



Regional Climate Change Adaptation Plan – the Śląskie Voivodeship perspective

Methodology and thematic scope of the Regional
Adaptation Plan

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1 Challenges

The Regional Climate Change Adaptation Plan for the Śląskie Voivodeship (RCCAP) is Poland's first regional strategic document devoted entirely to climate change adaptation. It was created in response to the challenges related to climate change faced by the residents and public administration of the Śląskie Voivodeship. In the integrated LIFE project "IP LIFE for Coal Mining Landscape Adaptation"¹, the Śląskie Voivodeship is developing systemic solutions to mitigate the effects of climate change by implementing a regional adaptation strategy and finding synergies between climate change mitigation and other challenges the Voivodeship faces. These challenges are numerous, given that this is an area with significant subregional diversity and varying sensitivity to climate change in different parts. Furthermore, this is an area where climate risks associated with almost all hazards occurring in Poland are identified and, additionally, where climate change overlaps with the effects of strong anthropogenic pressure – urbanisation and industrialisation.

The environmental and socio-economic diversity of the Voivodeship also poses a challenge in terms of shaping adaptation policy. The wealth of experience gained in formulating this policy should be shared for the benefit of other regions' communities in adapting to climate change. It also served as motivation for the development of the Handbook: "Regional Climate Change Adaptation Plan – the Śląskie Voivodeship perspective. Methodology and thematic scope of the Regional Adaptation Plan.". Its aim is to summarise experiences from work on the RCCAP for the Śląskie Voivodeship and to share knowledge about planning for climate change adaptation at the regional level. The Handbook directly refers to the content of the RCCAP for the Śląskie Voivodeship – the topics presented relate to key adaptation issues – safety, nature conservation, the local economy, and cooperation for climate change adaptation.

The Handbook presents various aspects related to climate change adaptation in the Śląskie Voivodeship, both methodological and thematic. Its structure refers to the adaptation priorities of the Śląskie Voivodeship. Based on these experiences, the challenges faced by all regions in Poland were presented, regardless of their environmental and socio-economic diversity, individual vulnerability to climate change, and the necessity to plan measures in accordance with the regional and local characteristics of the territories.

Undoubtedly, the region's community is a leader in shaping adaptation policy in Poland, not only in terms of developing the country's first RAP, but also in terms of incorporating climate change adaptation issues into strategies, plans and programmes of the Voivodeship, the preparation of municipal adaptation plans and the implementation of numerous projects adapting local and regional governments to climate change. The Śląskie Voivodeship has developed an approach to regional adaptation policy. The authors of the Handbook, who provided support to the authorities of the Śląskie Voivodeship in developing the RCCAP, appreciate the extraordinary and rich experience of cooperation with all participants in the process, warmly thanking them for their commitment and hospitality, and inviting them to read the Handbook.

¹ LIFE20 IPC/CZ/000004 – LIFE-IP COALA, a project co-financed by European Union funds from the LIFE programme, the National Fund for Environmental Protection and Water Management, and the budget of the Śląskie Voivodeship, under which the RCCAP for the Śląskie Voivodeship was created <https://www.lifecoala.cz/index-en.html>

2 Adaptation of regions to climate change – the role of the RCCAP and voivodeship government

Adaptation to climate change has a strong territorial context. This context is defined by the vulnerability of territories to climate change and climate risks depending on their geographical location, environmental resources, including in particular natural resources, local communities, functioning economic sectors, infrastructure, and the potential to adapt to changing climatic conditions. Vulnerability to climate change and climate risk characterise almost every regional policy issue.

These policies, including in particular spatial policy and the resulting tasks for which the regional government is responsible, need to be integrated with adaptation policy. A regional climate change adaptation plan can serve this integration. As a strategic document, it can ensure that climate change issues and their effects are incorporated into the region's development policy and taken into account in decision-making. It should be emphasised that the integration of adaptation policy into development policy through the RCCAP takes place at a number of levels – within the region, between local authorities, and between regional and national policy. This integrative nature of the RCCAP is its most important role.

The integrative role of the RCCAP is reflected in the way adaptation policy is formulated – this concerns two aspects. The first is the necessity to rely on knowledge. Adaptation policy, including the preparation of the RCCAP, must be formulated on the basis of the results of an in-depth diagnosis of the Voivodeship's vulnerability to climate change and a climate risk analysis that takes into account the specific conditions of the region. The second aspect of adaptation policy relates to the need to develop it in cooperation with stakeholders – local government authorities and administrations, as well as the region's inhabitants.

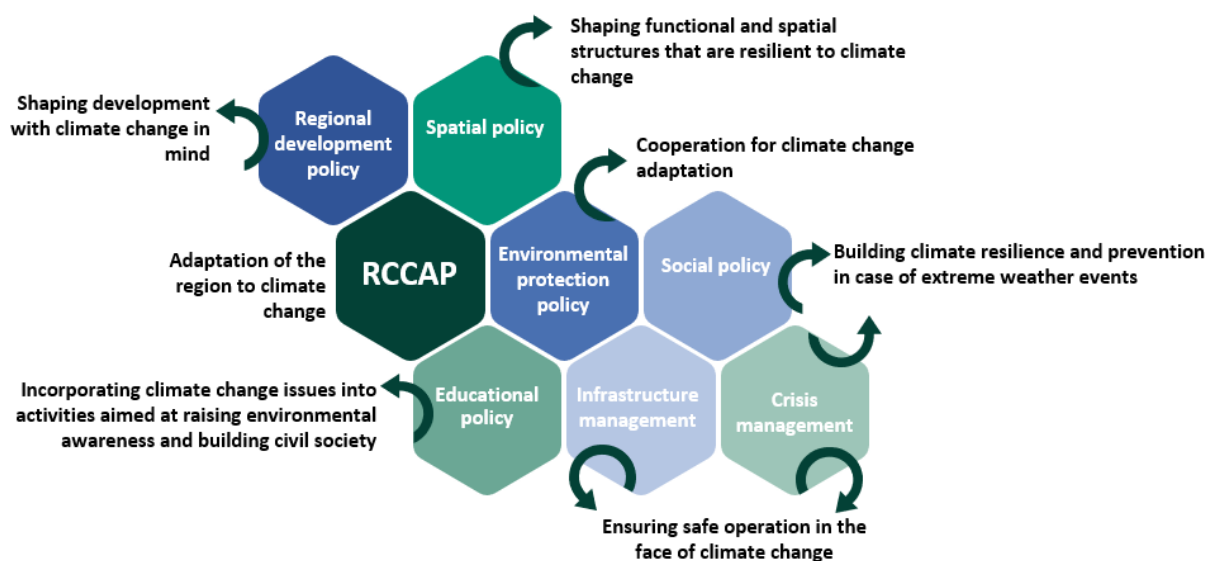


Fig. 1. The integrative nature of the RCCAP in regional development policy
Source: Own study by the Institute of Environmental Protection – National Research Institute

The voivodeship government plays a coordinating role in shaping and implementing adaptation policy. Not only does it integrate adaptation policy at the regional level and implement adaptation measures included in the RCCAP, but it also partners with local authorities and promotes other public and private entities in the field of regional adaptation to climate change. The coordinating role of the voivodeship government can be fulfilled in a number of ways (Fig. 2).

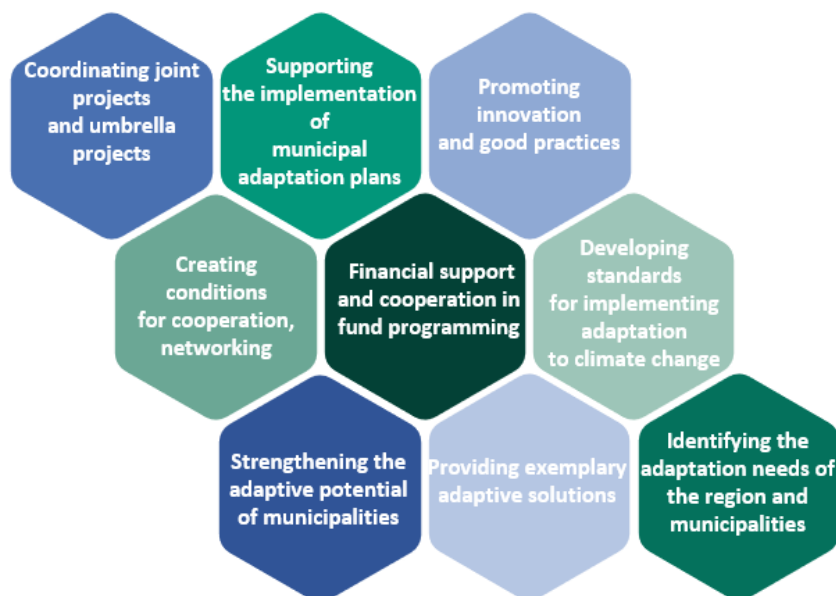


Fig. 2. The coordinating role of voivodeship government in adapting the region to climate change

Source: Own study by the Institute of Environmental Protection – National Research Institute

The RCCAP for the Śląskie Voivodeship contains the following: “The role of the Śląskie Voivodeship in adapting to climate change is to implement measures at the regional level and coordinate measures taken at the local level. It is recommended to coordinate cooperation by initiating joint projects and preparing umbrella projects, providing financial support and cooperating in fund programming, but also by creating conditions for cooperation and knowledge exchange, promoting innovative solutions and good practices, creating standards and providing model adaptation solutions. It is recommended that territorial cooperation be networked not only on a subregional scale, but also, for example, between local governments that face similar climate threats, including in particular mountain municipalities and communes (for clarity hereinafter referred to collectively as “municipalities”), where local actions carried out only at the municipal level will not bring the desired results.”

3 Methodically, step by step

3.1 From diagnosis to planning adaptation measures

A well-thought-out and methodically prepared and followed process for the development of a regional adaptation plan makes it possible to adequately identify the resources needed for the work, including the necessary time, competent experts as well as the financial and organisational resources. This reduces various difficulties when working on the RCCAP.

Divided into six stages, the process of developing an adaptation plan is well established in both

theory and practice (Figure 3). This approach is presented by the European Environment Agency (EEA) on its website <https://climate-adapt.eea.europa.eu/en>, among other places. It is also widely used in the development of urban adaptation plans and included in the "Adaptation Manual for Cities. Guidelines for the preparation of a Municipal Climate Change Adaptation Plan Update 2023" (Fig. 3).

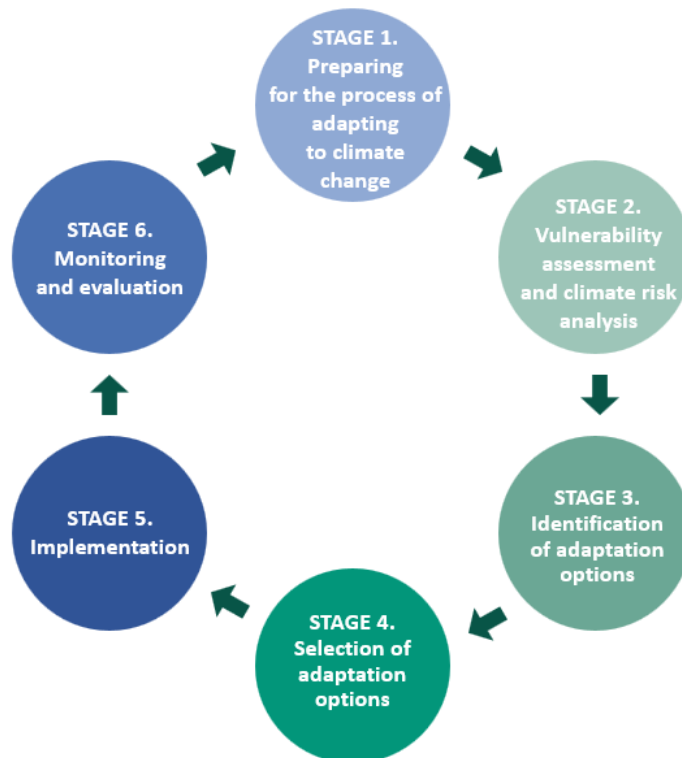


Fig. 3. The cycle for planning and implementing climate change adaptation

Source: Own study by the Institute of Environmental Protection – National Research Institute based on Climate-ADAPT

The approach presented requires adaptation to the specific conditions of the territory for which the adaptation plan is being developed. This was also done in the case of the RCCAP for the Śląskie Voivodeship – the first step in the work was to develop a methodological approach to working on the document. Proven solutions from urban adaptation plans and the following assumptions were adopted:

- The RCCAP is being implemented in close cooperation with local government units from the Śląskie Voivodeship, which are involved in developing the content of the RCCAP at every key stage of the document's preparation.
- The RCCAP is developed in a participatory manner, which means that the community of the region is involved in the work on the document, informed about the progress of the work, and invited to consultations at the earliest possible stage of the document's development.
- both a sectoral and an area-based approach are applied in the work on the RCCAP,
- analyses and action planning take into account territorial diversity, not only of municipalities and poviats, but also of the four subregions of the Śląskie Voivodeship – northern, central, western and southern.

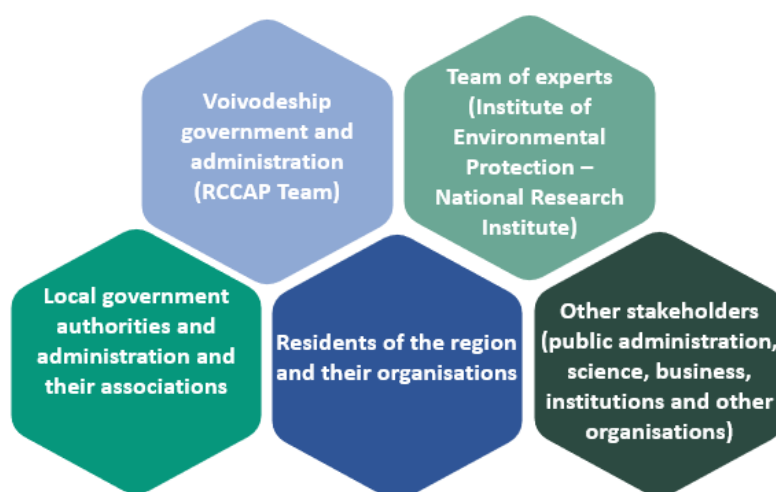


Fig. 4. Groups of stakeholders involved in developing the RCCAP for the Śląskie Voivodeship

Source: Own study by the Institute of Environmental Protection – National Research Institute

The method of working on the RCCAP for the Śląskie Voivodeship was described in detail in a document that served as a guide for entities involved in the work on the RCCAP (Stage 1). This description took into account the approach developed by the Śląskie Voivodeship as part of a public procurement contract for the development of the RCCAP and the experience of the LIFE-IP COALA project entitled "IP LIFE for Coal Mining Landscape Adaptation". A helpful solution in the Śląskie Voivodeship in working on the Plan was the appointment by the Marshal of the Śląskie Voivodeship of a special Team for the development of the Regional Climate Change Adaptation Plan for the Silesian Voivodeship (RCCAP Team), which included representatives from various departments of the Marshal's Office.

The first step in the diagnosis (Stage 2) was to assess the region's exposure to climate risks. A climate hazard is defined as a weather event, both short-term and sudden, as well as long-term, with a low probability of occurrence, which may have a negative impact on society, nature and the economy. The characteristics of climate phenomena were determined on the basis of historical meteorological and hydrological data. In addition, climate scenarios were developed for the periods up to 2030 and 2050.

As part of the vulnerability assessment, sectors and areas were characterised, taking into account those elements that may be negatively affected by climate phenomena. The sensitivity assessment took into account statistical data, spatial data, materials concerning the region, and relevant literature.

The results of the study analyses were discussed during workshops with local governments and verified by direct knowledge and observations from local authority representatives. The analyses also employed an area-based approach. Mountainous areas, urbanised areas and post-mining areas were analysed in terms of their vulnerability to climate change. The degree of vulnerability of these areas is linked to the accumulation of sectoral problems directly and indirectly related to climate change (see: Chapter 4.6).

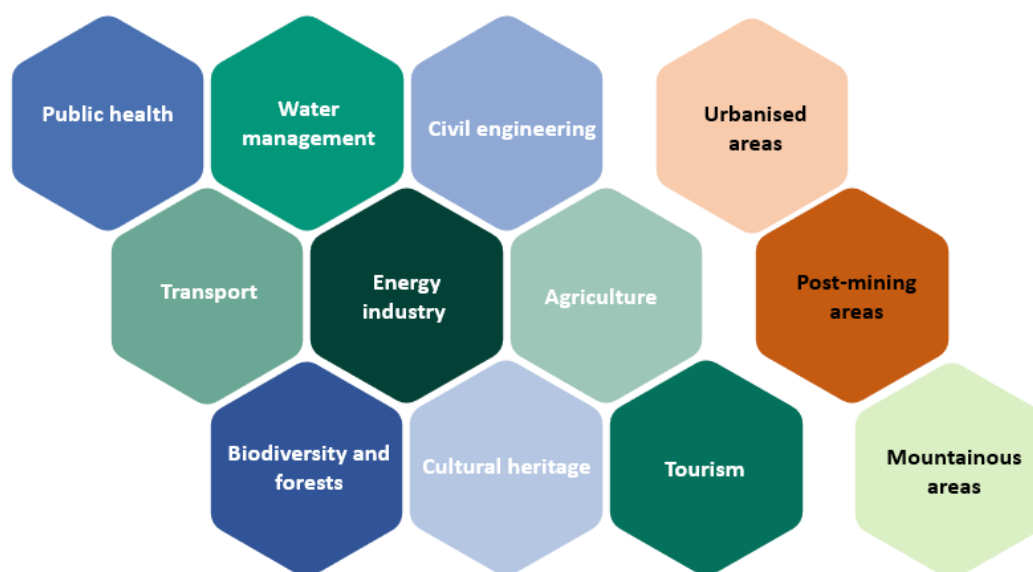


Fig. 5. Sectors and areas analysed in the RCCAP for the Śląskie Voivodeship
Source: Own study by the Institute of Environmental Protection – National Research Institute

A particularly important stage of diagnosis is the assessment of adaptive potential, which has been given special attention, including the widespread use of participatory methods (see: Chapter 3.2). The assessment of a region's adaptation potential aims to evaluate the region's resources in various aspects, and its results directly translate into adaptation measures.

In the RCCAP for the Śląskie Voivodeship, the vulnerability assessment results were presented in a single summary table covering sectors and threats broken down by individual subregions. A climate risk analysis was carried out for selected sectors. This in-depth assessment provided the knowledge necessary to identify adaptation options and enabled the transition to adaptation planning (Fig. 6).

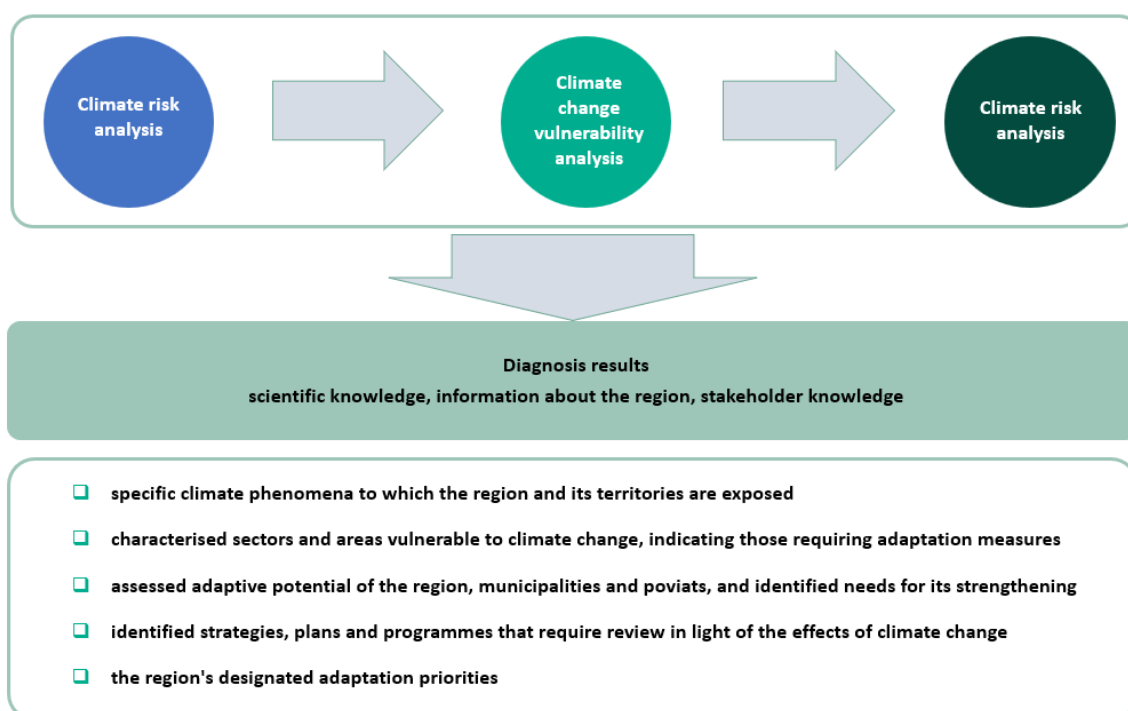


Fig. 6. Elements and results of the diagnosis for the purposes of RCCAP
Source: Own study by the Institute of Environmental Protection – National Research Institute

In the work on the RCCAP for the Śląskie Voivodeship, the transition from the results of the diagnosis to the identification of adaptation options (Stage 3) involved the formulation of adaptation priorities. These, in turn, formed the basis for the content of the adaptation objectives and measures. The document adopts the following structure: vision – strategic objectives – operational objectives – directions for adaptation measures. This approach is identical to the one contained in the "Development Strategy for the Śląskie Voivodeship 'Śląskie 2030' Green Śląskie".

In the stage of identifying adaptation options in response to adaptation priorities, RCCAP stakeholders were particularly involved. Workshops were held for local government representatives and residents on the vision, objectives and adaptation measures. The keywords developed during the workshops were reflected in the vision and overarching goal of the RCCAP. The wording of the vision and overarching objective was developed during another workshop attended by the RCCAP Team. Taking into account the results of the diagnosis and results of the workshops, a catalogue of adaptation measures was developed, covering a range of adaptation measures – sectoral and horizontal interventions to minimize climate risk (Fig. 7).



Fig. 7. Approach to developing adaptation measures
– content of the action card in the RCCAP for the Śląskie Voivodeship
Source: Own study by the Institute of Environmental Protection – National Research Institute

In Stage 4, i.e., the assessment of adaptation options, a number of analyses were carried out, including a multi-criteria analysis. The consistency of the objectives set in the RCCAP was also verified. Criteria were selected that allowed for the assessment of courses of action in terms of minimising climate risk, achieving sustainable development and environmental protection goals, financial acceptability, etc.

A multi-criteria analysis was conducted with the participation of stakeholders. As a result, the analyses enabled the development of three adaptation options – basic, extended and full. In the RCCAP for the Voivodeship, ultimately the full adaptation option was opted for, i.e., 37 measures, which the Voivodeship government, in cooperation with other stakeholders, will implement over the coming years.

The process of work from diagnosis to planning adaptation measures is illustrated in the diagram below (Fig. 8).

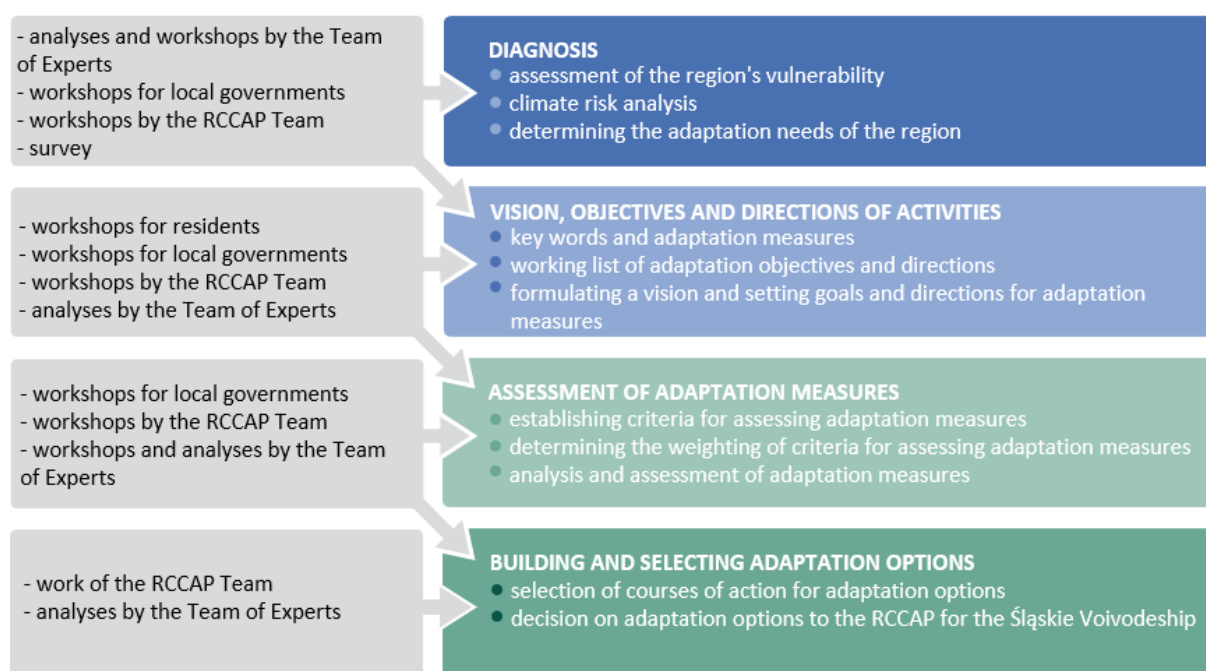


Fig. 8. From diagnosis to planning adaptation measures in the RCCAP for the Śląskie Voivodeship

Source: Own study by the Institute of Environmental Protection – National Research Institute

Worth implementing in other regions

Adapting to climate change requires numerous resources, including human, organisational, financial and time resources. Identifying these resources is the first step in planning an effective RCCAP development process. It requires thorough consideration and step-by-step planning. Organising the work into six proposed stages and defining the expected results of each stage will help to streamline the process and plan the roles of individual stakeholders, as well as identify the tasks to be performed by all parties involved. When starting work on the RCCAP, the following issues should be considered:

- developing a fairly detailed but flexible method for preparing the RCCAP, taking into account the specific conditions of the region resulting from its geographical location and socio-economic development – which determine its exposure to risks and indicate the necessary areas of expertise that should be represented by the experts preparing the plan,
- the use of proven good practices and solutions, including in particular the region's existing experience in developing strategic documents. This applies not only to the methodological approach, including participation, but also to ensuring the consistency of the RCCAP with the policies adopted in the region (document structure, how objectives are formulated and their operationalisation).
- mapping stakeholders and defining their roles, determining the stages in which they will be involved, and selecting methods for their involvement in the process. Planning for the region's community involvement in the development of the RCCAP is crucial in determining the time required for the entire process. It is important to bear in mind that involving stakeholders requires adequate time,
- planning extensive information and promotional activities. The quality of the RCCAP and satisfaction with the work on it will be influenced by the involvement of the public administration

and residents in the entire process – information activities will support this involvement and understanding of the importance of adaptation and the RCCAP document being created.

The success of the entire undertaking depends on the political will of local authorities. Not only is it necessary to initiate the development of an RCCAP and support its implementation by local authorities, but the authorities must also take responsibility for building broad support and alliances for the region's adaptation.

3.2 Assessing adaptive potential from different perspectives

Adaptive capacity refers to the ability of local authorities (in the case of the development of an RCCAP – the Voivodeship authorities) to adapt to the effects of climate change. It encompasses various resources: financial, human, knowledge, infrastructure, institutional, and those related to the protection and development of blue-green infrastructure. Adaptation potential varies across regions, and a thorough assessment of this potential (at the diagnosis stage) is crucial – every regional adaptation plan should refer to strengthening adaptation potential, because the higher the adaptation potential of a region, the more effectively it adapts to climate change.

A multifaceted approach to assessing the adaptive potential of the Voivodeship was used in the work on the RCCAP for the Śląskie Voivodeship. A combination of several methods was used for this purpose, such as: analysis of strategic and planning documents for the region, analysis of statistical data, analysis of data on the functioning of local government units, including the management system, surveys addressed to stakeholders (in particular local governments), focus group discussions and workshops addressed to key stakeholders.

The assessment of adaptive potential for the purposes of the RCCAP should combine two approaches:

- external (expert) related to assessment based on external analyses and objective statistical data,
- internal – self-assessment based on criteria adopted by the regional team. This element takes into account aspects of cooperation, knowledge and information flow in the region's public administration.

Linking the external and internal perspectives in the diagnosis for the RCCAP is extremely important, as it provides an opportunity to define the region's ambitions in terms of adaptation and, through the use of broad participatory methods, also the perspective of RCCAP stakeholders. When assessing the adaptive potential of voivodeships, it is important to note that it also includes the adaptive potential of the municipalities and poviats that comprise them.

During the work on the RCCAP for the Śląskie Voivodeship, extensive analyses, a survey and workshops were conducted to assess the adaptation potential. In terms of financial aspects, the analysis covered not only the region's budget expenditure on climate change adaptation measures, but above all the ability to obtain external funding and the experience gained by the local government in this area in recent years. In financial terms, the participatory budget was also taken into account with regard to climate change adaptation. In this way, it is also possible to indirectly recognise the importance of adaptation issues for residents.

Human resources are a key element of adaptive potential, which in the Śląskie Voivodeship were analysed in relation to knowledge resources. It was important to find answers to questions such as who (which entities) in the region deals with issues related to climate change adaptation, to what extent management staff are prepared to carry out their assigned tasks, and whether they have the

opportunity to improve their skills and knowledge through training, postgraduate studies, participation in conferences, etc.

The analysis also covered cooperation between various entities in the region, such as the crisis management centre, fire brigades and other services. An important aspect of human resources and knowledge included in the analyses of the Śląskie Voivodeship was social capital – social organisations operating in the region and civic activity. In addition, considerable attention was devoted to cooperation between local government units and cross-sectoral cooperation, e.g., between public administration, universities or other educational institutions.

During the work on the RCCAP for the Śląskie Voivodeship, a survey was also conducted among all municipalities and poviats of the Voivodeship to assess their potential. The response rate to the survey was high, although it was not possible to obtain data from all local authorities. Below is an illustrative overview of the self-assessment of municipalities' adaptive capacity in terms of knowledge and awareness of climate risks (Fig. 9).

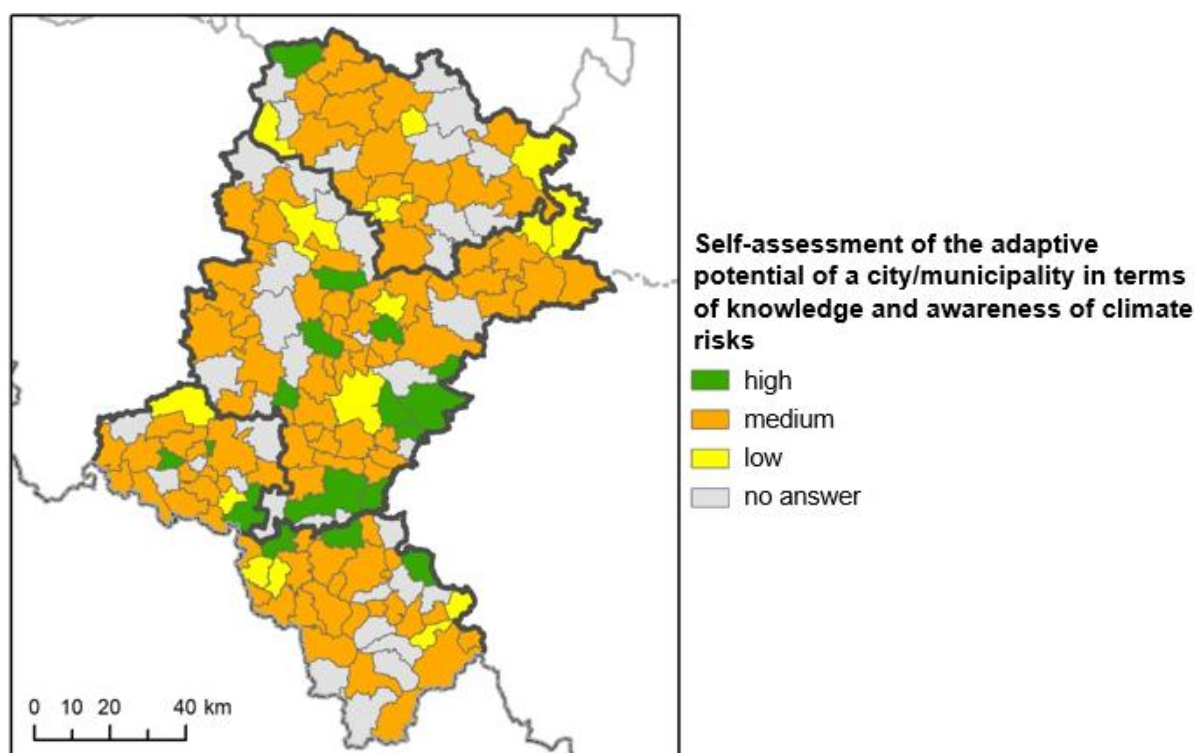


Fig. 9. Assessment of adaptive potential at the municipality level in the Republic of Poland for the Śląskie Voivodeship

Source: Own study by the Institute of Environmental Protection – National Research Institute

As practice shows (not only in the context of work on the RCCAP for the Śląskie Voivodeship), few local government units assess their adaptive potential as high. Local governments tend to focus on identifying which of the assessed elements require strengthening or capacity building when they are rated as low. It should also be remembered that even adaptation potential assessed as high will need to be strengthened in the face of climate threats.

Worth implementing in other regions

When planning an assessment of adaptive potential at the regional level, it is worth considering the following issues:

- planning diagnostic work in a manner enabling the assessment of the region's adaptive potential from various perspectives, i.e., involving stakeholders in the process,
- properly planning the schedule for assessing adaptive potential – conducting surveys among various regional entities and all local authorities in the Voivodeship takes time,
- planning and conducting focus meetings among stakeholders at the regional level (including, for example, the team appointed as part of the work on the RCCAP) – this is an invaluable source of inspiration for designing operational objectives and directions for action in the area of cooperation and strengthening human resources, including in the field of managing adaptation to climate change in the region,
- While assessing adaptive potential is crucial for designing objectives and directions for action in the RCCAP, all analyses conducted as part of this process, particularly those based on statistical data and collected survey material, may be of little interest to a wide audience. It is therefore worth ensuring that the adaptation plan itself includes a concise assessment of the potential that is clear to a wide audience (Fig. 10).

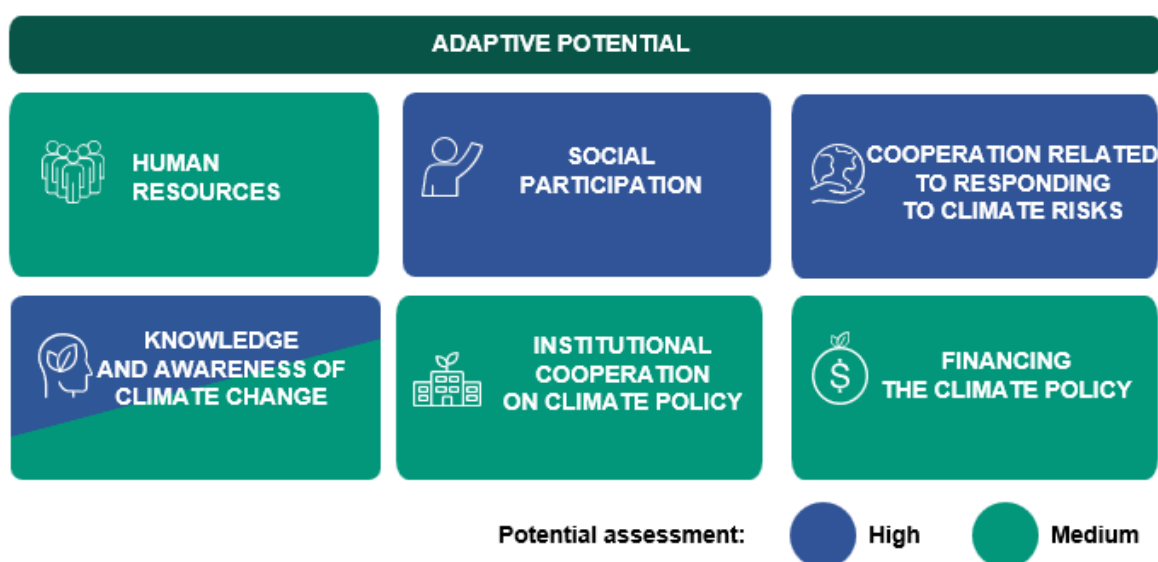


Fig. 10. Synthetic overview of the assessment of adaptive potential for the region in the RCCAP for the Śląskie Voivodeship

Source: Own study by the Institute of Environmental Protection – National Research Institute

3.3 Planning monitoring of adaptation and evaluation of the RCCAP

Measures taken as part of climate change adaptation require systematic monitoring and evaluation. This enables ongoing verification of the implementation of individual activities and assessment of the achievement of the objectives set out in the RCCAP. As a result, monitoring and evaluation become key elements of effective management of the region's adaptation to the effects of climate change.

Monitoring is the primary source of information on the status of implementation of planned adaptation measures and their progress. It covers the collection, processing and dissemination of data relating to both environmental issues (including climate) and related socio-economic aspects. In practice, adaptation monitoring should be integrated into the regional development strategy

monitoring system, as it is not only a climate policy tool but also an instrument for managing the development of the region as a whole.

Effective monitoring requires adequate data resources, which are then processed, converted into indicators, and interpreted in order to draw conclusions and formulate recommendations. Creating the necessary database, as well as the organisational and infrastructural facilities for collecting data, is a process that requires specialist knowledge and significant financial outlay. This often exceeds the capabilities of individual regions, which is why cooperation between institutions and support at national and EU level is so important.

The basis for monitoring adaptation to climate change is public statistics and the publicly available data they provide. However, it should be noted that both the effects of climate change and adaptation measures are relatively new areas of statistical research. Existing public databases are limited and often lack the detailed information needed to assess climate impacts at the regional level. However, it is worth noting that, in accordance with European Union requirements regarding the management of the energy union and climate action, data availability in these areas should increase systematically. The development of public statistics in this area should be a matter of particular concern to the regions themselves.

Due to the specific nature of each region and its territory, it is advisable, as far as resources allow, to conduct own research and create local databases based on data generated within regional administration structures and their subordinate units. The selection of indicators included in the RCCAP is therefore determined by the availability of data – both public and internal.

For effective management of the region in the context of climate change, it is recommended to create a coherent system for monitoring the changes taking place and to integrate a module of climate policy indicators into the existing regional development monitoring system. In accordance with the provisions of the National Regional Development Strategy 2030 (KSRR 2030), regional territorial observatories (RTO) perform the function of coordinating units in the field of development policy monitoring.

RTOs form a network for cooperation and information flow between key public entities at the regional level involved in the planning and implementation of development policy. As part of their activities, it is important to cooperate closely with Voivodeship Regional Research Centres – statistical office units that provide diagnostic and analytical support based on public statistics.

It is worth noting that currently, the scope of RTOs' activities is mainly limited to socio-economic issues, excluding environmental and climate-related aspects. For this reason, it is reasonable to supplement their activities with a module enabling the monitoring of regional adaptation plans. It is equally important to clearly identify the entity responsible for monitoring adaptation measures and to specify the frequency of reporting in this area. This module is also important due to the introduction of climate and environmental objectives into Article 11 of the Act on voivodeship authorities. Assessing the degree of their implementation will also require adequate monitoring.

In the Śląskie Voivodeship, RTOs perform a coordinating function. Monitoring of industry documents is carried out by the departments and units responsible for implementing the documents assigned to them. The results of their monitoring are included in subsequent editions of the monitoring reports on the Voivodeship's development strategy, which are prepared every two years. The Śląskie Voivodeship has a team responsible for implementing and monitoring the Voivodeship's development strategy, whose role is to network, exchange information and provide data as part of

the monitoring of the Voivodeship's development strategy, which is linked to the monitoring of the RCCAP. The method of monitoring the RCCAP, including the selection of indicators, was developed in cooperation with RTO. The results of the work carried out by the team responsible for monitoring the RCCAP will contribute to the RTO's studies on climate change adaptation.

In addition to its management function, the RCCAP monitoring also plays an important social role – it can increase residents' sense of security and raise awareness of climate risks. Therefore, monitoring reports should be publicly available, and information about their publication should be widely communicated, taking into account a variety of audiences. The data and reports may also be used for environmental and civic education in the region.

The selection of indicators is one of the key elements of monitoring and evaluation of the RCCAP. They are used to assess the progress of activities and to verify whether the intended results have been achieved and whether they translate into the achievement of the objectives set out in the plan. This process is not easy – it requires a compromise between the ambitions set out in the plan and the actual availability of data. Indicators may be assigned to specific adaptation objectives or take the form of cross-cutting indicators common to several objectives.

Evaluation of the progress of the Plan's implementation will be carried out periodically – every two years – based on a set of indicators assigned to operational objectives. In the RCCAP, a total of 37 indicators were assigned to 10 operational objectives for the Śląskie Voivodeship, classified into three categories: output, outcome and efficiency indicators. Each indicator has a specific data source, indicating the institution or database from which it will be obtained. Monitoring will be carried out not only on the basis of publicly available statistical data.

Where possible, the set of indicators includes indicators based on public statistics, but also indicators that need to be supplemented with regional data collected by local government institutions or obtained through own research. However, it is worth noting that due to the shortage of data in public statistics and the lack of detailed information at the regional level, as many as 17 indicators require data to be obtained from internal sources of the Marshal's Office of the Śląskie Voivodeship and from own research conducted at the regional level.

The information gathered on the implementation of individual courses of action and the determination of values achieved under monitoring indicators will form the basis for assessing progress in the implementation of adaptation measures. This assessment will form an integral part of the RCCAP monitoring report. The diagram below presents the key elements of RCCAP monitoring and evaluation (Fig. 11).

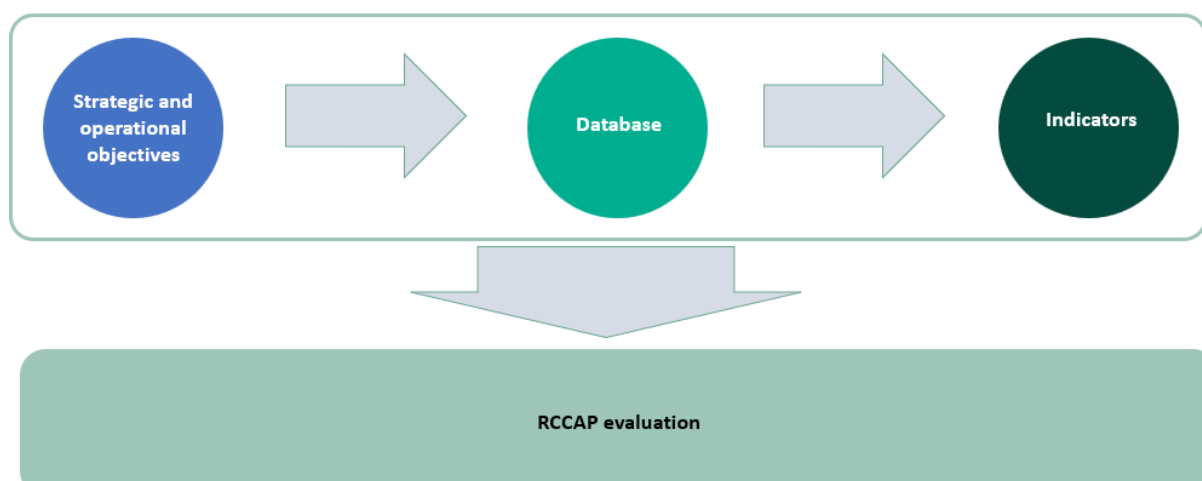


Fig. 11. Key elements of RCCAP monitoring and evaluation

Source: Own study by the Institute of Environmental Protection – National Research Institute

The evaluation of the RCCAP is linked to the RCCAP monitoring system, but also to the monitoring and evaluation system for regional development strategies. One of the key aspects of evaluation research is explaining the mechanisms that determine the success or failure of adaptation measures. Two stages of evaluation were designed in the RCCAP for the Śląskie Voivodeship:

- ongoing evaluation carried out during the implementation of the RCCAP, five years after the start of the document's implementation,
- ex-post evaluation after completion of the RCCAP implementation process.

The proposed evaluation system takes into account the region's previous experience in this area, as well as its organisational and financial capabilities. The evaluation designed within the framework of the RCCAP combines internal and external approaches. The ongoing evaluation has been planned as an internal process. Ex-post evaluation may be commissioned as an external study or carried out partly as internal tasks (e.g., analyses) and partly outsourced (e.g., use of participatory methods).

Critical to conducting an evaluation is the selection of appropriate methods and the formulation of evaluation questions to identify success factors and barriers to implementing adaptation measures (Figure 12).

The greatest challenges and difficulties associated with evaluating RCCAP, as with monitoring, relate to data availability and systematic data collection. Gathering feedback from stakeholders (e.g., local authorities, NGOs, entrepreneurs) is crucial, especially in the context of the evaluation aspects related to determining the extent to which objectives are met and their timeliness and relevance, as well as barriers to the implementation of the RCCAP. It is therefore essential to engage in dialogue with stakeholders at every stage of the development and implementation of the RCCAP. The challenge is to design and then consistently implement this cooperation, while the results that can be achieved through this approach, also in the context of monitoring and evaluation, allow for a thorough assessment of implementation and the formulation of conclusions and recommendations that take into account different perspectives (points of view) and different experiences of carrying out adaptation measures.

	Research issues and questions	Research techniques
Ongoing evaluation	VERIFICATION OF THE LEGAL AND PLANNING SITUATION OF THE VOIVODESHIP - Have any new or updated strategic and planning documents been developed at the voivodeship level? - Is there consistency between the updated or newly developed documents and the RCCAP? - Do updated or newly developed documents affect the implementation of the RCCAP? - Have new regulations been introduced in Poland regarding regional adaptation plans? If so, how do these regulations affect the developed of the RCCAP?	Comparative analysis
	CONTRIBUTION OF MUNICIPALITIES AND POWIATS TO THE IMPLEMENTATION OF THE RCCAP - To what extent do the municipalities and powiats within the voivodeship undertake activities that are in line with the objectives and directions of action adopted in the RCCAP? - To what extent is the RCCAP a useful document for them?	Survey of local governments
	IMPLEMENTATION OF OBJECTIVES AND MEASURES ADOPTED IN THE RCCAP AT THE VOIVODESHIP LEVEL What adaptation projects and measures are being undertaken by the voivodeship?	- Analysis of evaluation reports of other regional documents - Survey of regional public administration
Ex-post evaluation	ELEMENTS CONSTITUTING GUIDELINES FOR THE RCCAP Have there been any changes in the voivodeship and its surrounding areas, including whether and how documents at the voivodeship and national levels referred to in the RCCAP provisions have changed?	- Comparative analysis of regional and national documents - Analysis of ongoing evaluation results
	SHORT- AND LONG-TERM EFFECTS OF THE MEASURES TAKEN Have the objectives and directions of action defined at the RCCAP development stage been achieved?	- Indicator analysis - Workshops for stakeholders involved in the implementation of RCCAP
	FORMULATION OF CONCLUSIONS AND RECOMMENDATIONS Are the objectives and directions of action in the RCCAP still relevant and adequate to the changing factors and conditions of the region's development?	- Expert workshops - Stakeholder survey
	DIAGNOSING AND DEFINING IMPLEMENTATION BARRIERS AND RECOMMENDATIONS What barriers to the implementation of the RCCAP can be identified and how can they be counteracted?	Workshops or focus groups for various stakeholder groups

Fig. 12. Approach to evaluation of the RCCAP for the Śląskie Voivodeship – issues, questions and research techniques

Source: Own study by the Institute of Environmental Protection – National Research Institute

Worth implementing in other regions

When developing an RCCAP monitoring and evaluation system at the regional level, it is worth considering the following issues:

- availability of data related to climate and adaptation to climate change – what data is available in the public statistics system and what data can be generated at the regional level,
- linking the monitoring and evaluation system within the RCCAP with the monitoring and evaluation system for the development strategy,
- providing an organisational framework (as well as financial resources) for effective monitoring and evaluation,
- utilising existing experience – approaches to monitoring and evaluation in the regional development management system. The important questions here are whether the current system allows for effective management and how to incorporate climate and environmental aspects into it.
- utilising existing experience in cooperation with stakeholders in adaptation measures and the preparation of the RCCAP in order to design a tailor-made dialogue with stakeholders, including at the monitoring and evaluation stage.

3.4 Understanding the benefits of adaptation at the regional level

The benefits of undertaking and implementing adaptation measures can be seen as desirable, positive outcomes that strengthen the climate resilience of the region and build its developmental advantage compared to a scenario of no adaptation. The positive effects of adaptation are already evident at the planning stage. Diagnosing the region's adaptive potential, identifying the most vulnerable sectors and areas, analysing climate risks, mapping stakeholders and potential partners, setting out courses of action and estimating costs – all these elements form the foundation of an effective and responsible adaptation policy.

Adaptation to climate change brings a wide range of environmental, social and economic benefits. These include not only limiting the scale and severity of the effects of climate threats, but also improving the quality of life of residents and promoting long-term, sustainable development of the region. Importantly, adaptation is not only about mitigating risk, it is also about seizing new opportunities that may arise as a result of changing climatic conditions.

It is important to be aware that the potential opportunities associated with climate change are uncertain and often co-occur with negative effects, which may prevail on a regional scale. It is also necessary to understand that the opportunities associated with climate change are one thing, and the benefits of adaptation efforts are another. That is why it is so important to take a comprehensive, systematic approach to identifying opportunities and benefits in the context of climate change adaptation, based on a thorough analysis of risks, costs and synergies.

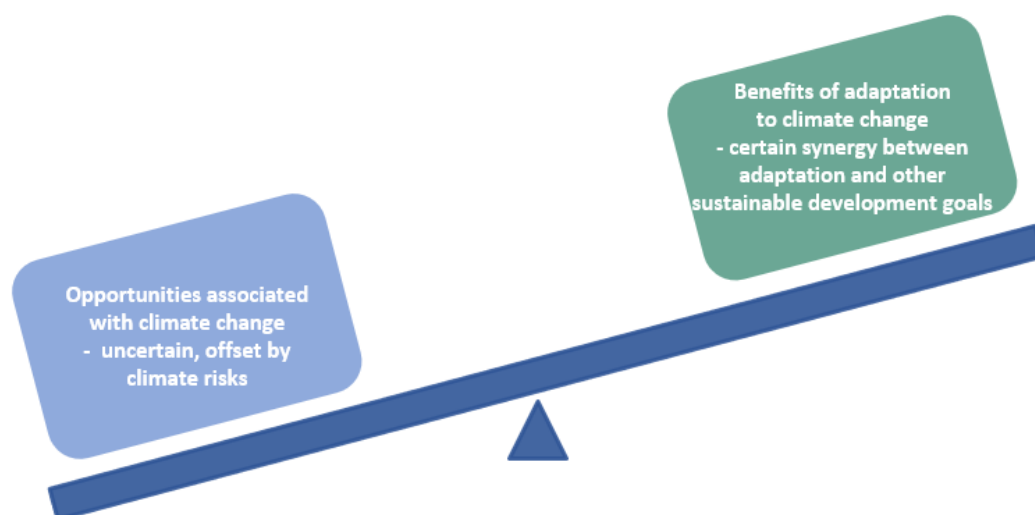


Fig. 13. Opportunities associated with climate change and the benefits of adapting to climate change

Source: Own study by the Institute of Environmental Protection – National Research Institute

The identification of the benefits of climate change adaptation as part of the work on the RCCAP for the Śląskie Voivodeship was a multi-stage process, starting with their identification at the climate scenario stage, through to verification and assessment of adaptation potential.

Climate scenarios provide knowledge about conditions that bring potential opportunities and possible threats. An analysis of climate scenarios for the Śląskie Voivodeship indicates warming of the region's climate, which may present certain opportunities. In the current decade and beyond, there will be an increase in the average annual and monthly air temperature, a decrease in the number of days with an average daily temperature below 18 °C, a longer growing season, a decrease in the number of frosty and freezing days, and a decrease in the number of days with temperatures below 0 °C per year. This climate profile helps us spot potential opportunities for the region and its people,

but these will be offset by the negative effects of many climate threats, especially extreme events and changes in rainfall patterns.

Opportunities for the Śląskie Voivodeship can only materialize if adaptation measures are taken. In this context, the benefits of adaptation can be interpreted in two ways. On the one hand, the opportunities associated with new climatic conditions can be turned into advantages; on the other hand, an indirect benefit is the reduction of potential risks – through appropriate preparation and adaptation of society and the economy. In a situation where it will not be possible to maintain certain sectors in the long term due to climate change, it is worth transforming the economy in advance. In the case of the Śląskie Voivodeship, this applies to winter sports tourism in the southern subregion and agriculture in the northern subregion.

Most importantly, however, failure to adapt means no benefits whatsoever – and even increased social, environmental and economic losses and costs. Only through conscious adaptation measures is it possible to build resilience, improve the well-being of residents and enhance the competitiveness of the region.

So, what specific benefits can adaptation measures bring? They can be grouped into three main categories: environmental, social and economic – with emphasis on their interpenetration and complementarity (Fig. 14).

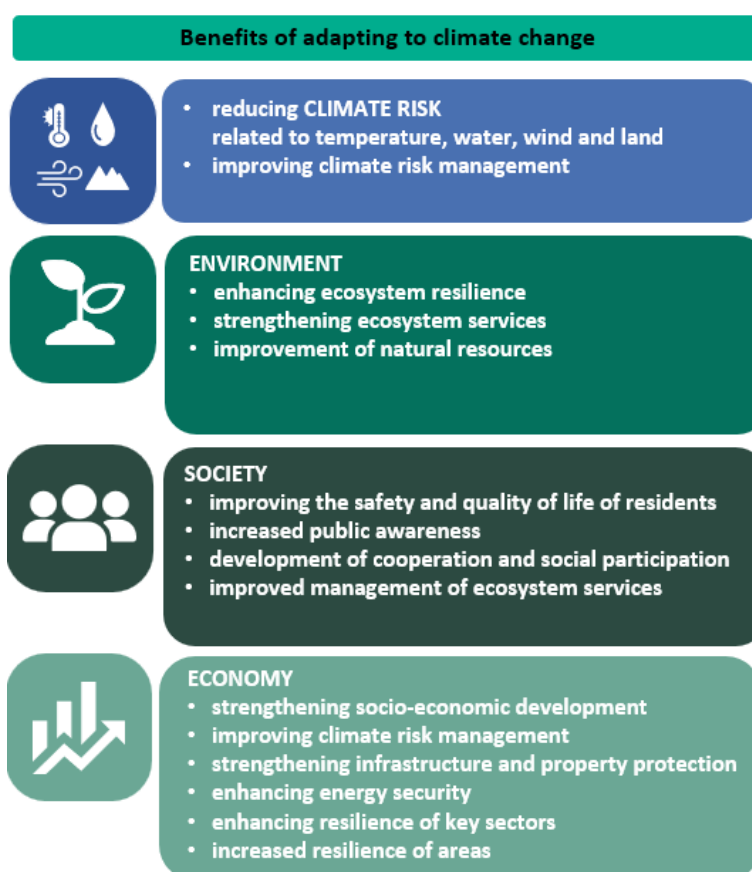


Fig. 14. Benefits of climate change adaptation in regional policy
Source: Own study by the Institute of Environmental Protection – National Research Institute

Worth implementing in other regions

Adaptation to climate change is a process of building the resilience of a region, which, when properly planned and implemented, brings real, measurable benefits to the environment, the economy and local communities. It is an investment in safety, quality of life and sustainable development. When working on the region's adaptation policy, it is important to bear in mind the following issues:

- it is valuable to recognise and understand the benefits that adaptation brings to safety, quality of life and the achievement of sustainable development goals.
- it is important to identify the benefits that can be achieved in a given region by implementing specific adaptation measures, paying particular attention to those adaptation measures that produce greater synergies, i.e. bring benefits in various areas, contribute to the achievement of other important development goals of the region and the ambitions of local communities in the Voivodeship.
- it is important to thoroughly understand climate risks and recognise the cascading effects of climate change in identifying opportunities associated with changing climatic conditions in the region.
- effective public communication about the benefits of adaptation is crucial; raising awareness and engaging in dialogue with residents promotes understanding of the purpose of the measures taken, increases their acceptance and, as a result, facilitates the implementation of investments and the bearing of the necessary costs.

4 Regional priorities for adaptation to climate change

4.1 Ensure safe living, working and leisure conditions in the region

Security issues in the face of climate change are the most important element of climate change adaptation at every level of governance, including regional. These issues not only affect the health of the region's inhabitants, but also concern water and energy supply, crisis management, business conditions and environmental safety.

The extent to which climate change and its impacts may affect security in the region depends on a number of interacting factors and trends, both environmental and socio-economic. Climate change increases health risks by directly affecting many environmental factors, including air pollution and changes in land use and development. These interactions indirectly affect exposure pathways, including, for example, access to water and food, or epidemiological safety (e.g., vector-borne diseases). The voivodeship-specific risks associated with flooding, landslides, strong winds or drought determine the region's priorities in adapting to climate change. The characteristics of the population, including its distribution within the region, determine the scope of adaptation measures. The presence of specific social groups, entrepreneurs or other users of the region, including tourists visiting the region, will also influence the scope of adaptation measures needed in the region.

Safety issues are one of the most important priorities for climate change adaptation in the Śląskie Voivodeship, and problems related to climate change in the public health, water management and energy sectors are reflected in the RCCAP.

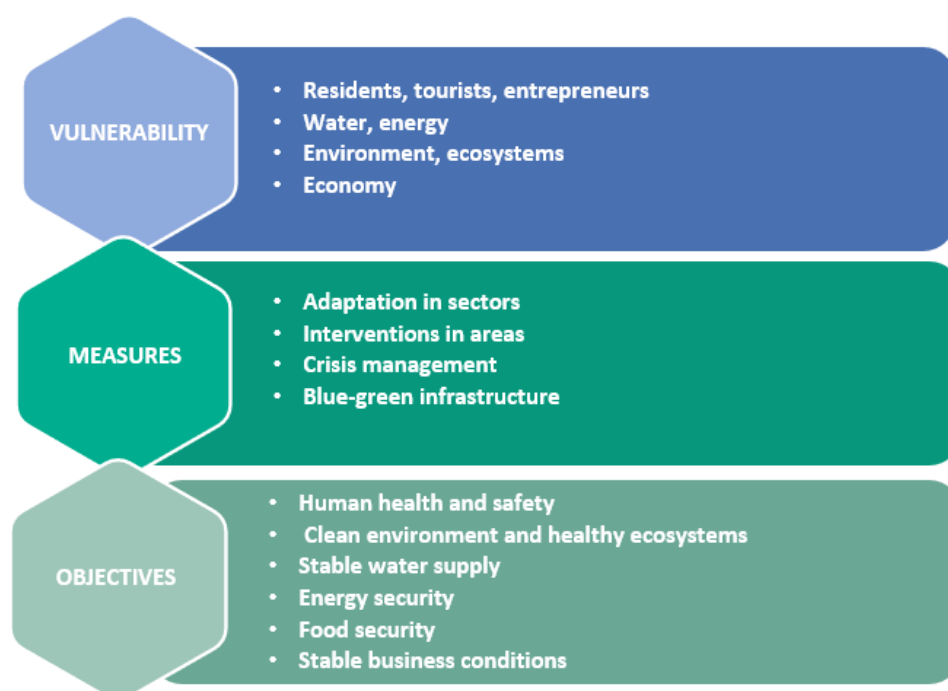


Fig. 15. Safety aspects included in the RCCAP for the Śląskie Voivodeship

Source: Own study by the Institute of Environmental Protection – National Research Institute

The vulnerability of the Śląskie Voivodeship to climate change is determined by its population density and degree of urbanisation. The Śląskie Voivodeship has a population density nearly three times higher than the national average and an urbanisation rate 1.5 times higher. These indicators are not evenly distributed across the Voivodeship. The northern subregion is characterised by indicators slightly lower than the national average and significantly lower than the Voivodeship average, while the central subregion significantly exceeds both values. The high degree of urbanisation and intensive industrial development are of great importance for the region's security in the context of climate change.

Climate change affects access to water intended for consumption as well as water used for industrial purposes. In addition, pollution from surface runoff from industrially degraded areas has a negative impact on water quality. The quantity and quality of resources here result from both human activity and climate change – strong anthropogenic pressure on water resources associated with water use and pollution is compounded by the negative effects of climate change (heat waves and droughts, river floods).

Mining activities, which have a huge impact on both water resources and quality through the drainage of mining facilities, affect the spatial variation in the abundance and availability of groundwater. The drainage of mining facilities causes a drop in the groundwater table, resulting in the formation of local depression funnels and changes in local groundwater flow directions. Long-term drainage contributes to irreversible changes in water relations and depletion of groundwater resources, and these problems are exacerbated by the effects of climate change.

Energy security is no less important at the regional level. Energy is the foundation of the region's stability and economic development. This sector is exposed to many climatic factors, and weather conditions affect energy production, demand and supply. In the Śląskie Voivodeship, the energy sector is undergoing intensive changes, with dynamic processes taking place in connection with the just transition of the region towards a modern, green economy. However, hard coal remains the

main source of electricity. Energy security is not only about adapting energy supply systems to climate change, but also about transforming these systems towards greater energy efficiency and the development of energy based on renewable and distributed energy sources. It is therefore impossible to ignore these issues when developing climate change adaptation plans. The RCCAP for the Śląskie Voivodeship provides an opportunity to take climate change into account as a factor influencing the development of renewable energy sources, to verify the potential for the development of this energy sector, and to strengthen distributed energy.

All these issues were taken into account in the analysis of the sensitivity of the Śląskie Voivodeship to climate change in the context of multi-faceted security. However, it is not only the characteristics of the environment, population or social services that are important in planning for adaptation to climate change. It is extremely important that public administration representatives are aware of the impact of climate change on security. Stable water supplies in the face of climate change are a matter of concern for the regional government. These issues were included in the RCCAP for the Śląskie Voivodeship, although it is the municipalities that are responsible for supplying water to residents, and many of the municipalities fulfil this obligation through the Górnośląskie Przedsiębiorstwo Wodociągowe (Upper Silesia Water Supply Company). Awareness of a common problem provides opportunities for better adaptive response, improvement of the situation and prevention of the spread of the effects of crisis situations across the entire region.

Responding to crisis situations is a specific task of regional public administration and an area of cooperation at the voivodeship level. Climate threats require a swift and effective response from state and local government institutions, services and other entities responsible for ensuring public safety. In accordance with the provisions of law, the voivod is responsible for the cooperation of all organisational units of government and local government administration operating within the Voivodeship in the field of natural disaster prevention and other extraordinary threats. However, the voivodeship marshal also has powers in the area of broadly understood security, in particular in urgent matters concerning threats to the public interest, direct threats to health and life, and in matters that may cause significant material losses. Responsibility for coordinating and implementing preventive measures relating to flood, hurricane and drought risks at regional level should be included in adaptation planning.

Worth implementing in other regions

Ensuring broadly understood security in the face of climate change is the most important issue in adapting to it. When planning adaptation at regional level, it is worth taking into account region-specific conditions in the following areas:

- crisis management, including the identification of areas at risk from extreme meteorological and hydrological phenomena, improving emergency response, developing climate hazard information systems, strengthening cooperation between services responsible for public safety, and preparing services and residents,
- health care, including the development of preventive health care, the adaptation of health services and infrastructure to the needs arising from climate change,
- taking into account social groups in a given region that are particularly vulnerable to climate change, as well as other stakeholders in adaptation in the above-mentioned aspects of safety (e.g., users of the area, such as tourists or representatives of specific economic sectors),

- water supply, including identification of threats to the stability of supply in relation to the risk of drought and floods, taking into account changes in water demand resulting from changes in population and socio-economic development, including water-intensive sectors of the economy,
- energy supply, promoting energy efficiency, developing renewable and distributed energy sources, taking into account their resilience to the effects of climate change, promoting the modernisation and expansion of transmission networks,
- shaping spaces and infrastructure that are safe for residents in extreme weather conditions, using nature-based solutions, adapting public facilities to climate change,
- involving residents in crisis management activities, volunteering to help those in need of support, coping and self-organisation in crisis situations.

An important factor affecting residents' security in the face of climate change is their awareness of the need to adapt. It is worth ensuring that the following issues are included in the RCCAP:

- building and strengthening climate awareness among various stakeholder groups and developing systems for sharing data and information on the environment – supporting citizen participation in adapting to climate change,
- conducting educational activities and organising information campaigns on the risks posed by climate change and responding to crisis situations,
- support for grassroots initiatives that strengthen social resilience to climate threats.

4.2 Protect and restore natural capital

Resilient ecosystems and the services they provide depend on complex, dynamic relationships between species and the environment, which are characterised by numerous non-linear processes. When managing natural capital, a number of factors must be taken into account, such as the potential effects of climate change and future socio-economic pressures, along with their uncertainties. Effective adaptation planning requires an approach that takes into account the complexity of the challenges and barriers facing ecosystems and their protection. Understanding how these factors affect ecosystem services is crucial for effective adaptation planning. The challenges associated with protecting ecosystem services are complex and require a holistic approach that takes into account the diversity of stakeholders, including local communities. The regional adaptation plan should be based on an approach that encompasses all these aspects.

Adapting natural capital to climate change involves a wide range of actions aimed at restoring, enhancing and protecting natural resources and their ability to adapt to changing climatic conditions. An important element is monitoring the condition of ecosystems, which enables early detection of changes and the implementation of effective preventive and corrective measures. Sustainable management of natural resources and the protection and restoration of habitats such as forests and wetlands are key to increasing the resilience of the Voivodeship's natural system to climate change.

Adaptation of natural capital is essential to ensure the continuity of ecosystem services in the region. Strengthening the resilience of ecosystems by increasing biodiversity improves their ability to adapt to extreme conditions. Habitat management, water cycle regulation and minimising the risk of climate hazards such as fires and floods are very important elements of effective adaptation planning.

It is equally important to involve local communities in conservation activities. Integrating local knowledge into planning processes provides valuable information and increases public acceptance of

adaptation measures. Education and raising public awareness are essential for mobilising communities to protect natural capital, while adaptation policies and strategies must address aspects of climate change at various levels of governance.

Effective adaptation to climate change requires strengthening cooperation between different sectors, enabling a coherent and effective approach to natural capital management. Adapting natural capital in the context of ecosystem services will not only enable us to tackle climate challenges in the Śląskie Voivodeship, but will also contribute to building a sustainable future in which people and nature coexist in harmony.

The Śląskie Voivodeship has valuable natural resources, including diverse landscapes – both natural and those created by human activity. Industry has created transformed areas which, thanks to natural succession processes, have become habitats for unique and rare species. The Voivodeship is characterised by a symbiosis between wild nature and industrial heritage, distinguishing this region from other parts of Poland. Nevertheless, despite its highly valued natural assets, only about 3% of the Voivodeship's area is covered by nature conservation areas.

Climate change, combined with anthropogenic pressures (mainly resulting from industrialisation and urbanisation), not only significantly affects the health, stability and resilience of ecosystems in the region, but also contributes to habitat transformation and changes in species populations. Extreme weather events such as heat waves, heavy rainfall and hurricanes destabilise ecosystems, especially those dependent on water and forests. Rising temperatures favour the spread of invasive alien species, threatening local biodiversity.

Forests in the Śląskie Voivodeship are already affected by adverse climatic phenomena, contributing to the decline of coniferous species and an increase in the population of harmful insects and the incidence of diseases in tree stands. Forest ecosystems in the northern, central and western subregions are threatened by fires, while those in the southern subregion are threatened by storms and heavy snowfall. As the frequency, intensity and extent of hazardous phenomena increase, the functioning of ecosystems is becoming increasingly threatened. Anthropogenic pressure, including industrial pollution emissions, is damaging the natural environment, especially in protected areas, which are particularly vulnerable to fragmentation, invasive alien species and pollution.

The RCCAP for the Śląskie Voivodeship tackles difficult challenges related to the protection of biodiversity and forests in the Voivodeship in the face of growing climate threats by developing effective solutions related to their adaptation to climate change. Increasing species diversity will contribute to greater resilience of the Voivodeship's natural system to climate change. Protecting natural habitats, including in particular through appropriate water management, and restoring ecosystems are key to ensuring the proper functioning of ecosystems. Regular monitoring of ecosystems, enabling early identification of changes and appropriate action, contributes to better management of natural resources in the region. Better management also means public education and raising awareness of the impact of climate change on natural resources, as well as involving local community knowledge in decision-making processes. It also involves cross-sectoral cooperation, which is crucial in developing an integrated approach to adaptation.

There are a number of difficulties and barriers associated with planning adaptation in the context of biodiversity and forest conservation at the regional level. One of the most significant problems is insufficient knowledge and a lack of accurate data on the state of ecosystems and the services they provide, which significantly hinders appropriate decision-making. Climate change and other factors mean that predictions about how ecosystems will function are highly uncertain, making long-term

planning difficult.

An additional problem is the lack of consistency in policies concerning various aspects of environmental protection. Limited financial resources for investments in nature conservation and the high social and economic costs associated with climate change adaptation may discourage the necessary action from being taken. Insufficient knowledge and public awareness of the value of ecosystem services limits support for conservation initiatives. Conflicts between various interest groups are a significant obstacle to the effective planning and implementation of the adaptation of the natural environment to climate change.

Worth implementing in other regions

Through a range of activities and programmes, regional authorities can contribute to minimising the negative effects of climate change and increasing the region's resilience to these changes, both in terms of nature conservation and the use of ecosystems in the adaptation of the entire region. In terms of biodiversity and forests, the following issues are important to highlight:

- coordination of activities by involving municipalities and institutions in the implementation of adaptation strategies and measures,
- sustainable management, including the promotion of practices that simultaneously ensure human resources and the protection of ecosystems,
- including in the RCCAP the restoration of natural resources and the implementation of the country's obligations under Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 on the restoration of natural resources and amending Regulation (EU) 2022/869,
- the use of spatial planning instruments in the protection of natural capital,
- cooperation with residents and non-governmental organisations in order to jointly develop and implement solutions,
- regular monitoring of the effects of actions and updating of climate change strategies,
- supporting the financing of projects related to the adaptation of natural resources, using regional, national and EU funds, including research projects and innovative technological solutions in adaptation to climate change,
- integration of natural resource protection with regional development policy,
- cooperation with other local governments and research institutions to implement joint adaptation strategies.

4.3 Shape a coherent network of blue-green infrastructure

Blue-green infrastructure (BGI) is defined as a multifunctional network of vegetation- or water-covered areas and nature-based solutions, designed and managed to provide a wide range of ecosystem services. This term is often used interchangeably with green-blue infrastructure or green infrastructure.

In adaptation policy, it is extremely important to design and manage space appropriately, at all levels (local, regional and national), in order to mitigate climate risk. Resources play a key role in shaping spaces that are resilient to the effects of climate change, particularly those related to the protection and development of blue-green infrastructure, which influence the health and well-being of residents and the effectiveness of adaptation measures. The blue-green infrastructure system is a complex network of connections and dependencies, which must be remembered to perform multidimensional functions: biological, climatic, social, aesthetic and protective functions of greenery, which together with water creates a coherent and continuous network.

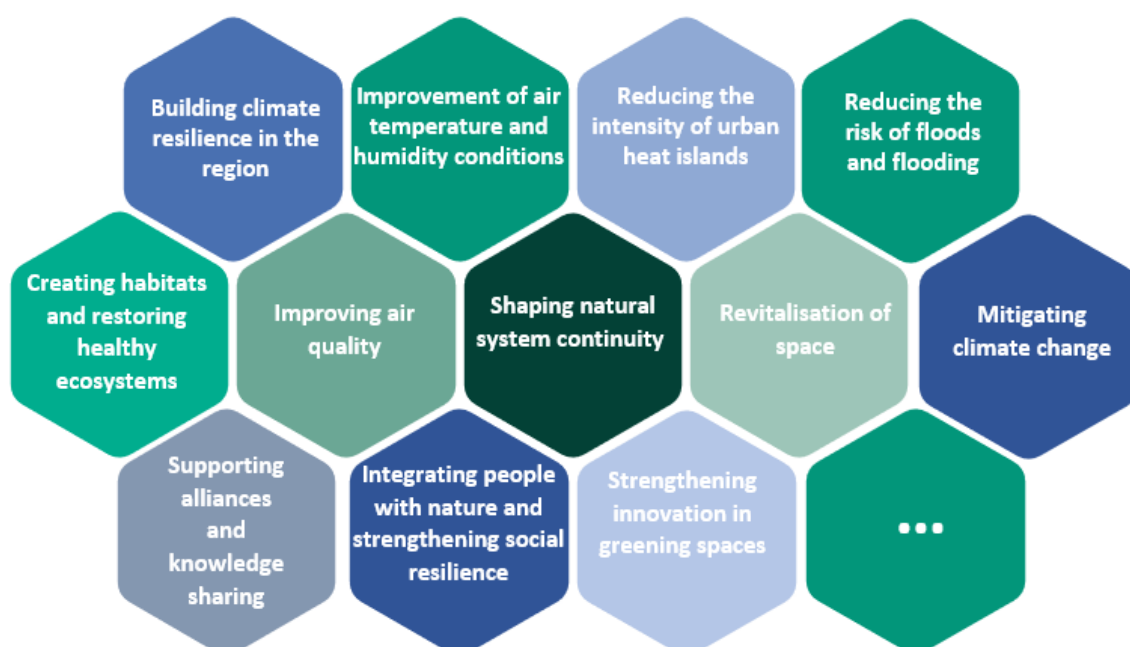


Fig. 16. The multidimensional benefits of BGI can be listed endlessly...

Source: Own study by the Institute of Environmental Protection – National Research Institute

Each voivodeship is different and has its own unique characteristics, but as practice shows, ecosystems and blue-green infrastructure should be one of the main pillars of adaptation. The most valuable elements of the BGI are areas protected under the Nature Conservation Act, forest and aquatic ecosystems and water-dependent ecosystems, as well as ecological corridors. On the one hand, these areas should be treated as particularly sensitive to climate change (as the most valuable resource), and on the other hand, as having the potential to perform adaptive functions. However, it should be remembered that when setting priorities for climate change adaptation, objectives and courses of action, it is extremely important to take into account the regional and local characteristics of territories. To this end, a detailed analysis of natural resources (including urban greenery) should be carried out, and these resources should be incorporated into the spatial and climate policy guidelines of the Voivodeship, regions and cities. An important aspect of the RCCAP is the identification of a system of protected areas, a regional network of natural connections, including ecological corridors linking biocentres and areas supplying the natural system. Planned adaptation

measures must be based on the identification of climate risks to natural resources, but also to residents, given the potential of ecosystems to perform adaptive functions.

A valuable source of information on the issue of shaping BGI may be a survey addressed to municipalities and counties, as well as workshops for residents and local governments devoted to this topic. In the Śląskie Voivodeship, studies and participatory work have identified adaptation priorities that directly relate to blue-green infrastructure, including protected areas as one of its elements:

- increasing the importance of blue-green infrastructure in climate change adaptation, including through development planning and decision-making instruments, the development of urban greenery as an element of shaping living conditions in the city, intensifying activities related to the protection of biodiversity, implementing solutions that use ecosystem functions to counteract the effects of drought and flooding, and utilising reclaimed, revitalised and revalued areas to strengthen and shape blue-green infrastructure,
- strengthening the protection and restoration of the region's natural resources that are subject to the negative effects of climate change and direct human activity, including increasing afforestation in order to achieve synergies in climate change mitigation and adaptation measures.

The graphic below presents a word cloud that indicates the high importance of blue-green infrastructure for stakeholders in the Śląskie Voivodeship's vision for the RCCAP in process of the document's creation (Fig. 17).

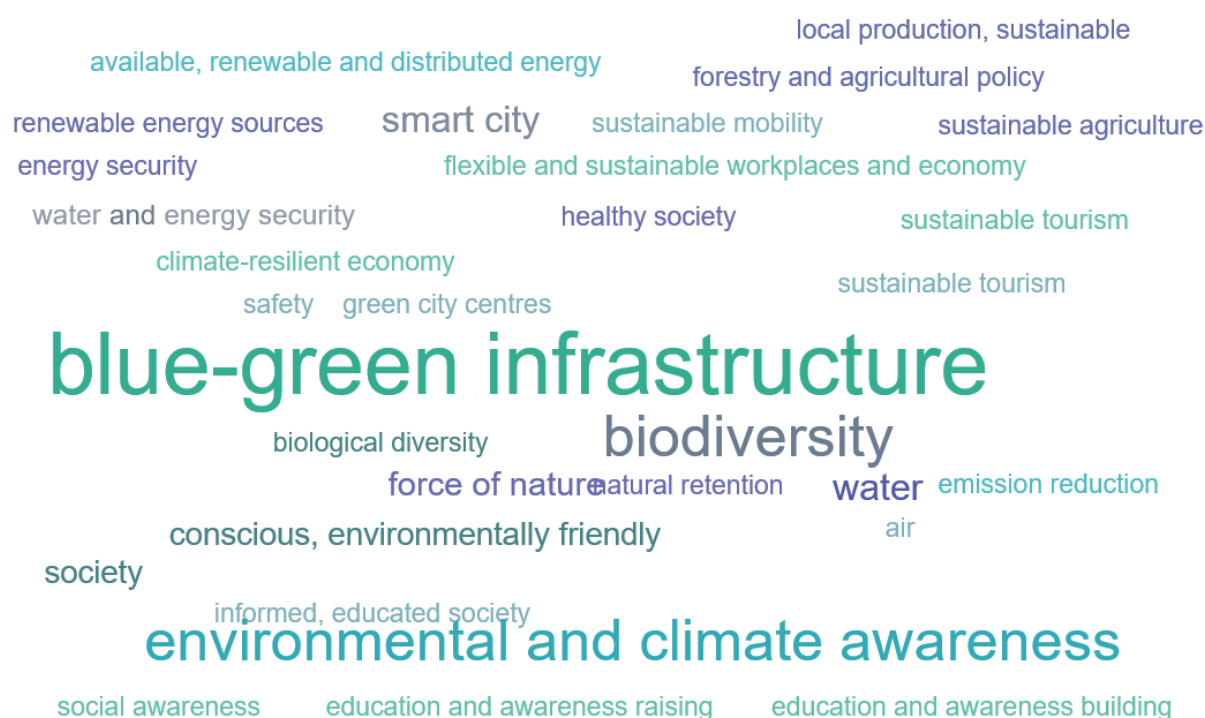


Fig. 17. Key words for the vision of the Śląskie Voivodeship from the perspective of the northern subregion, developed during workshops held in Częstochowa in January 2025.

Source: Own study by the Institute of Environmental Protection – National Research Institute

Worth implementing in other regions

In building the Voivodeship's adaptation to climate change, a holistic approach to sustainable ecosystem management (Ecosystem-based Approach) is particularly important, i.e., perceiving the natural environment as a whole, where all its elements are interrelated, and adaptation is based on the protection and restoration of the region's natural resources. The aim of this approach is to increase society's resilience to the negative effects of climate change while enhancing biodiversity. The main adaptation measures for implementing this approach are:

- creating a coherent system of protected areas that also takes into account the social functions of these areas,
- ensuring the continuity of regional networks of natural connections necessary for the resilience of biodiversity and counteracting its decline,
- supporting the development of blue-green infrastructure in line with the potential of urban and rural areas.

The regional approach to building a coherent blue-green infrastructure system should be reflected in the functional and spatial structure models, general plans and local spatial development plans of municipalities. In this regard, it is extremely important to support municipalities in reviewing and evaluating existing planning documents to ensure that they properly take into account the development of green infrastructure.

In terms of blue-green infrastructure management, it is important to focus on building and developing the human resources potential of marshal's, poviats and municipal offices. The role of the voivodeship is also to coordinate and strengthen cooperation between various entities for systematic, nature-based adaptation to climate change.

4.4 Strengthening local entrepreneurship in the face of climate change

Without a doubt, issues related to climate change are crucial for economic development planning, which is one of the pillars of regional development strategy. In the Śląskie Voivodeship, these issues primarily involve striving for climate neutrality while simultaneously focusing on building the competitiveness of the region's economy. Nevertheless, economic activity and entrepreneurship are sensitive to climate change, and climate risks to these activities cannot be ignored when planning the region's economic development. By analysing the vulnerability of various industries to climate change and assessing climate risks to business activities, the RCCAP provides a basis for taking the effects of climate change into account in the region's economic development. Adapting the economy to climate change requires an understanding of the links between the effects of climate change and the cascading risks affecting various elements of its system (Fig. 18).

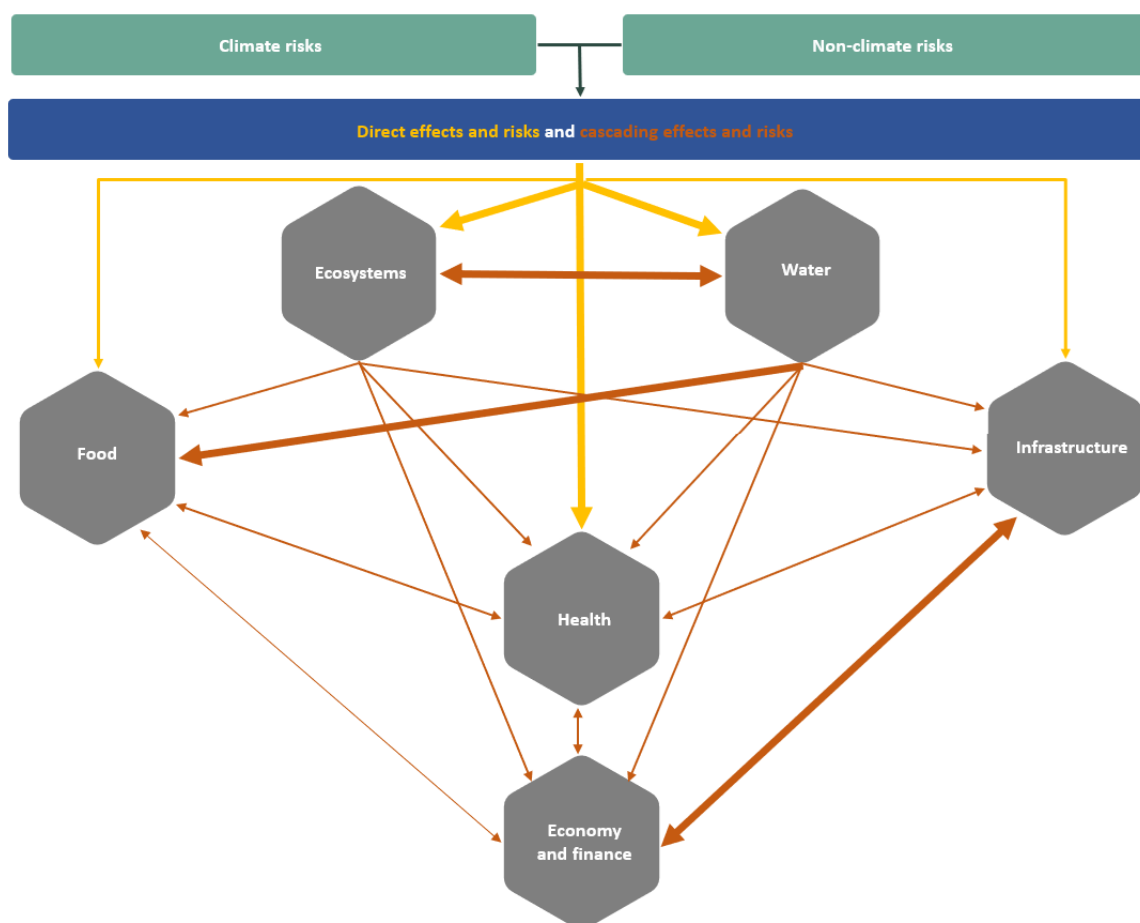


Fig. 18. The economy as an element in the climate risk nexus

Source: Own study by the Institute of Environmental Protection – National Research Institute based on EEA 2024

From the perspective of the sensitivity of entrepreneurship to climate change in the Śląskie Voivodeship, agriculture and tourism are of key importance, although it is worth emphasising their territorial diversity at the sub-regional level.

Farming activities face increasing climate change-related risks. These risks affect not only food production, but also supply chains, and has a cascading effect on rural life and financial markets. Agriculture is of strategic importance for the entire region in terms of food supply. As a labour market, the sector is also of great importance for the social and economic development of certain areas of the Voivodeship. At the same time, agriculture is considered one of the sectors most vulnerable to the effects of climate change. Changes in temperature and precipitation patterns necessitate the review and adaptation of crops, livestock farming and agricultural practices, while the observed and predicted risk of drought will affect water availability for agriculture in the northern, western and central subregions and, to a lesser extent, in the southern subregion. Weather anomalies such as frost and hail affect crops, while heat waves affect animal production, leading to heat stress in animals and impacting their health and productivity. An additional challenge is the growing risk of new diseases and pests that could destabilise agricultural production.

Tourism, the second most important economic activity for the Śląskie Voivodeship, is also one of the sectors most vulnerable to climate change. Extreme events pose a threat to tourists and affect the provision of services and the functioning of tourism-related infrastructure. Furthermore, permanent changes in climatic conditions, including in particular the warming of winters, are altering tourism patterns in mountainous areas. This necessitates the development of new forms of tourism,

investment and changes in infrastructure. The opportunities for tourism that may arise from changes in tourist seasons, including the lengthening of the tourist season, are linked to the preparation of new tourist offers adapted to changing climatic conditions. An important direction is investment in year-round infrastructure, making the region's tourist appeal independent of weather conditions.

Adapting to climate change in the region requires new solutions in the field of economic development planning. Climate change should be considered when assessing the suitability of areas for specific functions, shaping investment attractiveness, the vulnerability of technical infrastructure, the growing role of innovation, and the necessary employee qualifications. Cooperation between various stakeholders in economic development, including local and regional authorities, is also of importance.

The important coordinating and strategic role of local authorities in the development of entrepreneurship has also been noted in the RCCAP for the Śląskie Voivodeship. The document outlines measures aimed at supporting entrepreneurs in the agriculture and tourism sectors in adapting their businesses to changing climatic conditions. There are also plans to support cooperation between local governments and integrate activities related to tourism (including its promotion) in the context of climate change. In both the agriculture and tourism sectors, particular attention was paid to promoting and supporting environmentally friendly adaptation solutions that strengthen the Voivodeship's natural resources and are a priority in terms of building resilience to climate change.

Worth implementing in other regions

When working on the RCCAP, it is impossible to ignore the issue of economic activity and the impact of climate change on economic sectors that are important for the development of a given voivodeship. In this regard, the following issues are important to consider when planning for climate change adaptation:

- determining, on the basis of an analysis of climate scenarios for the region, the risks for various sectors of economic activity in a given voivodeship and understanding the cascading effects of these risks,
- identifying which sectors of the economy and which types of business activity in the voivodeship are most vulnerable to the effects of climate change, including indicating territorial differences in this regard,
- taking into account the climate resilience of the region's economy, including support for vulnerable industries, in the regional strategic management system,
- planning adaptation measures to review economic development directions in terms of the effects of climate change, taking into account the varying sensitivity of areas within the voivodeship,
- developing a monitoring system for sectors sensitive to climate change and disseminating knowledge about climate change that is crucial for entrepreneurs,
- creating a platform for cooperation between local and regional authorities to build competitive advantages in the context of climate change,
- taking into account the benefits of partnerships between local government, business and academia. Joint projects promote the exchange of know-how and technology, build new competences and increase opportunities for financing climate action.
- as part of adaptation measures, supporting and promoting eco-innovation, the development of green jobs and strengthening the green economy, implementing environmentally friendly

adaptation solutions, including those that strengthen ecosystems and their services, and integrating adaptation measures with the development of a circular, low-carbon and resource-efficient economy,

Local government partnerships for economic development under climate change conditions can include cooperation of higher and vocational education with the education sector to promote green competences in the labour market, cooperation of the scientific community with science and technology parks and business incubators to implement joint innovative and pro-climate projects, and the launch of financial pathways for entrepreneurial development, including the promotion of co-financing mechanisms for projects in eco-innovative climate-resilient sectors.

4.5 Building coherent multi-stakeholder cooperation

Multi-stakeholder and multi-level cooperation is the foundation for the development and subsequent effective implementation of a regional climate change adaptation plan. A key condition for success is the inclusion and active involvement of all relevant stakeholders in the process, including voivodeship, poviats and municipal authorities, public administration, representatives of business, the scientific community, non-governmental organisations and local communities. Interregional cooperation is also an important element, as is cross-border cooperation in the case of border regions.

The voivodeship authorities play a special role in initiating and promoting cooperation and in shaping formal and informal frameworks for institutional cooperation. It can also create conditions conducive to the development of volunteering, neighbourhood assistance systems and civic attitudes – elements that are of extreme importance in everyday adaptation to the effects of climate change.

Managing a process involving multiple partners requires a systematic and multi-stage approach. The creation and implementation of the RCCAP is part of the concept of climate co-governance, which is based on building networks of partnerships and implementing cooperation mechanisms and tools that support adaptation policy (Fig. 19). Particular attention should be paid to ensuring that those groups who are particularly vulnerable to the effects of climate change, yet have limited ability to represent their own interests (e.g., minorities, migrants, economically disadvantaged people), are accessible and have a real opportunity to participate in decision-making processes.

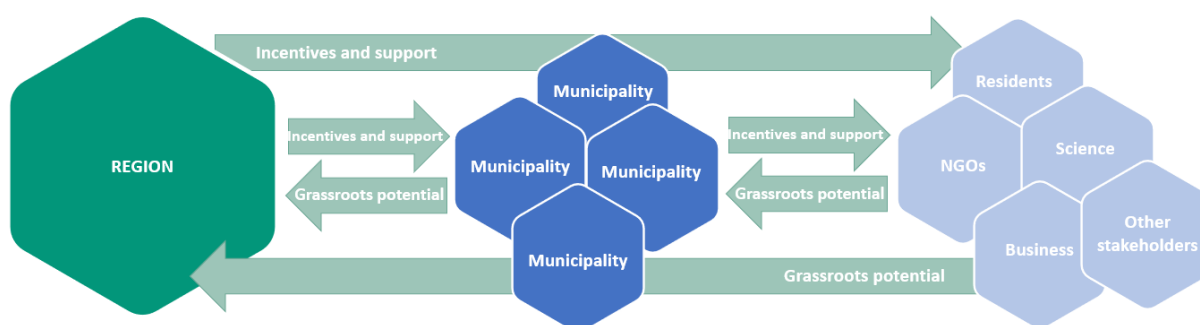


Fig. 19. Stakeholder relations – mechanisms of cooperation

Source: Own study by the Institute of Environmental Protection – National Research Institute

The concept of climate co-governance guided the work on the RCCAP for the Śląskie Voivodeship. They were conducted in broad cooperation with various stakeholders, covering all stages of the document's development. This allowed for the local perspective to be taken into account and strengthened the sense of shared responsibility for the implementation of adaptation measures. Contact with stakeholders was carried out in direct and indirect forms. Meetings in all the voivodeship's subregions and webinars summarizing the subsequent stages of work were organized and open to all stakeholders. Regular contact was maintained with stakeholders via e-mail, and the documents developed were subject to formal public consultation.

The process involved representatives of municipal and poviast authorities and their associations, who participated in assessing the Voivodeship's vulnerability to climate change, defining a vision for the region's adaptation to climate change, formulating RCCAP objectives and selecting adaptation measures. Residents of the Voivodeship, non-governmental organisations and representatives of the expert community also joined in the work.

Dialogue and cooperation between Voivodeship authorities, local authorities, communities and experts – conducted, among other things, during thematic workshops – made it possible to develop solutions tailored to the specific characteristics of the region. This process has also contributed to strengthening the adaptive capacity of public administration.



Fig. 20. The relationship between stakeholder engagement in the development of the RCCAP and adaptive capacity

Source: Own study by the Institute of Environmental Protection – National Research Institute

The RCCAP for the Śląskie Voivodeship particularly emphasises the role of stakeholder cooperation. It includes building coalitions of local and regional governments, strengthening local entrepreneurship in the region in the agriculture and tourism sectors, taking into account climate change, and cooperation to counter climate threats at various levels – between local governments, between local governments and national administrations, as well as at the cross-border and interregional levels, and cooperation between administrations and the scientific community. During the development of the Plan, the importance of collaboration was repeatedly emphasised and an analysis of the links between the operational objectives showed that it is the collaboration objectives that are key - stakeholder collaboration is not only a tool for the implementation of individual actions, but also a prerequisite for the achievement of other objectives and the overarching goal of the RCCAP.

Worth implementing in other regions

Public authorities and administrations play a key role and bear responsibility for building dialogue and creating institutional frameworks for multi-stakeholder cooperation in the face of climate change challenges. Working on a common adaptation policy for the region is an excellent opportunity to build coalitions for the entire Voivodeship. Experience gained from working on the RCCAP for the Śląskie Voivodeship shows that the following issues are important in building this coalition:

- involving various stakeholder groups in the development and implementation of the RCCAP, from the initial stages of work on the region's adaptation policy, and striving to increase

stakeholder participation, build trust in local government actions, strengthen acceptance of the initiatives undertaken, build relationships and networks, and create the region's climate-related know-how;

- defining a communication policy ensuring the efficient flow of information between stakeholders in the process of developing and implementing the RCCAP,
- planning various forms of cooperation in the Republic of Poland, both structural cooperation based on formal structures and administrative mechanisms, and flexible cooperation consisting in creating temporary, ad hoc solutions to emerging problems,
- When planning adaptation measures, it is important to take into account the coordinating role played by the Voivodeship authorities in ensuring the consistency of measures in the field of broadly understood security and natural resource management.
- Inclusion in the RCCAP of adaptation measures planned in municipal adaptation plans for which the regional government can act as a hub – a platform for raising joint funds and replicating proven solutions.

4.6 Identifying problems in various areas

Regions in Poland are characterised by considerable geographical, natural and socio-economic diversity. Each of these regions reacts differently to the effects of climate change and has specific adaptation needs. Furthermore, each voivodeship has specific areas where climate risks may be exacerbated by natural conditions or land development and use. The Śląskie Voivodeship is an excellent example of regional differences in vulnerability to climate change and adaptation needs. This diversity was analysed as part of the work on the RCCAP for the Śląskie Voivodeship – on the one hand, the Plan was developed at the sub-regional level, and on the other hand, the analysis focused on three categories of areas that are particularly sensitive to climate change – mountainous areas, urbanised areas and post-mining areas.

All these areas face a variety of problems resulting from climate threats. In mountainous areas, the specific flysch geological structure contributes to landslides during periods of heavy rainfall. Water levels in mountain rivers rise rapidly as a result of heavy rainfall, often causing violent floods. These factors influence settlement in mountainous areas, as well as the functioning of transport, agriculture and forestry. Climate change leads to changes in climatic and plant zones, including the disappearance of the highest one (subalpine). There are also changes in the duration and thickness of snow cover. These changes affect the natural resources that form the basis of tourism in these areas. Similar problems can be found in the Dolnośląskie, Podkarpackie and Małopolskie Voivodeships.

Urban areas are primarily exposed to extreme temperatures, urban heat islands, flash floods and flooding. Limited natural retention in cities increases the risk of both flooding and drought, leading to a deterioration in urban biodiversity and residents' quality of life. The problem in these areas is the modification of the local climate through land development, which also limits the implementation of nature-based adaptation solutions. Spatial management that is not carried out in a systematic manner fails to fully exploit the potential of ecosystems to mitigate the effects of climate change, which increases the vulnerability of urban areas to future climate threats. The problems of urbanised areas will be encountered in all major and minor cities in every province.

A distinctive feature of the Śląskie Voivodeship is the large proportion and diversity of industrial and post-industrial areas, including mining and post-mining areas. The work on the RCCAP for the Śląskie Voivodeship took into account two aspects related to the presence of mining and post-mining areas.

The first concerns the negative impact of these areas on the natural environment and infrastructure, as well as the increased sensitivity of these areas. The second aspect relates to the potential that these areas can carry in adapting to climate change – as areas that can be reclaimed, revalued and transformed into the region's blue-green infrastructure.

Undoubtedly, apart from those listed in the RCCAP for the Śląskie Voivodeship, areas that require special attention due to their specific adaptation needs include: coastal areas threatened by sea flooding, agricultural areas, in particular those located in the central belt of Poland threatened by drought, and lake areas, where nature is a valuable resource for the economy. In all these areas, there is an accumulation of sectoral adaptation challenges. Climate change is evident here in the form of additional or stronger negative impacts on the living conditions of residents in areas with specific natural and spatial planning conditions.

Worth implementing in other regions

The use of a sectoral and area-based perspective in the development of the RCCAP allows for an in-depth diagnosis and the development of adaptation measures that are consistent for areas with similar sensitivities, threatened by the same effects of climate change. When adopting an area-based perspective in work on the RCCAP, it is worth paying attention to the following issues:

- taking into account the spatial specificity of the region and its internal diversity; here it is valuable to refer to both natural boundaries and administrative divisions, including the nature of administrative units (rural, urban-rural and urban municipalities),
- identification of problem areas that are unique within the Voivodeship, e.g., large cities, degraded areas, areas particularly vulnerable to specific climatic phenomena,
- establishing a methodological approach to spatial analyses and presentations of data concerning vulnerability to climate change and climate risk.

5 Summary

How should adaptation policy be developed at the regional level, how can the consistency of this policy with national and local government objectives be ensured, and is it worthwhile to develop a regional adaptation plan as a separate document expressing this policy – the discussion on these issues is open. This Handbook presents the Śląskie Voivodeship perspective as a voice in this discussion.

The RCCAP for the Śląskie Voivodeship takes into account the spatial dimension of climate risks, the individual vulnerability of territories, the Voivodeship's potential to undertake adaptation measures, and the responsibility of local governments for living conditions in the region and municipalities. The valuable experience gained by the Śląskie Voivodeship in the process of developing its RCCAP can support other regional governments in developing their own approach to defining adaptation policies that take into account the specific conditions of the Voivodeship and the expectations and ambitions of the region's communities in building resilience to climate change.

6 Recommended publications and websites

Climate-ADAPT Sharing adaptation knowledge for a Climate-Resilient Europe <https://climate-adapt.eea.europa.eu/en>

EEA 2024. European Climate Risk Assessment. EEA Report 01/2024 doi:10.2800/8671471

European Environment Agency <https://www.eea.europa.eu/en>

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LIFE-IP COALA <https://www.lifecoala.cz/index-en.html>

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