stakeholders.		Association							and on health-economic analyses for experts at the national level.

### 4.9.2. ZD-02 - Integration of various information systems within healthcare to monitor indicators associated with climate change

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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>ZD-02-01.</b> Defining and positioning of key stakeholders within the central health IT system of health institutes, primary health care system, hospital system, emergency reception system, veterinary supervision system and	P4	Forming a list of institutions and representatives.  Educating experts in health care and other priority systems.	2019 – 2023	Ministry responsible for health care Croatian Health Insurance Fund, Croatian Institute of Public Health and a network of county public health institutes, Croatian Food Agency, WHO office in the Republic of Croatia, Meteorological and Hydrological	3.30	0.66	0.66	0.66	0.66	0.66	Formed lists of proposals of key stakeholders (institutions, representatives) per counties.  Educated at least 5 health risk experts in the public health care system according to an international programme (at least total of 4.5 ECTS credits per expert).
	RE				ERDF						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
others				Service, Ministry of Environment and Energy							<p>Held at least 2 work meetings, professional gatherings, international conferences with the main topic of assessment of meteorological and climate impacts on the health of the general population and risk groups.</p> <p>Held at least 3 work meetings, professional gatherings, conferences at the national /regional level with the main topic of assessment of meteorological and climate impacts on the health of general population and risk groups.</p>



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>ZD-02-02.</b> Expansion of knowledge base through scientific and expert definition of health indicators associated with climate change	P4	Appointment of members of a working group for the assessment of health risks of meteorological / climate impacts on health.	2019 – 202.	Croatian Health Insurance Fund ministry responsible for health care, Croatian Institute of Public Health and a network of county public health institutes, Croatian Food Agency, WHO office in the Republic of Croatia, Meteorological and Hydrological Service, Ministry of Environment and Energy	3.30	0.66	0.66	0.66	0.66	0.66	Appointed multidisciplinary working groups. Formed list of meteorological indicators. Formed list of health-ecological indicators. Formed list of health indicators. WHO assessment model of the impact of environmental factors on public health harmonised with the current Croatian model. .
	PR	Selection of indicators.  Harmonisation of available international tools with Croatian health-ecological / public health subsystem.			ERDF						
<b>ZD-02-03.</b> Creation of a network of meteorological information systems and air quality monitoring system with preventive, hospital, and primary health	P4	Carrying out public procurement. Evaluation of submitted bids and selection of service providers. Upgrade of the central health information system with	2019 – 2023	Croatian Health Insurance Fund, ministry responsible for health care, Croatian Institute of Public Health and a network of county public health institutes, WHO office in the Republic of	3.30	0.66	0.66	0.66	0.66	0.66	Selected service providers through public procurement.  Upgraded central health information system with health-ecological / public health subsystem
	PR				EFRR						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
care systems		health-ecological / public health subsystem Carrying out annual and 5-year system performance assessment.		Croatia, Meteorological and Hydrological Service, Ministry of Environment and Energy, representatives of health institutions.							Carried out annual and 5-year evaluation.

### 4.9.3. ZD-03 - Establishment of a framework for the implementation of human biomonitoring for tracking environmental factors related to climate change

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>ZD-03-01.</b> Selection of authorized stakeholders for human biomonitoring	P5	Forming a working group at the Ministry of Health to make amendments to legislation and assess priorities.	2019 – 2023	Ministry responsible for health care	5.0	1.0	1.0	1.0	1.0	1.0	Formed working group at the responsible ministry (ministry responsible for health care).
	IR	Creating preconditions for		Croatian Institute of Public Health and a network of county public health	ERDF						Amendments to legislation related to the right of use



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		<p>authorised stakeholders through the working group of the ministry responsible for health care.</p> <p>Announcement of a call for authorisation, evaluation and appointment of authorised stakeholders.</p> <p>Education of at least 3 persons per county.</p>		<p>institutes</p> <p>Institute for Medical Research</p> <p>Croatian Institute for Health Protection and Safety at Work</p> <p>Croatian Health Insurance Fund</p>							<p>of analysis results in force.</p> <p>Carried out evaluation of submitted applications.</p> <p>Appointed key persons for the analytical and health-ecological part of the process.</p> <p>At least 3 persons per county (public health institute) trained for data and sample collection.</p>
<b>ZD-03-02.</b> Collection of epidemiological / descriptive population data and analysing environmental factors related to climate change amongst people	P5	Collecting human samples.	2019 – 2023	Ministry responsible for health care	50.0	10.0	10.0	10.0	10.0	10.0	<p>Formed admission centres at the level of the network of institutes for public health for the collection of descriptive data and samples.</p> <p>Restored analytical</p>
	IR	<p>Collecting environmental samples.</p> <p>Including the results of environmental sample analyses in the health-ecological / public</p>		<p>Croatian Institute of Public Health and a network of county public health institutes</p> <p>Croatian</p>	ERDF						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		health subsystem.  Preparation of public procurement documentation for the services of reconstruction / construction of admission centres / ambulances for the collection of samples at the level of the network of public health institutes.  Collection of epidemiological data and biological samples for the national human biomonitoring research project.		Health Insurance Fund  Institute for Medical Research  Croatian Institute for Health Protection and Safety at Work							equipment of the central laboratory.  Collected epidemiological descriptive data on the population (at least 5 000 respondents).  Collected at least 15 000 biological samples.
<b>ZD-03-03.</b> Publication of research findings and creation of a national knowledge base	P5	Integration of results of environmental and human sample analyses.	2019 – 2023	Croatian Institute of Public Health and a network of county public health institutes	5.0	1.5	1.5	1.0	0.5	0.5	Purchased statistical programme and at least 3 persons trained for statistical data processing.
	IR	Publishing of public procurement and		Private ICT	ERDF						Statistically



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		<p>selection of the provider of statistical programme and statistical data processing services.</p> <p>Expanding health-ecological / public health subsystem with indicators and results from the human biomonitoring research.</p> <p>Increasing the number of published papers.</p>		<p>sector</p> <p>Croatian Health Insurance Fund</p> <p>Ministry responsible for health care</p> <p>Institute for Medical Research</p> <p>Croatian Institute for Health Protection and Safety at Work</p>							<p>processed epidemiological and analytical results of human biomonitoring research.</p> <p>Data gathering and involvement of stakeholders in the human biomonitoring platform.</p> <p>Published at least 2 papers per year in relevant international journals.</p>



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### 4.10. Spatial planning and management of the coastal area

#### 4.10.1. PP-01 - Strengthening of the knowledge base, as well as the monitoring and evaluation system

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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>PP-01-01.</b> Implementation of targeted research on the impact of sea level rise on the most vulnerable parts of the coast as a basis for the preparation of priority intervention plans	P5	Conducting thematically and spatially targeted research on sea level rise at the most vulnerable parts of the coast, including endangered parts of the zones of valuable cultural heritage as a basis for the preparation of priority recovery plans and spatial development planning that will be more resistant to climate change impacts.  Implementation through allotted funding for this thematic area in the programmes	2019 – 2022	Ministry responsible for environmental protection  Ministry responsible for science, EPEEF, Croatian Science Foundation	4.0	1.0	1.0	1.0	1.0	0	Number of completed research projects in accordance with contractual obligations.  Number of spatial and other recovery plans in which findings from the research projects were used.  Number of locations/areas covered by the research.
	IR				EPEEF  EU funds (ERDF)						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		of stimulation of research and development activities in the field of climate change in coordination with the ministries responsible for construction and spatial planning, and culture.									
<b>PP-01-02.</b> Implementation of an integrated multi-disciplinary assessment of the vulnerability of coastal areas to extreme sea levels, including social and economic aspects as well as cost estimates and the benefits of	P1	Development of periodic integral multidisciplinary assessment of vulnerability of coastal areas of the Republic of Croatia to extreme sea levels, including socioeconomic aspects (damage) and estimation of costs and benefits of options of adaptation measures and	2020 – 2021	Ministry responsible for environmental protection	7.0	0	4.0	3.0	0	0	Completed assessment in accordance with contractual obligations.
	PR			Ministry responsible for science, EPEEF, Croatian Science Foundation	EPEEF EU funds (ERDF)						Number of strategic spatial planning and development documents and documents regarding government monitoring using the assessment findings.



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
adaptation options		their prioritisation by locations (distance from the coast, coastal walls, coastal embankments, urban-technical of protection and damage minimisation measures, graveling erosive shorelines and beach nourishment, etc.). Implementation through allotted funding for this thematic area in research and development stimulation programmes in the field of climate change in coordination with HV regarding									



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		activities in the Flood Risk Management Plan.									
<b>PP-01-03.</b> Implementation of targeted research on climate change impacts related to spatial planning decisions in the function of tourism development	P5	Implementation of target integral (multi-disciplinary) research (through public calls), including best practice analysis, climate change impact on the decision-making criteria in spatial planning related to all the requirements for the planning of tourist zone areas outside and in settlements at different	2020 – 2021	Ministry responsible for environmental protection  Ministries responsible for tourism, spatial planning and science, EPEEF, Croatian Science Foundation	1.0	0	0.5	0.5	0	0	Number of completed research projects in accordance with contractual obligations <sup>15</sup> .  Number of recommendations from research projects included into guidelines from PP-03-02.
	IR				EPEEF EU funds						

<sup>15</sup>In this tendering programme the minimum amount is 500.000 kuna , which is sufficient for research on the criteria for the selection of tourist zone locations and spatial planning conditions for these locations by minimising the negative and potentially using the positive impacts of climate change, rather than detailed research on specific locations (as is the case in PP-01-04). The amount of 1 million kuna may be sufficient for one or maximum 2 projects of coordinated research areas.



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		planning levels.  Implementation through allotted funding for this thematic area in the programmes of stimulation of research and development activities in the field of climate change. In the elaboration of fields and objectives of the research ensuring coordination with the ministries responsible for spatial planning and tourism.									
<b>PP-01-04.</b> Implementation of an assessment of vulnerability to the occurrence of thermal islands and	P1	Implementation of periodic assessments of vulnerability of settlements to the occurrence of thermal islands and	2019 – 2022	Ministry responsible for environmental protection  Ministries responsible	4.0	1.0	1.0	1.0	1.0	0	Number of completed research projects in accordance with contractual obligations.  Number of
	PR				EPEEF EU funds (ERDF)						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
extreme precipitation in settlements, with emphasis on connection with spatial planning solutions		extreme precipitation, taking into consideration spatial planning solutions – analysis and mapping of vulnerability and elaboration of analytical indicators as well as possible options of adaptation measures as a basis for the improvement of spatial plans and respective legislation.  Implementation through allotted funding for this thematic area in		for spatial planning and science, EPEEF, Croatian Science Foundation							locations/settlements covered by the research <sup>16</sup> .

<sup>16</sup>Most of these research are carried out for larger towns, but small towns like Knin, Sinj or Vodice also have problems. The idea is to analyse the relationship between the settlement structure, which is the result of spatial planning solutions, and vulnerability, to establish which solutions are more favourable, which would provide guidelines for future planning of settlements that would be more resistant to specific types of climate impacts. Another idea is to analyse multiple settlements in the framework of individual projects, e.g. 5-10, that would provide more relevant correlations of urban typologies and vulnerability. This indicator thus estimates the number of analysed settlement situations. The amount of 4 million kuna is sufficient for 4-5 projects, 8 at the most.



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		the research and development stimulation programmes in the field of climate change ensuring coordination with the ministry responsible for spatial planning and HV in the elaboration of the field and objectives of the research.									
<b>PP-01-05.</b> Ensuring availability of research results through current information systems of spatial planning, protection of the environment and waters or Open Data Portal i.e.	P4	Integration of the results of research, monitoring and evaluation within Measure PP-01, especially those in the form of a map, into current information systems of spatial planning, protection of the	2021 – 2022	Ministries responsible for environmental protection and spatial planning HV	1.0	0	0	0.5	0.5	0	Number of publically available publications (including in the digital form) with complete results of research projects.  Number of new layers of spatial information in the information systems of spatial planning, protection of the environment and
	PR				Ministries responsible for environmental protection and spatial planning, HV, EU funds						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
Geoportal of National Spatial Data Infrastructure		environment and waters or Open Data Portal i.e. Geoportal of National Spatial Data Infrastructure and ensure their availability to the general public.									water arising from the completed research projects from Measure PP-01.



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### 4.10.2. PP-02 - Strengthening the human and institutional capacities of professional stakeholders in the spatial planning system

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>PP-02-01.</b> Strengthening of continuing professional training program for spatial planners concerning the application of climate change adaptation measures	P1	Developing and carrying out a permanent professional training programme related to the implementation of climate change adaptation measures in spatial planning by the responsible institution (Croatian Chamber of Architects). In the framework of professional training, guidelines are used from PP-03-02 and PP-03-03 and results of activities from PP-01.	2022 – 2023	Croatian Chamber of Architects  Ministries responsible for environmental protection and spatial planning	0.2	0	0	0	0.1	0.1	Number of carried out professional trainings.  Number of counties in which professional trainings have been carried out.  Number of participants in professional trainings (separate for Internet participants if this form is used).
	RE				Croatian Chamber of Architects (participation fees), ministries responsible for environmental protection and spatial planning						



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### 4.10.3. PP-03 – Integration of adaptation measures into the spatial planning system

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>PP-03-01.</b> Amendments to the legal framework to develop adaptation measures to climate change in spatial planning	P1	Draft expert bases (with best practice analysis) and implementation of the amendments to the respective laws and regulations that will be used for a more detailed elaboration of the implementation of climate change adaptation measures in spatial planning taking into account, among others, the results and recommendations from the research projects from Measure PP-01.	2021	Ministry responsible for spatial planning	0.2	0	0	0.2	0	0	<p>Drafted expert base of the analysis of requirements for amendments to respective spatial planning legislation related to the implementation of adaptation measures in spatial plans.</p> <p>Carried out legislative amendments in accordance with the findings from the expert base.</p>
	RE				State Budget						
<b>PP-03-02.</b> Development and strengthening of Integrated Spatial Planning	P1	Developing guidelines for the improvement of spatial planning methodology and Strategic Environmental	2021 – 2022	Ministry responsible for spatial planning	1.5	0	0	1.0	0.5	0	<p>Developed guidelines in accordance with contractual obligations.</p> <p>Guidelines</p>
	RE			Ministry responsible for	EPEEF EU funds						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
Methodology and Strategic Environmental Impact Assessment with emphasis on applying climate change adaptation measures		Impact Assessment with emphasis on climate change adaptation (including best practice analysis), using the techniques of integral evaluation of land and marine environment (vulnerability analyses) applicable in the design of spatial plans or expert bases for the planning of adaptation measures at the regional and local level, taking into account the results of research projects from Measure PP-01.		environmental protection	(ERDF), State Budget (possible to link with a similar measure from the Programme of Measures for the Protection and Management of Marine Environment and the Coastal Region of the Republic of Croatia)						accepted for use by the responsible ministries.
<b>PP-03-03.</b> Development of the programme and guidelines for	P1	Development of the programme and guidelines for strengthening inter-sectoral	2022	Ministry responsible for spatial planning	0.3	0	0	0	0.3	0	Developed guidelines in accordance with contractual



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
strengthening inter-sectoral coordination in the spatial planning procedure, with emphasis on the planning of climate change adaptation measures	RE	coordination in the spatial planning procedure, especially including coordination of sectors in the planning of climate change adaptation measures.  The implementation of this activity can be integrated with the implementation of PP-03-02.		Ministry responsible for environmental protection	State Budget (possible to link with a similar measure from the Programme of Measures for the Protection and Management of Marine Environment and the Coastal Region of the Republic of Croatia)						obligations.  Guidelines accepted for use by the responsible ministries.
<b>PP-03-04.</b> Analysis and elaboration of methods of monitoring and evaluating the efficiency and effectiveness of spatial plans in the implementation of climate change adaptation	P1	Research and analysis of the methods of monitoring and assessment of effectiveness and efficiency of the spatial planning system and their execution in relation to the current spatial situation as well as use of	2022 – 2023	Ministry responsible for environmental protection  Ministries responsible for spatial planning and science, EPEEF, Croatian Science	1.0						Conducted and completed research in accordance with contractual obligations.  Number of recommendations (analytical tools, indicators) accepted and used in the production of periodic
	RE				EPEEF EU funds	0	0	0	0.5	0.5	



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
measures		<p>vulnerability assessments and application and implementation of adaptation measures predicted in spatial plans.</p> <p>Implementation through allotted funding for this thematic area in the programmes of stimulation of research and development activities in the field of climate change ensuring coordination with the ministry responsible for spatial planning in the elaboration of the area and objectives of research.</p>		Foundation							reports on the current spatial situation and reports on the state of the environment.



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### 4.10.4. PP-04 – Raising awareness of the public and decision-makers at all levels

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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>PP-04-01.</b> Design and implementation of public information and education programmes focusing on targeted groups in vulnerable areas	P1	Developing and carrying out information and education programmes for the public on the importance of adaptation measures (brochures, media campaigns, local gatherings) focusing on target groups from areas that are likely to be faced with adverse impacts of climate change in the future (e.g. property owners in vulnerable areas on the coast or in towns or citizens sensitive to heat waves).  The responsible institution can	2019 – 2023	Ministry responsible for environmental protection (as the activity agent) and implementing partners, e.g. NGO	2.5	0.5	0.5	0.5	0.5	0.5	Number of media events (TV, radio) per year aiming to inform and educate the public.  Number of cities/settlements in which activities have been carried out.  Total number of citizens who participated in the activities.  Number of visits to websites aiming to inform and educate in the framework of the programme.
	ED				Ministry responsible for environmental protection, EU funds (ESF)						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		make a common communication strategy for all similar activities related to climate change.									
<b>PP-04-02.</b> Design and implementation information programmes for decision-makers at all levels of government	P1	Developing and carrying out information programmes for decision-makers at all government levels, adapted to their field of activity (drawing up local adaptation plans) with emphasis on specific situations and data on vulnerability assessments and damages and benefits from adaptation measures, funding possibilities and practical examples of	2019 – 2023	Ministry responsible for environmental protection (as the activity agent) and implementing partners, e.g. NGO, associations of cities and municipalities, etc.	1.5	0.3	0.3	0.3	0.3	0.3	Total number of decision makers (to be defined by the programme) who personally participated in the informing and education activities.  Number of filled in questionnaires by decision-makers after gatherings, presentations or workshops.  Number of towns/settlements in which the activities have been carried out.
	ED				Ministry responsible for environmental protection, EU funds (ESF)  Croatian Chamber of Architects (through participation fees)						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		activities from other areas.									
<b>PP-04-03.</b> Raising awareness of social responsibility in the banking and insurance sector regarding climate change	P1	Conducting an analysis of the state in the commercial banking sector and insurance industry related to recognition of climate impacts as risk management factors and organising a workshop with representatives of both sectors on the topic of possibilities for linking credit and insurance terms with climate risks to which credited projects or insured goods are exposed (the activity can also be linked with other sectors, e.g. agriculture and risk	2022	Ministry responsible for environmental protection	0.3	0	0	0	0.3	0	Conducted analysis and organised workshop.  Number of banks and insurance institutions whose representatives have participated in the workshop.  Number of arranged initiatives for the inclusion of climate risks in credit and insurance terms
	ED				Ministry responsible for environmental protection, EU funds						



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		management, and the topic of climate change mitigation as a factor in green banking).									



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### 4.11. Risk management

#### 4.11.1. UR-01 – Mapping of water sources outside the public water supply system

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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>UR-01-01.</b> Mapping of water sources outside the public water supply system (private wells, spring-water intakes, etc.)	P4	Announcement of a public call for the analysis of the states of sources at county levels.	2019 – 2023	Water Management Directorate	23.49	12.83	3.53	3.53	1.8	1.8	Conducted analysis of the current and estimated need for and recovery extent of potential sources.
	PR	Identification of public and private sources, collecting data on the sources, analysing current and required measurements, assessing the need for recovery by analysis (1.4 million kuna per year for 3 years = 4.2 million kuna).  Educate employees in county public		HV Network of public health institutes  Local government or self-government  Private sector (ICT service provider)	ERDF 5b EAFRD – Rural Development Programme – Sustainable Water Management and Reduction of Irrigation Pressure on Water Resources, Prevention of Fire Outbreak and Disaster Management						Educated and employed person in county public health institutes for coordination and database management.  Established IT basis of all stakeholders.  Formed list of sources with features within the source database.  Database filled with initial indicators from previous monitoring.  A promotional video filmed, advertising in the national media funded, printed educational materials



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		<p>health institutes (0.33 million kuna per year for 3 years = 1 million kuna).</p> <p>Establishment and maintenance of an integrated IT system for data collection in real time and automated analysis and risk assessment based on predefined algorithms (9.2 million establishments + 6 million maintenance = 15.2 million kuna).</p> <p>Preparation of technical documentation for the reconstruction of public and private sources</p>									<p>distributed (printing run of at least 210 000 copies).</p> <p>Procured 420 automated measuring devices and developed application for monitoring the quantity and basic determinants of water availability and safety (20 per county).</p>



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	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		<p>at county levels (0.21 million kuna).</p> <p>Raising the public's awareness of the implementation of incentive measures for the recovery implementation (0.3 million per year = 1.5 million kuna).</p> <p>Procurement of automated measuring devices for the monitoring of quantity and basic determinants of water availability and safety</p>									
<b>UR-01-02.</b> Water testing and initial health risk assessment and	P4	Education/employment of at least one person per county for	2019 – 2023	Water Management Directorate  Network of	7.7	2.0	2.1	1.0	1.3	1.3	<p>Trained and employed at least 1 person per county.</p> <p>Educated at least five</p>
	PR				ERDF 5b EAFRD – Rural						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
application in the mapped water sources outside the public water supply system		<p>initial activities within the database.</p> <p>Education of experts about health risk assessment.</p> <p>Establishment of an IT system of initial risk assessment based on analyses and professional evaluation of results.</p> <p>Risk assessment and allocation for at least 20 sources per county.</p> <p>Implementation of the stimulating measure of recovery.</p> <p>Publication of the research</p>		public health institutes, local government or self-government, private sector (ICT service provider)	Development Programme – Sustainable Water Management and Reduction of Irrigation Pressure on Water Resources, Prevention of Fire Outbreak and Disaster Management						<p>persons for the health risk assessment.</p> <p>Database filled with indicators based on analyses during the mapping project.</p> <p>Statistically processed data.</p> <p>Established automatic algorithm of initial risk assessment in the analysed sources database.</p> <p>Recovered at least one source per county to be used in a priority type of disaster based on initial risk assessment.</p> <p>Published at least two scientific papers in an international journal.</p> <p>Published at least five professional/conference papers.</p>



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		results.									
<b>UR-01-03.</b> Comprehensive assessment of health risk and application based on results of field inspections, documentation, and laboratory analysis	P4	Forming a work group at the Ministry of Environment and Energy to draw up amendments to legislation and carry out risk assessment.  Estimation of the possibilities for the use of specific sources according to priorities of local (regional) self-government units and type of disaster.	2019 – 2023	Water Management Directorate  Network of public health institutes, local government or self-government units, ministry responsible for health care, HV	2	0.5	0.5	0.5	0.25	0.25	<p>Formed working group at the Ministry of Environment and Energy.</p> <p>Legislative changes related to the right to use the results of analyses have come into force.</p> <p>Published utilisation protocols on an expanded platform for disaster risk assessment (according to type of disaster) for at least 10% of mapped sources annually.</p> <p>Published five-year monitoring, recovery and utilisation plan in the following period for the remaining sources.</p>
	PR				ERDF 5b EAFRD – Rural Development Programme – Sustainable Water Management and Reduction of Irrigation Pressure on Water Resources, Prevention of Fire Outbreak and Disaster Management						



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### 4.11.2. UR-02 – Multi-sectoral risk assessment for various threat / risk scenarios associated with climate change

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022.	2023	
<b>UR-02-01.</b> Expansion of relevant working groups and persons responsible for certain types of threats / risks related to climate change	P4	Expansion of risk assessment working groups of the Croatian Platform for disaster risk reduction  Forming of additional activity scenarios for individual types of threats/risks.	2019 – 2023	National Protection and Rescue Directorate (NPRD)	0.5	0.1	0.1	0.1	0.1	0.1	Formed expanded multisector work group at the national level.  Appointed additional key stakeholders and persons responsible for individual types of climate-change related disasters, emergencies or incidents.
	RE			Emergency services network (firefighters, Ministry of the Interior)  Local government or self-government  Network of public health institutes  President's Office  Ministry of Defence of the Republic of Croatia  Ministry of the Sea, Transport and	State Budget  ERDF 5a, 5b, 5i  ERDF/ CF – OPCC – Prevention, Risk and Disaster Management in Case of Drought, Flood, Forest Fires, Heat Waves, Coastal Erosion						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022.	2023	
				Infrastructure							
<b>UR-02-02.</b> Development of algorithms and action guidelines for handling various scenarios at all levels	P4	Forming of a multi-sectoral risk assessment work groups at the civil protection system and regional self-government level.  Development of different procedure algorithms and national guidelines.	2019 – 2023	National Protection and Rescue Directorate (NPRD)	0.25	0.05	0.05	0.05	0.05	0.05	Formed multi-sectoral working groups at county levels.  Available procedure algorithms.  Developed national guidelines.
	RE			Emergency services network (ER, firefighters), Ministry of the Interior, Ministry of Defence of the Republic of Croatia  Local government or self-government  Network of public health institutes	State Budget ERDF 5a, 5b, 5i ERDF / CF – OPCC – Prevention, Risk and Disaster Management in Case of Drought, Flood, Forest Fires, Heat Waves, Coastal Erosion						
<b>UR-02-03.</b> Amendments to the legislative framework related to	P4	Forming a committee for amendments to the legislative framework and	2019 – 2023	National Protection and Rescue Directorate	0.1	0.02	0.02	0.02	0.02	0.02	Amended legislative framework for at least 3 priority disasters, major
	RE				State Budget ERDF 5a, 5b,						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022.	2023	
decentralisation and centralisation of management functions depending on the type of threat / risk		decentralisation.  Preparation of a proposal of the reporting system and evaluation procedure.		(NPRD)  Responsible ministries  Network of regular or emergency services (firefighters, Ministry of the Interior, Ministry of Defence)  Local government or self-government  Network of public health institutes	5i ERDF/CF – OPCC – Prevention, Risk and Disaster Management in Case of Drought, Flood, Forest Fires, Heat Waves, Coastal Erosion						accidents or emergencies.  Established written reporting and evaluation procedure to the committee by application on the expanded platform for disaster risk reduction  At least 50% interventions with positively evaluated reports on decentralised activities.
<b>UR-02-04.</b> Linking of information systems of key stakeholders	P4	Linking communication and information systems at the horizontal and vertical level.  Forming an equipment basis		Responsible government authorities  Basic operative civil defence forces  National	0.45	4.09	4.09	4.09	4.09	4.09	Linked communication systems.  Linked information systems.
	PR				ERDF 5a, 5b, 5i ERDF/CF – OPCC – Prevention, Risk and Disaster Management						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022.	2023	
		and the equipment circulation system at the national level.		Protection and Rescue Directorate  Network of emergency services (firefighters, Ministry of the Interior, etc.)  Croatian Red Cross  Network of public health institutes	in Case of Drought, Flood, Forest Fires, Heat Waves, Coastal Erosion						
<b>UR-02-05.</b> Connection of civil, security, and defence services in interventions	P4	Forming a working group.	2019 – 2023  (In 2020 expansion of the platform for disaster risk assessment by developing a reporting and evaluation application).	Ministry responsible for defence  Other responsible ministries  Intelligence services  Protection and Rescue Directorate	0.1	30.0	30.1	30.0	30.0	30.0	Formed committee for procedure evaluation.  Established written reporting and evaluation to the committee by an application on the expanded platform for disaster risk assessment.
	RE	Strengthening technological capacity of the stakeholders and forming a national base of equipment for floods and forest fires.  Preparing a proposal of a			ERDF 5a, 5b, 5i ERDF/CF – OPCC – Prevention, Risk and Disaster Management in Case of Drought, Flood, Forest Fires, Heat Waves,						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022.	2023	
		system of reporting and evaluation of activities of civilian and security-defence services.		(NPRD)  Network of emergency services (firefighters, Ministry of the Interior, etc.)  Croatian Institute for Emergency Medicine  Croatian Red Cross  Local government or self-government  Network of public health institutes	Coastal Erosion						Positively evaluated activities of civilian and security-defence services in at least 50% interventions.



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### 4.11.3. UR-03 – Expansion of the *Croatian Platform for Disaster Risk Reduction* to include climate change-related indicators for the development of an early warning system

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>UR-03-01.</b> Establishment of an integrated database on climate-change related threats / risks and strengthening the role of the Croatian Platform for Disaster Risk Reduction	P4	Forming an integrated database.	2019 – 2023	Protection and Rescue Directorate (NPRD)	3.0	1.0	0.5	0.5	0.5	0.5	<p>Formed chronological database / list of disasters, major accidents and emergencies related to climate change.</p> <p>Expanded Croatian Platform for disaster risk reduction with a list of climate-change related risks.</p> <p>Established link towards the systems of monitoring meteorological and health indicators.</p>
	PR	Preparing tender documentation for system links to inter-sectoral indicators (meteorological and health).  Carrying out public procurement procedure and selection of ICT service provider.		Local self-government units / counties  Croatian Red Cross  Network of public health institutes  Croatian Food Agency  Private ICT sector	ERDF 5a, 5b and 5i  ERDF/CF – OPCC – Prevention, Risk and Disaster Management in Case of Drought, Flood, Forest Fires, Heat Waves, Coastal Erosion						
<b>UR-03-02.</b> Development of an integrated database and training platform for key	P4	Education and preparation of indicators for integration into the database of climate change-related risks.	2019 – 2023	Protection and Rescue Directorate (NPRD)	1.99	0.5	0.5	0.33	0.33	0.33	At least 1 person per county employed for coordination of education and maintenance/collection of data for the database.
	PR			Meteorological	ERDF 5a, 5b and 5i  ERDF/CF – OPCC – Prevention,						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
stakeholders		Education on the use of ICT system of links to inter-sectoral indicators.		<p>I and Hydrological Service</p> <p>Responsible state administration bodies and institutions included in the work of the Croatian Platform for disaster risk reduction.</p> <p>HV</p> <p>Croatian Veterinary Institute</p> <p>Ministry of Environment and Energy</p> <p>Croatian Red Cross</p> <p>Local self-government units/counties</p> <p>Network of</p>	Risk and Disaster Management in Case of Drought, Flood, Forest Fires, Heat Waves, Coastal Erosion						<p>At least 5 persons per county trained for defining indicators and forming a database.</p> <p>Established database of monitoring life-long learning for participants in the response.</p>



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
				public health institutes  Croatian Food Agency							
<b>UR-03-03.</b> Integration of the results of health and environmental databases and state databases: number of bush fires and forest fires, flood areas or sea level rise areas, condition of crops or of the soil characteristics etc., at the site of disasters or emergency incidents	P4	Tender announcement, carrying out public procurement procedure and selection of a provider of the service of integration of health-ecological and state databases on hydro-meteorological hazards.  Insight into the results of all measurements in the environment (water, food, air, and soil).  Publication of the research	2019 – 2023	Protection and Rescue Directorate (NPRD)	6.2	15.0	3.0	3.0	3.6	3.6	At least 5 persons per county trained for using the database.  Enabled at least 1 link per year (e.g. link and data integration on the number of fires, trends air quality parameters and measured land characteristics at the fire location before, immediately after and after the forest fire near agricultural land, water sources, protected areas or urban area).  Published at least one scientific paper and at least five professional conference papers
	PR			Meteorological and Hydrological Service  Responsible state administration bodies and institutions included in the work of the Croatian Platform for disaster risk reduction  HV  Croatian Veterinary Institute	ERDF 5a, 5b and 5i  ERDF / CF – OPCC – Prevention, Risk and Disaster Management in Case of Drought, Flood, Forest Fires, Heat Waves, Coastal Erosion						



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Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
		results.		Croatian Environment and Nature Agency  Local self-government units / counties  Network of public health institutes  Croatian Food Agency							



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### 4.12. Supra-sectoral measures

#### 4.12.1. KM-01 – Strengthening human and technical capacities for implementing research and applied activities in the area of climate modelling, analysis, and interpretation of observed and expected climatic changes

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Possible funding sources	2019	2020	2021	2022	2023	
<b>KM-01-01.</b> Supporting the development of applied sector models and strengthening capacity for the use of these models in the development of climate models at spatial resolutions 1-4 km and development of climate scenarios for wider Croatian area	P4, P5	Including new human and technical resources in the development of applied sector (so-called application) models and scenarios taking into account the results of basic climate modelling of future climate change, and they are based on specific sector needs and parameters.  Employment and education of experts in the field of advanced climate	2019 –2023	Universities  Scientific research institutes  Agencies  Institutes and other professional bodies  Meteorological and Hydrological Service	1.5	0.5	1	1	1	1	Number of developed applied sectoral models.  Number of trained experts for the use of applied sectoral models.  At least two newly employed and educated experts in the Meteorological and Hydrological Service.  Developed climate model version adapted for wider Croatian area at the spatial resolution from 1 to 4 km by the end of 2019.  Carried out simulations of historical climate (end of the 20 <sup>th</sup> century; at least three realisations) by the end of 2021.  Derived projections of future climate (mid-21 <sup>st</sup> century; at least three realisations) by the end of 2022.
	IR				State Budget and/or national and EU funds and/or programmes (e.g. Croatian Employment Service, Horizon 2020)						



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		modelling.  Application of developed climate model versions to spatial resolutions from 1 km to 4 km using available and planned computer resources.									
<b>KM-01-02.</b> Involvement of new human capacities in the development of combined climate models (atmosphere-ocean-soil) and drafting climatic scenarios for the Adriatic and Mediterranean area	P4, P5	Employment and education of experts in the field of advanced joint climate modelling.  Application of joint climate models to spatial resolutions from 4 km to 12 km using available and planned computer resources.	2019 –2023	Meteorological and Hydrological Service  Universities  Scientific research institutes	1.5	0.3	0.3	0.3	0.3	0.3	At least one newly employed and educated expert in the Meteorological and Hydrological Service and one newly employed and educated expert in other institutions.  Developed version of joined climate model adapted for wider Adriatic and Mediterranean area at spatial resolution from 4 to 12 km by the end of 2019.  Derived historical climate simulations (end of the 20 <sup>th</sup> century, at least one realisation) by the end of 2021.  Derived future climate simulations (mid-21 <sup>st</sup> century; at least one realisation) by the end of 2022.
	IR				State Budget and/or national and EU funds and/or programmes (e.g. Croatian Employment Service, Horizon 2020)						
<b>KM-01-03.</b> Support to the	P4, P5	Inclusion of new human and	2019 –2023	Universities	4.5	0.5	1	1	1	1	Number of applied sectoral



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development of applied sector models and capacity-building for the use of these models	IR	technical capacities in the development of applied models and scenarios that take into account the results of climate modelling of future climate change and are based on specific sectoral needs and parameters		Scientific research institutes  Agencies  Other expert bodies	State budget and/or national and EU funds and/or programmes (e.g. HrZZ, Horizon 2020)							models developed.  Number of qualified experts using the sectoral models.
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### 4.12.2. RP-01 – Development of impact indicators of the implementation of the adaptation strategy for vulnerable sectors and society

Measure and activity designation and activity title	Priority designation within the Adaptation Strategy	Activity description / Implementation method	Implementation period	The responsible authority and associates in implementing the measure/ activity	Estimated total cost (million kuna)	Estimated cost by years of implementation (million kuna)					Implementation indicators
	Activity category				Potential funding sources	2019	2020	2021	2022	2023	
<b>RP-01-01.</b> Preparation of a project assignment by developing additional adaptation indicators.	P4	The activity includes determining potential data sources necessary for the calculation of adaptation indicators and thus inclusion of the necessary organisations in the implementation of activities. Except for adaptation indicators recommended in the Climate Change Adaptation Strategy, in accordance with new	2019	Ministry responsible for the environment and climate  Ministries responsible for sectors vulnerable to climate change, universities, scientific research	0.05	0.05					Number of workshops organised by activity agent to identify all elements of the project assignment for the implementation of activities RP-01-02.  Compiled list of indicators of implementation effects covered by
	RE				State Budget and/or national and EU funds and/or programmes (e.g. Croatian Employment Service, Horizon 2020)						



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		insights, there is an identified need for the development of additional implementation indicators. In order to include the necessary organisations in the implementation of this measure, joint workshops will be organised by activity agents.		institutes							this measure.  Defined project assignment for the implementation of activity RP-01-02.
RP-01-02 Detailed elaboration of all adaptation indicators	P4	The activity involves defining indicators, establishing and prescribing the methodology of design of indicators, establishment of the corresponding sub-indicators, relationships with other indicators, data sources, data collection periodicity, institution(s) responsible for the development of and reporting on the indicators and periodicity and reporting timetable.	201	Ministry responsible for the environment and climate  Ministries responsible for sectors vulnerable to climate change, universities, scientific research institutes	0.9	0.9					List of indicators of implementation effects of the Climate Change Adaptation Strategy on vulnerable sectors and the society with all of the required elements.
	RE				State Budget and/or national and EU funds and/or programmes (e.g. Croatian Employment Service, Horizon 2020)						



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### 5. FUNDING

In 2018, there will be a revision of programme documents for using European Structural and Investment (ESI) Funds for the Period 2014-2020, providing the possibility to partially allocate financial resources in the period until 2020 for some priority measures and activities of the Action Plan 2019-2023. This primarily relates to the use of funds from the European Regional Development Fund (ERDF), the European Agricultural Fund for Rural Development (EAFRD) and the European Social Fund (ESF), where funding of climate change adaptation measures has been defined in thematic objectives, priority axes, investment priorities, and specific measures.

The main funding sources of climate change adaptation measures and activities in the Action Plan 2019-2023 will be ESI funds in particular, and the majority of funds for its implementation should be provided in the future programming period 2021-2027 in the following funds:

- European Regional Development Fund (ERDF)
- Cohesion Fund (CF)
- European Agricultural Fund for Rural Development (EAFRD)
- European Maritime and Fisheries Fund (EMFF)
- European Social Fund (ESF).

Below is a table overview (Table 5-1 – Table 5-2) of specific funding options from ESI funds for priority measures and activities related to climate change adaptation and prevention and risk management. The climate change adaptation activities will be funded in a very small part from the State Budget (SB) (0.21% of the total funding) and this mostly relates to regulatory and administrative activities serving as preparatory actions for defining the framework of operations, analyses, studies, legal framework, etc.



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*Table 5-1: Overview of the amount and sources of financing of the Action Plan 2019-2023 by sectors, adaptation activities and implementation years in million kuna*

Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimat ed total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
Beyond-sectoral measures			2.05	1.60	1.60	1.60	1.60	19.45	0.95	0.00	0.00	0.00	7.50
KM-01	Strengthening human and technical capacities for implementing research and applied activities in the area of climate modelling, analysis, and interpretation of observed and expected climatic changes	KM-01-01. Supporting the development of applied sector models and strengthening capacity for the use of these models in the development of climate models at spatial resolutions 1-4 km and development of climate scenarios for wider Croatian area  KM-01-02. Involvement of new human capacities in the development of combined climate models (atmosphere-ocean-soil) and drafting climatic scenarios for the Adriatic and Mediterranean area  KM-01-03. Support to the development of applied sector models and capacity-building for the use of these models	1.1	1.60	1.60	1.60	1.60	7.5					7.5



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
RP-01	Development of impact indicators of the implementation of the adaptation strategy for vulnerable sectors and society	RP-01-01 Preparation of the project assignment  RP-01-02 Detailed elaboration of all adaptation indicators	0.95	0.00	0.00	0.00	0.00	0.00	0.95				
<b>Hydrology, water and sea resources management</b>			<b>23.70</b>	<b>55.20</b>	<b>165.20</b>	<b>263.70</b>	<b>322.20</b>	<b>830.00</b>	<b>0.00</b>	<b>829.00</b>	<b>0.00</b>	<b>0.00</b>	<b>1.00</b>
HM-01	Strengthening the capacity for the implementation of non-structural measures for protection against the harmful effects of water in the occurrence of extreme hydrological opportunities whose increase in intensity and frequency of	HM-01-01. Development of models for the prediction of extreme precipitation in the broader catchment areas and their local occurrence	1.50	1.50	1.50	0.00	0.00	4.50		4.50			
		HM-01-02. Development of models of large water simulation in the wider catchment areas and small torrential streams	0.00	1.50	1.50	1.50	0.00	4.50		4.50			
		HM-01-03. Preparation of a forecast study on flood propagation, determination of flood zones and risks and	0.00	1.50	1.50	1.50	0.00	4.50		4.50			



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
	occurrence is conditioned by climate change	opportunities for the provision of natural flood retention areas and their inclusion in spatial planning documentation											
		HM-01-04. Drafting of revisions to existing protection projects against the harmful effects of water and high sea levels	0.00	2.00	2.00	2.00	0.00	6.00		6.00			
HM-02	Strengthening the capacity to build, reconstruct and upgrade the system for protection against harmful effects of water and related multi-purpose hydro-technical systems (structural measures) and lowland natural floodplains flooded in a	HM-02-01. Preparation of project documentation for the construction and upgrading of existing accumulation and retention systems within multifunctional hydro-technical systems	5.00	7.00	7.00	5.00	0.00	24.00		24.00			
		HM-02-02. Construction of new and upgrading of existing accumulation and retention systems within multifunctional hydro-technical systems	0.00	0.00	100.00	200.00	300.00	600.00		600.00			
		HM-02-03. Preparation of project documentation for the construction,	0.00	1.50	1.50	1.50	0.00	4.50		4.50			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
	controlled fashion	reconstruction and upgrade of protective embankments, dikes and similar facilities and multipurpose systems for protection from harmful effects of water											
		HM-02-04. Construction, reconstruction and extension of protective embankments, dikes and similar multifunctional facilities related to the protection against harmful effects of water	0.00	20.00	30.00	30.00	0.00	80.00		80.00			
		HM-02-05. Development of "green infrastructure" - arrangement of watercourse sections with natural flow characteristics or according to eco-remediation principles of river restoration and provision of natural lowland areas for controlled flooding and retention / reduction of large water - measures of	0.00	3.00	3.00	5.00	5.00	16.00		16.00			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		“flood adaptation”											
HM-03	Strengthening research and management capacities to assess the occurrence and risk of adverse impacts of climate change and adaptation of freshwater and marine water system in current and future climatic conditions	HM-03-01. Provision of education for specifically chosen target groups both in the form of thematic workshops for experts and interested members of the public as well as thematic units within the regular curricula of the primary, secondary and university education populations	0.20	0.20	0.20	0.20	0.20	1.00					1.00
		HM-03-02. Support of research on the possible scenarios of climate change at the national and regional level (for research and management institutions), with the aim of identifying the impacts of climate change, analysing their impact on water and sea resources, and reversing and influencing these changes in the environment, urban areas, infrastructure, protected areas and human activity to a	5.00	5.00	5.00	5.00	5.00	25.00		25.00			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		greater extent related to water (water supply, agriculture, hydropower, etc.)											
		HM-03-03. Improvement of monitoring system of quantitative status and quality of inland water and the condition of the Adriatic Sea and the public availability of their results (measurement, information)	5.00	5.00	5.00	5.00	5.00	25.00		25.00			
		HM-03-04. Development of international cooperation in the implementation of monitoring of the state of the inter-state watercourses and the Adriatic Sea with the aim of sustainable management and protection	3.00	3.00	3.00	3.00	3.00	15.00		15.00			
		HM-03-05. Implementation of the initial activities necessary for the realization of measures whose	4.0	4.0	4.0	4.0	4.0	20.0		20.0			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		implementation is planned in the next phases of realization in the area of water use, protection of water and sea resources and protection from harmful effects of water											
<b>Agriculture</b>			<b>0.30</b>	<b>128.50</b>	<b>273.50</b>	<b>505.00</b>	<b>966.00</b>	<b>1.873.30</b>	<b>0.20</b>	<b>9.10</b>	<b>0.00</b>	<b>1.854.00</b>	<b>10.00</b>
P-01	Implementation of an experimental climate change adaptation programme in agriculture	<p>P-01-01 Preparation for the implementation of a climate change adaptation research programme in agriculture</p> <p>P-01-02. Implementation of the research programme on adaptation to climate change in agriculture</p> <p>P-01-03. Transfer and promoting the achievements of the climate change adaptation research programme in agriculture</p>	0.10	2.00	1.00	2.50	3.50	9.10		9.10			
		P-02-01. Development of an operation for	0.10	0.00	0.00	0.00	0.00	0.10	0.10				



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
P-02	Increasing the water absorption capacity of agricultural soil	increasing the absorption capacity of agricultural soil and inclusion in the Rural Development Program of the Republic of Croatia for the Period 2014 - 2020											
		P-02-02. Design and implementation of a promotional and educational programme of popularisation of the implementation of the operation of increasing water absorption capacity of agricultural soil among farmers	0.00	1.00	1.00	1.00	1.00	4.00					4.00
		P-02-03. Implementation of operations for increasing the water absorption capacity of agricultural soil	0.00	40.00	100.00	200.00	400.00	740.00				740.00	
P-03	Application of the conservation soil treatment	P-03-01. Development and implementation of a promotional and educational programme of popularization of soil conservation tillage	0.00	0.50	0.50	0.50	0.50	2.00					2.00



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		among farmers											
		P-03-02. Implementation of soil conservation tillage	0.00	40.00	100.00	200.00	400.00	740.00				740.00	
P-04	Breeding of species and cultivars of agricultural crops and breeds of domestic animals that are more resilient to climate change	P-04-01. Development of an operation for the breeding of species and sorts of agricultural crops and breeds of farm animals that are more resilient to climate change and its inclusion into the Rural Development Programme of the Republic of Croatia for the Period 2014–2020	0.10	0.00	0.00	0.00	0.00	0.10	0.10				
		P-04-02. Development and implementation of a promotional and educational programme of popularization among farmers of cultivation of agricultural crops and breeds of domestic animals that are more resilient to climate change	0.00	0.50	0.50	0.50	0.50	2.00					2.00



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		P-04-03. Implementation of the operation for cultivating species and varieties of agricultural crops and breeds of domestic animals that are more resilient to climate change	0.00	4.00	10.00	20.00	40.00	74.00				74.00	
P-05	Construction of reservoirs for irrigation	P-05-01. Development and implementation of a promotional and educational programme popularizing the construction of reservoirs for irrigation among farmers	0.00	0.50	0.50	0.50	0.50	2.00					2.00
		P-05-02. Implementation of reservoir construction for irrigation	0.00	40.00	60.00	80.00	120.00	300.00				300.00	
Forestry			24.70	24.70	29.20	27.20	27.20	133.00	0.50	132.50	0.00	0.00	0.00
ŠU-01	Incorporation of adaptation measures into key documents pertaining to forests and forestry sectors	ŠU-01-01. Incorporate measures of adaptation to climate change into Forestry Sector Strategy and Forest Act as well as other legal regulations concerning forests and forestry sector, including	0.10	0.10	0.10	0.10	0.10	0.50	0.50				



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		implementation indicators											
ŠU-02	Research on species and provenance of forest trees that are more resilient to climate change	ŠU-02-01. Implementation of research of species and provenance of forest trees that are resilient to climate change	5.00	5.00	5.00	5.00	5.00	25.00		25.00			
ŠU-03	Strengthening the capacity for systematic monitoring of forest ecosystem conditions as a prerequisite for informed planning and implementation of climate change adaptation	ŠU-03-01. Evaluation of the existing forest ecosystem monitoring system with identification of advantages and disadvantages and development of guidelines for its improvement	0.50	0.50	0.00	0.00	0.00	1.00		1.00			
		ŠU-03-02. Creating a registry of monitoring, experiments, and research conducted by state institutions that are not part of systematic monitoring, their evaluation, and proposal for inclusion of selected items in the monitoring	0.50	0.50	0.50	0.00	0.00	1.50		1.50			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		system											
		ŠU-03-03. Upgrading and integration of selected existing monitoring / experimentation / research into the monitoring system of forest ecosystem status monitoring and enabling the availability of results in accordance with the INSPIRE Directive	0.00	0.00	5.00	3.50	3.50	12.00		12.00			
ŠU-04	Strengthening capacity for fire protection	ŠU-04-01. Improvement of the system of early warning for forest fires	6.10	6.10	6.10	6.10	6.10	30.50		30.50			
		ŠU-04-02. Develop models of the spreading of forest fires and predictive models entailing all elements of fire prediction and relevant risks	0.30	0.30	0.30	0.30	0.30	1.50		1.50			
		ŠU-04-03. Development of a plan and raising public awareness on the importance of implementation of preventive measures to	0.20	0.20	0.20	0.20	0.20	1.00		1.00			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		prevent forest fires											
		ŠU-04-04. Maintenance of existing fire roads in the Mediterranean and Sub-Mediterranean zone and construction of new ones	12.00	12.00	12.00	12.00	12.00	60.00		60.00			
<b>Fishery</b>			<b>5.85</b>	<b>5.85</b>	<b>5.85</b>	<b>5.85</b>	<b>5.85</b>	<b>29.25</b>	<b>1.00</b>	<b>0.50</b>	<b>25.25</b>	<b>0.00</b>	<b>2.50</b>
RR-01	Strengthening the sector by investing in the development of new markets and by expanding the supply	RR-01-01. Implementation of research on the acceptability of new types of breeding organisms and products by consumers	0.20	0.20	0.20	0.20	0.20	1.00			1.00		
RR-02	Strengthening the capacity to assess the future state of the sector due to impact of the climate change	RR-02-01. Encouraging the development of application models for forecasting the movement of fish biomass in the future	0.30	0.30	0.30	0.30	0.30	1.50			1.50		
RR-03	Strengthening the resilience of natural	RR-03-01. Develop the monitoring system of the state of bioresources in	1.50	1.50	1.50	1.50	1.50	7.50			7.50		



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
	resources through adaptive fisheries management	marine and fresh water that will also encompass monitoring of the food chain of marine organisms											
RR-04	Increasing the involvement of fishermen in the tourism sector	RR-04-01. Education of fishermen to carry out tourism activities	0.10	0.10	0.10	0.10	0.10	0.50					0.50
		RR-04-02. Supporting fishermen to reconstruct vessels for the purpose of carrying out tourism activities	0.20	0.20	0.20	0.20	0.20	1.00			1.00		
RA-01	Strengthening aquaculture capacity by breeding more organisms at lower trophic levels and new forms of breeding	RA-01-01. Implementation of a programme to encourage shellfish farming	2.00	2.00	2.00	2.00	2.00	10.00			10.00		
		RA-01-02. Implementation of a programme for supporting controlled farming of shellfish in hatcheries instead of collecting them in nature	0.10	0.10	0.10	0.10	0.10	0.50			0.50		



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		RA-01-03. Preparation of a study on the feasibility of growing aquatic plants and their acceptance on the market	0.20	0.20	0.20	0.20	0.20	1.00			1.00		
		RA-01-04. Development and implementation of an educational programme on the benefits and uses of integrated breeding of aquatic organisms	0.20	0.20	0.20	0.20	0.20	1.00					1.00
		RA-01-05. Awareness raising of the general public about the benefits of shellfish, aquatic plants and non-meat species of fish	0.30	0.30	0.30	0.30	0.30	1.50			1.50		
RA-02	Strengthening aquaculture capacity through breeding in recirculation systems	RA-02-01. Analysis of the possibility of using recirculation breeding systems in fisheries	0.20	0.20	0.20	0.20	0.20	1.00			1.00		
		RA-02-02. Development and implementation of an educational programme on the benefits of recirculation breeding systems	0.20	0.20	0.20	0.20	0.20	1.00					1.00



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		RA-02-03. Implementation of research related to the use of recirculation systems for certain stages of farming and for breeding new species of fish in recirculating systems	0.10	0.10	0.10	0.10	0.10	0.50		0.50			
RA-03	Strengthening aquaculture capacity by breeding new species of fish	RA-03-01. Making amendments to the legislative framework for the cultivation of new (alien) fish species						0.00	0.00				
		RA-03-02. Study on the possibilities of breeding new (alien) fish species	0.05	0.05	0.05	0.05	0.05	0.25			0.25		
		RA-03-03. Market research to determine the possibility of accepting new (alien) fish species by consumers	0.20	0.20	0.20	0.20	0.20	1.00	1.00				
Biodiversity			14.25	21.00	59.25	57.75	57.75	210.00	0.00	138.00	0.00	72.00	0.00
B-01	Preservation of traditional agriculture in natural ecosystems	B-01-01. Continuation of inventory of traditional varieties and breeds	0.50	0.50	0.50	0.00	0.00	1.50				1.50	
		B-01-02. Development of models of restoration of	0.00	1.50	1.50	1.50	1.50	6.00				6.00	



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		traditional agriculture in natural ecosystems											
		B-01-03. Develop and implement a program of encouraging traditional agriculture and placements of value added products	5.00	10.00	12.00	15.00	20.00	62.00				62.00	
		B-01-04. Establishment of systemic monitoring of natural ecosystems covered in the programme of traditional agriculture	0.25	0.50	1.25	0.25	0.25	2.50				2.50	
B-02	Establishment of a climate monitoring and early warning system for protected areas and ecological	B-02-01. Establish a monitoring and early warning system for all protected areas and areas of the ecological network of the Republic of Croatia	3.00	3.00	3.00	3.00	3.00	15.00		15.00			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
	network of the Republic of Croatia and monitoring of protected wild habitat types and wild species	B-02-02. Establish expert monitoring of natural habitat types and wild species for monitoring the impacts and consequences of climate change, in accordance with regulations on the protection of nature	2.00	2.00	2.00	2.00	2.00	10.00		10.00			
B-03	Improvement of knowledge and creation of databases of natural ecosystems and biodiversity	B-03-01. Update the map of land-based non-forest and map of forest habitats of the Republic of Croatia	1.0	0.5	0.5	0.5	0.5	3.00		3.00			
		B-03-02. Update of habitat map with elements of vulnerability to climate change	0.25	0.25	0.25	0.25	0.00	1.00		1.00			
		B-03-03. Completion of inventory of flora and fauna and implementation of inventory of fungi	3.0	3.0	3.0	3.0	3.0	15.00		15.00			
		B-03-04. Cataloguing of invasive species particularly aggressive in the climate change	0.50	0.50	0.00	0.00	0.00	1.00		1.00			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		process with repression and control measures and cataloguing of habitats, taxonomic groups and species particularly vulnerable to climate change											
		B-03-05. Updating the List of Speleological Objects of the Republic of Croatia	0.50	0.50	0.50	0.50	0.50	2.50		2.50			
B-04	Integrated management of freshwater resources for the conservation and revitalization of natural ecosystems and biodiversity	B-04-01. Ensure combined flood protection and protection from loss of biodiversity by restoring natural floodplains	0.00	0.00	15.00	15.00	10.00	40.00		40.00			
		B-04-02. Creation of retention basins for freshwater, wetland and hygrophilic ecosystems	0.00	0.00	10.00	10.00	10.00	30.00		30.00			
		B-04-03. Prevention of salinization of coastal sources and wetland habitats by building dams, embankments and by other measures	0.00	0.00	10.00	10.00	10.00	30.00		30.00			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
Energy			28.50	336.00	426.00	433.00	403.00	1.626.50	0.00	1.622.50	0.00	4.00	0.00
E-01	Strengthening the resilience of production facilities through the storage of electrical energy	E-01-01. Conducting a vulnerability analysis of currently important production plants to adverse climate change impacts to define the most vulnerable ones and make a priority list	3.50	4.00	0.00	0.00	0.00	7.50		7.50			
		E-01-02. Analysis of the possibilities of the construction of energy storage facilities	0.00	1.00	0.00	0.00	0.00	1.00		1.00			
		E-01-03. Preparation of project documentation for construction of a test facility for energy storage	0.00	1.00	2.00	0.00	0.00	3.00		3.00			
		E-01-04. Construction of a test facility for energy storage	0.00	0.00	16.00	30.00	0.00	46.00		46.00			
		E-01-05. Development of a study on the possibilities of building small autonomous energy systems on islands and rural areas, based on the integration of wind	3.00	2.50	2.50	0.00	0.00	8.00		8.00			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		energy, photovoltaic and battery power storage systems											
E-02	Strengthening the capacities and ensuring of an incentivizing legal framework to increase the capacity of renewable energy and distributed sources	E-02-01. Development of a map of the climate potential (positive and negative) of Croatian regions for the production of energy from alternative sources in different climatic scenarios	4.00	6.00	0.00	0.00	0.00	10.00		10.00			
		E-02-02. Development of a study of possibilities of development of diversified energy sources with emphasis on exploitation of alternative (renewable) energy sources in the territory of the Republic of Croatia	3.00	2.50	2.50	0.00	0.00	8.00		8.00			
		E-02-03. Development of a study on the possibilities of using renewable energy sources in rural areas such as agricultural micro-installations	2.00	2.00	0.00	0.00	0.00	4.00				4.00	



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
E-03	Strengthening the resilience of current facilities for the production of electricity and thermal energy	E-03-01. Development of preliminary analysis on the vulnerability of existing thermal power plants to the occurrence of extreme weather and climate hazards and reduced precipitation in order to define the most vulnerable power plants and create a list of priorities	4.00	0.00	0.00	0.00	0.00	4.00		4.00			
		E-03-02. Development of a detailed analysis of vulnerability for the most vulnerable thermal power plants with proposed measures which will involve technical and economic analysis	0.00	6.00	0.00	0.00	0.00	6.00		6.00			
		E-03-03. Development of preliminary analysis of the vulnerability of existing hydro power plants related to the occurrence of extreme weather and climate hazards and the reduction of rainfall in order to define the most	6.00	0.00	0.00	0.00	0.00	4.00		6.00			



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		vulnerable hydro power plants and to create a list of priorities											
		E-03-04. Development of detailed vulnerability analysis for the most vulnerable hydroelectric power plants with proposed of measures which will involve technical and economic analysis	0.00	8.00	0.00	0.00	0.00	6.00		8.00			
		E-03-05. Development of project documentation for the revitalisation of parts of settlements in urban areas connected to the central heating system (CHS) by introducing a low-temperature regime to heating pipes, increasing cost-effectiveness of the CHS	3.00	3.00	3.00	3.00	3.00	15.00		15.00			
		E-03-06. Revitalization of urban areas connected to the central heating system (CHS) through introducing a low-temperature regime in	0.00	300.00	400.00	400.00	400.00	1.500.00		1.500.00			



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			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		hot-water pipelines, thus increasing the profitability of CHS											
<b>Tourism</b>			<b>2.70</b>	<b>15.10</b>	<b>213.10</b>	<b>222.10</b>	<b>233.10</b>	<b>686.10</b>	<b>4.30</b>	<b>669.80</b>	<b>0.00</b>	<b>0.00</b>	<b>12.00</b>
T-01	Integration of climate change into the tourism development strategy	T-01-01. Definition of the impact of climate change on tourism	1.50	0.00	0.00	0.00	0.00	1.50	1.50				
		T-01-02. Definition of guidelines for the development of Croatian tourism in accordance with adaptation to climate change	0.80	0.00	0.00	0.00	0.00	0.80	0.80				
		T-01-03. Development of plans for protection of tourism infrastructure against the impacts of climate change and weather extremes	0.00	1.00	1.00	0.00	0.00	2.00		2.00			
		T-01-04. Development of plans for construction of future tourism infrastructure more resilient to weather extremes	0.00	0.7	0.7	0.7	0.7	2.80		2.80			
		T-01-05. Continuous monitoring of the state of	0.00	0.50	0.50	0.50	0.50	2.00	2.00				



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		tourism infrastructure											
T-02	Raising awareness of persons involved in the tourism sector on the possibilities of adaptation to climate change	T-02-01. Organisation of workshops for interested tourism professionals in order to learn about specific climate risks, their likelihood of occurrence, and adaptation options	0.25	0.25	0.25	0.25	0.25	1.25					1.25
		T-02-02. Printing of promotional materials and other advertising activities to spread awareness of the necessity for adaptation – directed towards tourism subjects	0.15	0.15	0.15	0.15	0.15	0.75					0.75
T-03	Strengthening the competencies of high school and university students	T-03-01. Education of teaching personnel on climate change and adaptation measures in the tourism sector	0.00	1.00	1.00	1.00	1.00	4.00					4.00
		T-03-02. Climate change and adaptation in the tourism sector - basic or elective subject / course in secondary schools and colleges geared towards	0.00	1.50	1.50	1.50	1.50	6.00					6.00



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimat ed total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		tourism											
T-04	Strengthening the resilience of tourism infrastructure to different weather extremes	T-04-01. Development of specific destination offers adapted to climatic and spatial characteristics	0.00	0.00	1.00	1.00	1.00	3.00		3.00			
		T-04-02. Construction of public tourism infrastructure adapted to climate change	0.00	10.00	207.00	217.00	228.00	622.00		622.00			
Health			51.60	32.17	30.67	30.17	30.17	174.78	0.00	174.78	0.00	0.00	0.00
ZD-01	Establishment of a system for calculating health-economic indicators for climate change-related conditions	ZD-01-01. Development of a calculation system of health-economic indicators by selecting priority diagnoses according to the International Classification of Diseases and Related Health Problems that can be linked to the impact of meteorological or climatic parameters	0.33	0.33	0.33	0.33	0.33	1.65		1.65			



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		ZD-01-02. Establishment of network of persons conducting health and economic analyses	6.93	6.93	6.93	6.93	6.93	34.65		34.65			
		ZD-01-03. Establishment of an automated calculation within the central information healthcare system / health-ecological / public health subsystem	22.93	2.50	2.50	2.50	2.50	32.93		32.93			
		ZD-01-04. Establishment of a networked database and authorized stakeholders in the evaluation and monitoring of health and economic indicators related to climate change	6.93	7.93	6.93	6.93	6.93	35.65		35.65			
ZD-02	Integration of various information systems within healthcare to monitor indicators associated with climate change	ZD-02-01. Defining and positioning of key stakeholders within the central health IT system of health institutes, primary health care system, hospital system, emergency reception system, veterinary supervision system and	0.66	0.66	0.66	0.66	0.66	3.30		3.30			



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		others											
		ZD-02-02. Expansion of knowledge base through scientific and expert definition of health indicators associated with climate change	0.66	0.66	0.66	0.66	0.66	3.30		3.30			
		ZD-02-03. Creation of a network of meteorological information systems and air quality monitoring system with preventive, hospital, and primary health care systems	0.66	0.66	0.66	0.66	0.66	3.30		3.30			
ZD-03	Establishment of a framework for the implementation of human biomonitoring for tracking environmental factors related to climate change	ZD-03-01. Selection of authorized stakeholders for human biomonitoring	1.00	1.00	1.00	1.00	1.00	5.00		5.00			
		ZD-03-02. Collection of epidemiological / descriptive population data and analysing environmental factors related to climate change amongst people	10.00	10.00	10.00	10.00	10.00	50.00		50.00			
		ZD-03-03. Publication of research findings and	1.50	1.50	1.00	0.50	0.50	5.00		5.00			



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		creation of a national knowledge base											
<b>Spatial planning; management of the coastal area</b>			<b>2.80</b>	<b>7.30</b>	<b>8.00</b>	<b>5.00</b>	<b>1.40</b>	<b>24.50</b>	<b>4.00</b>	<b>16.00</b>	<b>0.00</b>	<b>0.00</b>	<b>4.50</b>
PP-01	Strengthening of the knowledge base, as well as the monitoring and evaluation system	PP-01-01. Implementation of targeted research on the impact of sea level rise on the most vulnerable parts of the coast as a basis for the preparation of priority intervention plans	1.00	1.00	1.00	1.00	0.00	4.00		4.00			
		PP-01-02. Implementation of an integrated multi-disciplinary assessment of the vulnerability of coastal areas to extreme sea levels, including social and economic aspects as well as cost estimates and the benefits of adaptation options	0.00	4.00	3.00	0.00	0.00	7.00		7.00			
		PP-01-03. Implementation of targeted research on climate change impacts related to spatial planning	0.00	0.50	0.50	0.00	0.00	1.00		1.00			



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		decisions in the function of tourism development											
		PP-01-04. Implementation of an assessment of vulnerability to the occurrence of thermal islands and extreme precipitation in settlements, with emphasis on connection with spatial planning solutions	1.00	1.00	1.00	1.00	0.00	4.00		4.00			
		PP-01-05. Ensuring availability of research results through current information systems of spatial planning, protection of the environment and waters or Open Data Portal i.e. Geoportal of National Spatial Data Infrastructure	0.00	0.00	0.50	0.50	0.00	1.00	1.00				
PP-02	Strengthening the human and institutional capacities of professional	PP-02-01. Strengthening of continuing professional training program for spatial planners concerning the	0.00	0.00	0.00	0.10	0.10	0.20					0.20



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
	stakeholders in the spatial planning system	application of climate change adaptation measures											
PP-03	Integration of adaptation measures into the spatial planning system	PP-03-01. Amendments to the legal framework to develop adaptation measures to climate change in spatial planning	0.00	0.00	0.20	0.00	0.00	0.20	0.20				
		PP-03-02. Development and strengthening of Integrated Spatial Planning Methodology and Strategic Environmental Impact Assessment with emphasis on applying climate change adaptation measures	0.00	0.00	1.00	0.50	0.00	1.50	1.50				
		PP-03-03. Development of the programme and guidelines for strengthening inter-sectoral coordination in the spatial planning procedure, with emphasis on the planning of climate change	0.00	0.00	0.00	0.30	0.00	0.30	0.30				



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		adaptation measures											
		PP-03-04. Analysis and elaboration of methods of monitoring and evaluating the efficiency and effectiveness of spatial plans in the implementation of climate change adaptation measures	0.00	0.00	0.00	0.50	0.50	1.00	1.00				
PP-04	Raising awareness of the public and decision-makers at all levels	PP-04-01. Design and implementation of public information and education programmes focusing on targeted groups in vulnerable areas	0.50	0.50	0.50	0.50	0.50	2.50					2.50
		PP-04-02. Design and implementation information programmes for decision-makers at all levels of government	0.30	0.30	0.30	0.30	0.30	1.50					1.50
		PP-04-03. Raising awareness of social responsibility in the banking and insurance sector regarding climate	0.00	0.00	0.00	0.30	0.00	0.30					0.30



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
		change											
<b>Risk management</b>			<b>5.56</b>	<b>10.47</b>	<b>4.49</b>	<b>5.14</b>	<b>5.14</b>	<b>30.80</b>	<b>1.40</b>	<b>29.40</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
UR-01	Mapping of water sources outside the public water supply system	UR-01-01. Mapping of water sources outside the public water supply system (private wells, spring-water intakes, etc.)	12.83	3.53	3.53	1.80	1.80	23.49		23.49			
		UR-01-02. Water testing and initial health risk assessment and application in the mapped water sources outside the public water supply system	2.00	2.10	1.00	1.30	1.30	7.70		7.70			
		UR-01-03. Comprehensive assessment of health risk and application based on results of field inspections, documentation, and laboratory analysis	0.50	0.50	0.50	0.25	0.25	2.00		2.00			
UR-02	Multi-sectoral risk assessment for various threat / risk scenarios	UR-02-01. Expansion of relevant working groups and persons responsible for certain types of threats / risks related to	0.10	0.10	0.10	0.10	0.10	0.50	0.50				



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimated total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
	associated with climate change	climate change											
		UR-02-02. Development of algorithms and action guidelines for handling various scenarios at all levels	0.05	0.05	0.05	0.05	0.05	0.25	0.25				
		UR-02-03. Amendments to the legislative framework related to decentralisation and centralisation of management functions depending on the type of threat / risk	0.02	0.02	0.02	0.02	0.02	0.10	0.10				
		UR-02-04. Linking of information systems of key stakeholders	4.09	4.09	4.09	4.09	4.09	20.45	20.45				
		UR-02-05. Connection of civil, security, and defence services in interventions	30.00	30.10	30.00	30.00	30.00	150.10	30.02	120.08			
UR-03	Expansion of the <i>Croatian Platform for Disaster Risk Reduction</i> to include climate	UR-03-01. Establishment of an integrated database on climate-change related threats / risks and strengthening the role of the Croatian Platform for	1.00	0.50	0.50	0.50	0.50	3.00		3.00			



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Measure indicator	Name of the measure	Name of the measure	Estimated cost implementation year (in million kuna)					Estimat ed total cost (in million kuna)	Possible sources of funding (in million kuna)				
			2019	2020	2021	2022	2023		DP	EFRR / KF	EFPR	EPFRR	ESF
	change-related indicators for the development of an early warning system	Disaster Risk Reduction											
		UR-03-02. Development of an integrated database and training platform for key stakeholders	0.50	0.50	0.33	0.33	0.33	1.99		1.99			
		UR-03-03. Integration of the results of health and environmental databases and state databases: number of bush fires and forest fires, flood areas or sea level rise areas, condition of crops or of the soil characteristics etc., at the site of disasters or emergency incidents	15.00	3.00	3.00	3.60	3.60	28.20		28.20			
UKUPNO			224.29	673.46	1.256.04	1.595.96	2.092.61	5.842.36	62.27	3.787.34	25.25	1.930.00	37.50

Table 5-2 Overview of the amounts and sources of financing of the Action Plan 2019-2023 by sectors and adaptation measures in million kuna

Measure indicator	Name of the measure	Estimated costs (in million kuna)	Possible sources of funding (in million kuna)				
			DP	EFRR/KF	EFPR	EPFRR	ESF
Beyond-sectoral measures		8.45	0.95	0.00	0.00	0.00	7.50



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Measure indicator	Name of the measure	Estimated costs (in million kuna)	Possible sources of funding (in million kuna)				
			DP	EFRR/KF	EFPR	EPFRR	ESF
KM-01	Strengthening human and technical capacities for implementing research and applied activities in the area of climate modelling, analysis, and interpretation of observed and expected climatic changes	7.50	0.00	0.00	0.00	0.00	7.50
RP-01	Development of impact indicators of the implementation of the adaptation strategy for vulnerable sectors and society	0.95	0.95	0.00	0.00	0.00	0.00
<b>Hydrology, water and sea resources management</b>		<b>830.00</b>	<b>0.00</b>	<b>829.00</b>	<b>0.00</b>	<b>0.00</b>	<b>1.00</b>
HM-01	Strengthening the capacity for the implementation of non-structural measures for protection against the harmful effects of water in the occurrence of extreme hydrological opportunities whose increase in intensity and frequency of occurrence is conditioned by climate change	19.50	0.00	19.50	0.00	0.00	0.00
HM-02	Strengthening the capacity to build, reconstruct and upgrade the system for protection against harmful effects of water and related multi-purpose hydro-technical systems (structural measures) and lowland natural floodplains flooded in a controlled fashion	724.50	0.00	724.50	0.00	0.00	0.00
HM-03	Strengthening research and management capacities to assess the occurrence and risk of adverse impacts of climate change and adaptation of freshwater and marine water system in current and future climatic conditions	86.00	0.00	85.00	0.00	0.00	1.00
<b>Agriculture</b>		<b>1.873.50</b>	<b>0.20</b>	<b>9.10</b>	<b>0.00</b>	<b>1.854.00</b>	<b>10.00</b>
P-01	Implementation of an experimental climate change adaptation programme in agriculture	9.10	0.00	9.10	0.00	0.00	0.00
P-02	Increasing the water absorption capacity of agricultural soil	744.10	0.10	0.00	0.00	740.00	4.00
P-03	Increase of the water holding capacity of the agricultural soil.	742.00	0.00	0.00	0.00	740.00	2.00
P-04	Breeding of species and cultivars of agricultural crops and breeds of	76.10	0.10	0.00	0.00	74.00	2.00



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Measure indicator	Name of the measure	Estimated costs (in million kuna)	Possible sources of funding (in million kuna)				
			DP	EFRR/KF	EFPR	EPFRR	ESF
	domestic animals that are more resilient to climate change						
P-05	Construction of reservoirs for irrigation	302.00	0.00	0.00	0.00	300.00	2.00
<b>Forestry</b>		<b>133.00</b>	<b>0.50</b>	<b>132.50</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
ŠU-01	Incorporation of adaptation measures into key documents pertaining to forests and forestry sectors	0.50	0.50	0.00	0.00	0.00	0.00
ŠU-02	Research on species and provenance of forest trees that are more resilient to climate change	25.00	0.00	25.00	0.00	0.00	0.00
ŠU-03	Strengthening the capacity for systematic monitoring of forest ecosystem conditions as a prerequisite for informed planning and implementation of climate change adaptation	14.50	0.00	14.50	0.00	0.00	0.00
ŠU-04	Strengthening capacity for fire protection	93.00	0.00	93.00	0.00	0.00	0.00
<b>Fishery</b>		<b>29.25</b>	<b>1.00</b>	<b>0.50</b>	<b>25.25</b>	<b>0.00</b>	<b>2.50</b>
RR-01	Strengthening the sector by investing in the development of new markets and by expanding the supply	1.00	0.00	0.00	1.00	0.00	0.00
RR-02	Strengthening the capacity to assess the future state of the sector due to impact of the climate change	1.50	0.00	0.00	1.50	0.00	0.00
RR-03	Strengthening the resilience of natural resources through adaptive fisheries management	7.50	0.00	0.00	7.50	0.00	0.00
RR-04	Increasing the involvement of fishermen in the tourism sector	1.50	0.00	0.00	1.00	0.00	0.50
RA-01	Strengthening aquaculture capacity by breeding more organisms at lower trophic levels and new forms of breeding	14.00	0.00	0.00	13.00	0.00	1.00
RA-02	Strengthening aquaculture capacity through breeding in recirculation systems	2.50	0.00	0.50	1.00	0.00	1.00



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Measure indicator	Name of the measure	Estimated costs (in million kuna)	Possible sources of funding (in million kuna)				
			DP	EFRR/KF	EFPR	EPFRR	ESF
RA-03	Strengthening aquaculture capacity by breeding new species of fish	1.25	1.00	0.00	0.25	0.00	0.00
<b>Biodiversity</b>		<b>219.50</b>	<b>0.00</b>	<b>147.50</b>	<b>0.00</b>	<b>72.00</b>	<b>0.00</b>
B-01	Preservation of traditional agriculture in natural ecosystems	72.00	0.00	0.00	0.00	72.00	0.00
B-02	Establishment of a climate monitoring and early warning system for protected areas and ecological network of the Republic of Croatia and monitoring of protected wild habitat types and wild species	25.00	0.00	25.00	0.00	0.00	0.00
B-03	Improvement of knowledge and creation of databases of natural ecosystems and biodiversity	22.50	0.00	22.50	0.00	0.00	0.00
B-04	Integrated management of freshwater resources for the conservation and revitalization of natural ecosystems and biodiversity	100.00	0.00	100.00	0.00	0.00	0.00
<b>Energy</b>		<b>1,626.50</b>	<b>0.00</b>	<b>1,622.50</b>	<b>0.00</b>	<b>4.00</b>	<b>0.00</b>
E-01	Strengthening the resilience of production facilities through the storage of electrical energy	65.50	0.00	65.50	0.00	0.00	0.00
E-02	Strengthening the capacities and ensuring of an incentivizing legal framework to increase the capacity of renewable energy and distributed sources	22.00	0.00	18.00	0.00	4.00	0.00
E-03	Strengthening the resilience of current facilities for the production of electricity and thermal energy	1.539.00	0.00	1.539.00	0.00	0.00	0.00
<b>Tourism</b>		<b>686.10</b>	<b>4.30</b>	<b>669.80</b>	<b>0.00</b>	<b>0.00</b>	<b>12.00</b>
T-01	Integration of climate change into the tourism development strategy	8.30	4.30	4.80	0.00	0.00	0.00
T-02	Raising awareness of persons involved in the tourism sector on the possibilities of adaptation to climate change	2.00	0.00	0.00	0.00	0.00	2.00
T-03	Strengthening the competencies of high school and university students	10.00	0.00	0.00	0.00	0.00	10.00



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			DP	EFRR/KF	EFPR	EPFRR	ESF
T-04	Strengthening the resilience of tourism infrastructure to different weather extremes	665.00	0.00	665.00	0.00	0.00	0.00
<b>Health</b>		<b>174.78</b>	<b>0.00</b>	<b>174.78</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
ZD-01	Establishment of a system for calculating health-economic indicators for climate change-related conditions	104.88	0.00	104.88	0.00	0.00	0.00
ZD-02	Integration of various information systems within healthcare to monitor indicators associated with climate change	9.90	0.00	9.90	0.00	0.00	0.00
ZD-03	Establishment of a framework for the implementation of human biomonitoring for tracking environmental factors related to climate change	60.00	0.00	60.00	0.00	0.00	0.00
<b>Spatial planning; management of the coastal area</b>		<b>24.50</b>	<b>4.00</b>	<b>16.00</b>	<b>0.00</b>	<b>0.00</b>	<b>4.50</b>
PP-01	Strengthening of the knowledge base, as well as the monitoring and evaluation system	17.00	1.00	16.00	0.00	0.00	0.00
PP-02	Strengthening the human and institutional capacities of professional stakeholders in the spatial planning system	0.20	0.00	0.00	0.00	0.00	0.20
PP-03	Integration of adaptation measures into the spatial planning system	3.00	3.00	0.00	0.00	0.00	0.00
PP-04	Raising awareness of the public and decision-makers at all levels	4.30	0.00	0.00	0.00	0.00	4.30
<b>Risk management</b>		<b>237.78</b>	<b>51.32</b>	<b>186.46</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
UR-01	Mapping of water sources outside the public water supply system	33.19	0.00	33.19	0.00	0.00	0.00
UR-02	Multi-sectoral risk assessment for various threat / risk scenarios associated with climate change	171.40	51.32	120.08	0.00	0.00	0.00
UR-03	Expansion of the <i>Croatian Platform for Disaster Risk Reduction</i> to include climate change-related indicators for the development of an early warning	33.19	0.00	33.19	0.00	0.00	0.00



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Measure indicator	Name of the measure	Estimated costs (in million kuna)	Possible sources of funding (in million kuna)				
			DP	EFRR/KF	EFPR	EPFRR	ESF
	system						
<b>TOTAL</b>		<b>5,843.16</b>	<b>62.27</b>	<b>3,788.14</b>	<b>25.25</b>	<b>1,930.00</b>	<b>37.50</b>

Table 5-2 Overview of the amounts and sources of financing of the Action Plan 2019-2023 according to the priorities of the Climate Change Adaptation Strategy

Priority	Possible sources of financing					
	State budget	European Regional Development Fund / Cohesion Fund	European Maritime and Fisheries Fund	European Agricultural Fund for Rural Development	European Social Fund	Total
1. Ensuring sustainable regional and urban development	7.80	800.80	0.00	0.00	17.50	826.10
2. Providing for preconditions for economic development of rural areas, coastal areas and islands	1.20	761.00	25.25	1.926.00	12.50	2.725.95
3. Sustainable energy development	0.00	1,622.50	0.00	4.00	0.00	1,626.50
4. Strengthening management capacity through networked monitoring and early warning system	53.27	444.24	0.00	0.00	7.50	505.01
5. Ensuring continuity of research activities	0.00	159.60	0.00	0.00	0.00	159.60
<b>TOTAL</b>	<b>62.27</b>	<b>3,788.14</b>	<b>25.25</b>	<b>1,930.00</b>	<b>37.50</b>	<b>5,843.16</b>
<b>SHARE IN %</b>	<b>1.07%</b>	<b>64.83%</b>	<b>0.43%</b>	<b>33.03%</b>	<b>0.64%</b>	



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### 6. RISKS AND OBSTACLES IN IMPLEMENTATION OF THE ACTION PLAN

The table contains the expected risks and obstacles that will be important to monitor and respond to when implementing the Action Plan.

Risks/obstacles	Suggestions for reducing / eliminating expected risks / obstacles
Inadequate sources of public finance sources (including local and regional government)	<ul style="list-style-type: none"><li>• Applications for additional funding sources / production of project documentation and utilisation of European funds</li><li>• Implementation of public-private partnerships</li></ul>
Lack of coordination of state bodies	<ul style="list-style-type: none"><li>• Establishing an inter-sectoral body for the implementation of the Action Plan</li></ul>
Lack of staffing capacity / lack of awareness on the levels of decision-making about the vulnerability of the existing system – including local and regional government	<ul style="list-style-type: none"><li>• Education, additional schooling</li><li>• Increase of absorption capacity for Structural Funds and PRRs</li><li>• Engagement of consultants and private companies for the implementation of activities</li><li>• Allocate funds and other equipment from state resources according to actual needs on the field</li></ul>
Possible conflict with development plans of other sectors	<ul style="list-style-type: none"><li>• Timely and expert-based planning with wider consensus of the experts and the public</li><li>• Raising awareness of leaders, public bodies</li><li>• Place adaptation measures at the top of the priority list at all levels of decision making</li></ul>
Inadequate amount of investigations and studies carried out as a basis for decision-making, insufficient funding, inertia of the administration in making changes / changes in spatial plans, pressures on economic development	<ul style="list-style-type: none"><li>• Urgent drafting of the necessary expert backgrounds as the basis for decision making and initiating the procedure of amending and supplementing the spatial planning documentation.</li><li>• Perform necessary changes to legal, by-law and other relevant documents</li></ul>
Insufficient technology, high cost of the required technology	<ul style="list-style-type: none"><li>• Introduction of certificates / standards in construction and other industries</li><li>• Connecting with successful global and local examples in order to incorporate the most appropriate technology</li></ul>
Resilience of manufacturers and traders - resistance to the implementation of new	<ul style="list-style-type: none"><li>• Working with stakeholders on the field, connecting to information sources in</li></ul>



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Risks/obstacles	Suggestions for reducing / eliminating expected risks / obstacles
measures due to lack of resources and / or time	<p>order to react timely to problems (e.g. through Advisory Service) etc.</p> <ul style="list-style-type: none"> <li>• Connecting with successful global and local examples in order to transfer technology successfully into national framework</li> </ul>
The pressure of the expected, intensive economic development on spatial planning	<ul style="list-style-type: none"> <li>• Integrated approach in spatial planning which will evaluate the function of casual housing and the related interest and purpose of building houses / apartments of casual housing</li> <li>• Upon construction, mandatory introduction into spatial plans</li> </ul>
Incomplete or insufficient exploitation of scientific results	<ul style="list-style-type: none"> <li>• Linking scientific papers to the problem of developing the economy and the well-being of the population</li> <li>• Open access to the public for all state-funded scientific results</li> <li>• Encouraging applied-research science</li> </ul>
Lack of awareness / public involvement	<ul style="list-style-type: none"> <li>• Systematically raising public awareness on the impacts of expected climate change and achieving consensus on the proposal and implementation of measures</li> <li>• Inclusion of schools and the local population in a promotional and educational campaign</li> </ul>
Investment risks	<ul style="list-style-type: none"> <li>• Ensuring additional financing / incentives for adaptation</li> <li>• Cost benefit analysis of specific investments - including various climate parameters</li> </ul>



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### 7. INDICATORS OF THE IMPLEMENTATION OF THE ACTION PLAN

As in the case of the implementation of the Adaptation Strategy, the implementation of the Action Plan must be supported by an appropriate system of indicators to monitor the implementation of measures and activities and monitor the effectiveness of measures and activities implemented – which aim to reduce vulnerability and strengthen the resistance of social and natural systems.

Indicators include:

- Indicators of the implementation of measures and activities (process indicators): which are monitored through the implementation of measures and activities in the action plans and which are specific to each measure and activity.
- Indicators of the effectiveness of the Action Plan implementation (and consequently of the Adaptation Strategy): demonstrating whether the measures taken have contributed to reducing vulnerability and increasing the ability of the social and natural systems to recover from the effects of climate change.
- Climate indicators: which are designed to monitor the climate and are essential for assessing impacts and vulnerabilities in the observed sectors and thematic areas.

**Indicators of the implementation of measures and activities of the Action Plan** (process indicators) should provide answers, *inter alia*, to the following questions:

- Are the measures and activities being implemented?
- Are there any improvements possible to the climate change adaptation measures and activities?
- Which of the measures not achieving the expected effects?

Process indicators only indicate that a certain measure has been taken and that the expected results of each of its activities have been achieved (or attained).

**The indicators of the effectiveness of the adaptation measures implemented** (the effectiveness of the Adaptation Strategy) are required to track whether measures in the Action Plan have led to increased resilience (e.g. less extreme weather events damage claims, etc.) and to improving the socioeconomic and physical systems. These indicators make it possible for decision-makers (Government of the Republic of Croatia, the Parliament) and organizations involved in the process of adaptation to climate change, to assess the effectiveness of the implemented activities. Consequently, they also ensure the achievement of the Adaptation Strategy goals.

A list of possible indicators of the effects of the measures implemented is provided in the Adaptation Strategy, but for the purpose of selecting the most appropriate indicators, in this first Action Plan, a priority measure RP-01 “Development of impact indicators of the implementation of the adaptation strategy for vulnerable sectors and society” is proposed.

**Climate indicators** are designed to monitor the climate and are essential for evaluating impacts and vulnerabilities in the observed sectors and thematic areas.

Climate indicators are included in the National List of Indicators (*Cro. Nacionalna lista pokazateljja; NLP*) prepared by the HAOP, and the legal basis for NLP is defined by the



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Environmental Protection Act (Official Gazette 80/13, 78/15) and by the Decree on the Environmental Information System (Official Gazette 68/08).

The NLP for each of the climatic indicators provides a detailed elaboration of the methodology for producing indicators, definition of indicators, their sub-indices and related indicators, legal coverage by national and international regulations, a set of raw data required to produce indicators and how indicators are presented. Any future changes to the aforementioned climatic indicators should follow comparison to climate indicators calculated for the period 1961-1990, which is taken as a reference climatological period by the World Weather Organization (WMO) recommendation.

The Action Plan as a basis for the proposed adaptation measure has used climatic modelling results that gave a wider range of climatic parameters which can be considered as climatic indicators as well. The depictions of the basic climatic parameters (in subsection 4.1 of Adaptation Strategy) are broadly in line with the climate change indicators described in the NLP. The Action Plan therefore foresees an obligation to further monitor the following climate indicators given by NLP regarding adaptation to climate change:

- KP 7 Average air temperature trend: The indicator follows the trend of the average seasonal and annual air temperatures since 1961.
- KP 8 Trend of the mean maximum air temperature: The indicator follows the annual average maximum air temperature trend since 1961.
- KP 9 Trend of the Minimum Air Temperature: The indicator follows the annual average minimum air temperature trend since 1961.
- KP 10 Hot Temperature Temperatures Index trend: The indicator follows the trend of the following extreme indices:
  1. Summer Days (SD), i.e. days with maximum daily temperature greater than or equal to 25 °C,
  2. Annual number of warm days with the threshold of the percentile (Tx90%), i.e. the number of days with the air temperature higher than the threshold, determined as the 90th percentile of the maximum air temperature for the calendar day in the period 1961-1990.,
  3. Annual number of hot nights with the threshold of the percentile (Tn90%), i.e. the number of days with a minimum air temperature higher than the threshold, determined as the 90th percentile minimum air temperature for the calendar day in the period 1961-1990.,
  4. Warm Spell Duration Index (WSDI), i.e. number of days in periods of at least 6 consecutive days with maximum air temperature higher than Tn90.
- KP 11 Index of Cold Temperature Extremes Trend. This indicator follows the trend of the following extreme indices:
  1. Annual number of cold days according to the absolute threshold, ie the number of days with a minimum daily air temperature less than 0 °C,
  2. Annual number of cold days with the threshold of the percentile (Tx10%), i.e. the number of days with the maximum air temperature below the threshold, determined as the 10<sup>th</sup> percentile of the maximum air temperature for the calendar day in the period 1961 – 1990,
  3. Annual number of cold nights (Tn90%), i.e. the number of days with a minimum air temperature lower than the threshold defined as the 10th



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- percentile of the minimum air temperature for the calendar day in the period 1961 – 1990,
4. Cold Spell Duration Index (CSDI), the number of days in periods of at least 6 consecutive days with maximum air temperature lower than  $T_{n10}$ .
- KP 12 Precipitation Trend: The indicator follows the trend of annual and seasonal rainfall and is expressed in mm/10 yrs or in %/10 years, in relation to the reference value from the period 1961 to 1990.,
  - KP 13 Trend of dry indices of precipitation extremes: The indicator follows the trend of the following extreme index (units):
    1. Annual number of dry days (unit: days), i.e. number of days with daily precipitation of less than 1 mm
    2. Annual maximum extent of dry periods (unit: days) defined as a continuous number of days with a daily precipitation of less than 10 mm.
  - KP 14 Trend of wet indices of precipitation extremes: The indicator follows the trend of the following extreme indices:
    1. Annual number of moderately humid days (R75, days), i.e. number of days with daily rainfall above 75 percentile of daily rainfall distribution determined from all precipitation days ( $R_d \geq 1.0$  mm) in the reference period 1961 - 1990.
    2. Annual number of very wet days (R95, days), i.e. number of days with daily rainfall above 95 percentile of daily rainfall distribution determined from all days of the day ( $R_d \geq 1.0$  mm) in the reference period 1961 - 1990.
    3. Percentage of annual precipitation in very wet days (defined in accordance with 2.) (R95T, %),
    4. Maximum annual rainfall (days) defined as continuous number of days with a daily precipitation of more than 10 mm.
  - KP 15 Standardized Precipitation Index (SPI): This indicator estimates precipitation rates for individual time scales (1, 3, 6, 12 months) using standardized precipitation index (SPI) according to the WMO Manual (*Standardized Precipitation Index User Guide*, WMO, 2012).
  - KP 16 Estimation of air temperature and rainfall abnormalities by percentile: This indicator monitors the climatic anomalies of monthly, seasonal and annual air temperature and rainfall in relation to the reference 30-year period (1961-1990). The deviations are associated with certain percentile ranges for the air temperature (extreme cold, very cold, cold, normal, warm, very warm and extremely warm) and precipitation (extreme dry, very dry, dry, normal, rainy, very rainy and extremely rainy). Evaluation is done for months, seasons and years. If a particular climatic element has a significantly higher or lower value than the normal (mean) values in the reference period, the climate anomaly may have the effect of altering the plant and animal world in this area as well as migrating people to areas less affected by climate change
  - KP 17 Aridity Rating: Indicator of the Aridity Index (Drought) defined by UNEP 1992. The indicator is a non-dimensional size. The degree of aridity is defined by the value of the indices of aridity (the boundaries of the aridity category are shown in the table in the part for the description of the process for the calculation of the indicator). The indices of aridity are counted in months. The trend of aridity has been monitored since 1961 for monthly values. Given that it indicates the availability of water in the ground, it is a useful tool for analyzing the impact of climate elements on soil degradation.



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The source of all data is the DHMZ which is also obliged for annual reporting (except indicators KP 15 and KP 16 where monthly, seasonal and annual reporting is recommended) of all climate indicators towards a ministry responsible for the environment and climate.

The methodology of data production as prescribed by NLP for the given indicators is applied.

In addition to the above mentioned climatic indicators already covered by NLP, an additional development of climate indicators important for assessing impacts and vulnerabilities in several vulnerable sectors is proposed:

- Medium Wind Speed trend
- Medium Maximum Wind Speed trend
- Evapotranspiration
- Sunlight (flux of incoming solar energy).



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### 8. MONITORING AND EVALUATION

Reporting on the implementation of the Adaptation Action Plan will follow formats and deadlines for reporting under EU legislation in this area. Wherever possible, reporting procedures should be harmonized and rely on existing systems with the necessary further development of the MZOE and HAOP capacities to monitor and report on the implementation of the Adaptation Strategy.

The MZOE coordinates the production of reports on the implementation of the Action Plan, in which other responsible bodies, i.e. activity implementer and associates, will participate in the implementation of their tasks. The reports will include an assessment of the implementation of the measures and activities and effectiveness of the implemented measures where possible, as well as identify obstacles and serve as a basis for creating new action plans.

The *Inter-Sector Coordination Commission for Policy and Mitigation and Adaptation Measures for Climate Change*, appointed by the Government of the Republic of Croatia under the Air Protection Act will monitor the implementation of the Action Plan at sessions, review reports and propose measures to remove obstacles and improve implementation.