Assessment of the Implementation Status of Climate Change Management in Strategic Environmental Assessments in Poland and Slovakia

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http://doi.org/10.29227/IM-2025-01-07

Submission date: 17-03-2025 | Review date: 28-04-2025

Abstract

Based on information recorded in geological sediments, glaciers and tree rings and on monitoring of climate parameters conducted for approximately 150 years, we can certainly conclude that climate on the Earth is evolving. The average global temperature of the surface layer of the atmosphere is increasing, as is the number of extreme phenomena such as storms and droughts. To counteract these changes, in 2017 the European Union began efforts to include climate change mitigation and adaptation in the Environmental Impact Assessments (EIA) procedure of planned investment projects (revisions to the EU Directive (2014/52/EU), effective by 2017). Meanwhile, according to the authors, Strategic Environmental Assessment (SEA) procedures are much more important for mitigating climate change because they concern projects (strategic, development, planning) that usually cover a larger area and are often of a comprehensive, organizational nature and largely precede the EIA process, which concerns specific investments.

The authors aimed to determine how climate change mitigation and adaptation are integrated into the SEA process in Poland and Slovakia. This study employed a cross-sectional analysis of current and planned guidelines and handbooks to incorporate climate aspects into strategic environmental assessments. Additionally, a matrix assessment was conducted to categorize the inclusion of specific climate change elements in SEA for various developmental, strategic, or planning documents implemented over the past 10 years at the national, regional, and local levels.

The analysis of SEA in Poland and Slovakia in the context of climate change adaptation has revealed areas for improvement in both countries concerning the integration of climate-related aspects into their strategic documents. Poland is more advanced, especially in terms of assessing the impact of strategic documents on climate factors, evaluating the susceptibility of strategic documents to climate change, and proposing adaptive actions. According to the authors, there is an urgent need to supplement national regulations in SEA process so that they strictly take into account the problems of climate change.

Keywords: *climate change, strategic environmental assessment, strategic documents*

1. Introduction

Globally, there is heightened apprehension regarding the detrimental effects of climate change on both human populations and ecosystems. The increasing frequency of extreme events, including droughts, floods, coastal erosion, and rising sea levels, underscores the urgency of addressing this issue. Poland and Slovakia, countries situated in Central Europe, are also experiencing the adverse impact of climate change on socio-economic development. Climate change affects all sectors of the economy, the health and quality of life of residents, and biodiversity. The most palpable aspects are observed in areas of concentrated urbanization. Climate mitigation and adaptation are acknowledged as interrelated strategies, and the Strategic Environmental Assessment (SEA) is emerging as an effective tool to address climate issues in planning (Posas, 2011, Ledda et al., 2021, Yang et al., 2021, Mayembe et al., 2023).

Despite global progress in understanding climate change, there's a need to consider factors contributing to global warming at regional and national levels. In the context of climate change mitigation efforts, addressing CO2 emissions and the impacts of global warming is crucial. However, there's a disparity between global goals and local plans, and the SEA procedure evaluation indicates a downplaying of uncertainty related to climate change in strategic documents (Stone et al. 2012, Wende et al., 2012, Larsen et al., 2013, Ledda et al., 2021, Mayembe et al., 2023).

In summary, SEA is a significant tool for managing climate change, but there's a need for better consideration of local realities and factors influencing climate change. Effective adaptive actions, integration of climate criteria in strategic assessment, specialist education, industry standards, and social dialogue are suggested measures for improving this process. Responsibilities for monitoring the effectiveness of adaptive

actions and financial support for sustainable projects are additional aspects requiring attention in the context of strategic assessments.

In response to the tangible impacts of climate change and associated threats, actions are being undertaken in Slovakia and Poland, similar to other countries, to integrate adaptive strategies into investment projects, policies, plans/strategies, and programmes within the framework of the Environmental Impact Assessment (EIA) procedure and Strategic Environmental Assessments.

The Directive 2001/42/EC on the assessment of certain effects of plans and programs on the environment, namely the Strategic Environmental Assessment Directive (SEA Directive), provides a legal framework for the incorporation of climate-related policies/goals into policies, plans, strategies, and programmes (hereinafter referred to as strategic documents) by their creators (Fig. 1). In accordance with the SEA Directive, the assessment report requires a description of the impacts of strategic documents on biodiversity, population, human health, fauna, flora, soil, water, air, climate factors, material assets, cultural heritage including architectural and archaeological heritage, landscape, and the interrelationships among these factors (SEA Directive). Through SEA, it is possible to integrate climate change adaptation into development activities at the national, regional, and local levels and across various economic sectors. Within the conducted SEA for sectoral policy/strategy, it is possible to analyze whether the given policy/strategy does not lead to increased sector vulnerability to climate change, thus preventing incorrect adaptation.

Environmental Impact Assessment Directive (EIA Directive) means Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. The amendment to directive reinforced the significance of climate change issues within the Environmental Impact Assessment system. This indicates an increased recognition and consideration of climate change-related aspects in the process of evaluating the potential environmental impacts of projects. The description of the EIA project should particularly include the project's impact on the climate, such as the nature and magnitude of greenhouse gas emissions, and the project's vulnerability to climate change (EIA Directive). In the SEA Directive, there hasn't been a direct specification of the inclusion of climate change aspects so far (SEA Directive). Due to the overall cascade arrangement of the environmental assessment system for policies, plans, strategies, programs, and projects (Rodrigo-Ilarri et al. 2020)., consideration of climate change should already be introduced at the level of the SEA Directive (Fig.1).

Climate change management is a comprehensive process encompassing strategies, actions, and adaptive measures to counteract and adapt to the effects of climate change. It is an approach that considers diverse aspects, such as infrastructure development, spatial planning, and sectoral initiatives, aiming to minimize the negative impacts of changing climate on society, the economy, and the environment (Zubíček et al., 2023).

In this context, Strategic Environmental Assessment plays a pivotal role, providing a systematic way to integrate issues related to climate change into strategic planning processes (Fig. 2). SEA allows for the identification of vulnerable areas, the planning of adaptive actions, and the assessment of how strategic plans impact exposure and vulnerability to various climatic phenomena. Consequently, it enables effective climate change management on a macro level, which is crucial for the sustainable development of societies and the protection of the environment.

In connection with the considered issues of the importance of SEA in adaptation to climate change, the aim of the analyses conducted was to find answers to the following research questions:

a) How effectively has the issue of climate change been incorporated into the SEA in Poland and Slovakia?

b) To what extent and on what scale were each of the assessed aspects of climate change adaptations taken into account in the SEA reports?

c) Are there differences in the consideration of climate change issues at different levels (local, regional, national) of strategic assessment?

d) Are there differences in the implementation of climate aspects in SEA between Poland and Slovakia?

2. Methodology of research work

The aim of the analysis is to assess the incorporation of adaptation and mitigation aspects related to climate change in strategic environmental assessments in Poland and Slovakia. Both countries are significantly expanding their transportation infrastructure (for example, over the last 20 years, the network of expressways and highways in Poland has increased 6.5 times), technical infrastructure (expansion of the sewage network), and are introducing changes related to energy transformation (renewable energy infrastructure and thermal modernization), which entails the development of plans, strategies, and development programs (for example, The Government's National Road Construction Programme), as well as the necessity of issuing environmental decisions as part of the environmental impact assessment process.

In the studies conducted simultaneously in the analyzed countries from August 2023 to February 2024, the focus was on the process of strategic environmental impact assessment. First, a desk review of documents and cross-sectional analysis of current and planned national guidelines and manuals on the issues of adaptation and mitigation to climate change in strategic environmental impact assessments were performed. As a result of the analysis of guidelines and manuals, aspects of climate change were selected that should be adapted in strategic assessments:

- Assessment of the alignment of the assessed strategic document with other documents, plans, and policies related to adaptive actions, i.e., actions related to climate change manifestations (e.g., spatial plans, flood plans, energy policy, and environmental policy).
- Assessment of the climatic factors occurring in the affected area, e.g., temperature, precipitation, extreme heat, intense rainfall.
- Impact of the strategic document realisation on identified climatic factors, on climate change.
- Impact of climate change on the strategic document realisation (in a specific sector/industry).
- Evaluation of the susceptibility of the strategic document to climate change, including sensitivity and exposure assessment.

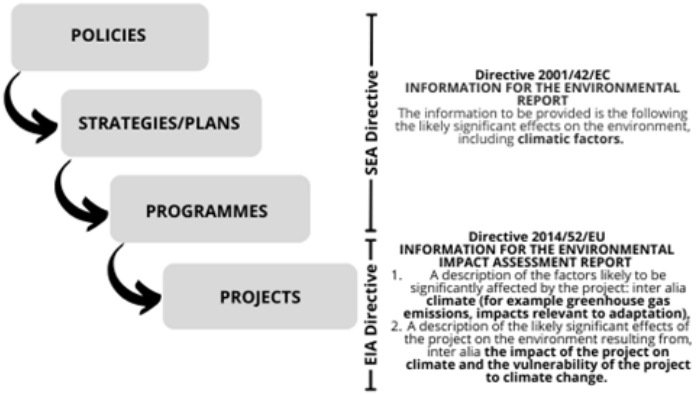


Fig. 1. Implementation of climate aspects in the cascade system of the environmental impact assessment (own study)
Fig. 1. Uwzględnienie aspektów klimatycznych w systemie kaskadowym oceny oddziaływania na środowisko (opracowanie własne)

- Assessment of climate risk for the current and future climate on a risk level scale: low, moderate, high, depending on the magnitude of the impact (moderate, serious, negligible, serious, and catastrophic) and the likelihood of this impact occurring (possible, unlikely, probable).
- Proposal of adaptive actions. Creating a catalog of all possible adaptive actions and subsequently assessing their feasibility, costs, or other limiting factors.
- Assessment of the scope and need for regular monitoring of the adverse impacts of climate change on the strategic document and the effectiveness of adaptive actions. Evaluating effectiveness in the case of SEA is challenging because benefits from some actions may become noticeable only after a significant climate change (extremely high temperatures).

Then, the content analysis of SEA forecasts in Poland and Slovakia was analyzed for selected development, strategic or planning projects developed over the last 10 years at the national, regional and local levels, including, for example in Poland: Environmental Impact Assessment of the Draft National Waste Management Plan, 2022; Environmental Impact Assessment Of The Draft Spatial Development Plan of the Kujawsko-Pomorskie Voivodeship, 2018. Content analysis is a well-known and used method by several researchers, also in the field of climate change and environmental impact assessment (Hands & Hudson, 2016, Ledda et al. 2021, Mayembe et al., 2023). In the next step, a matrix assessment and comparative analysis of the obtained results was performed. For this purpose, an assessment matrix was developed, categorizing the inclusion of selected aspects of adaptation to climate change in SEA forecasts on a scale of: aspects not included, superficially included, moderately included and completely included. The last element of the work was to draw conclusions from the assessment and identify proposals for best practices for implementing climate aspects in the strategic assessment.

3. Implementation Status of Climate Change Management in SEA/EIA

3.1 Overview of Current Regulations and Policies Regarding Climate Adaptation in Poland

In Poland (PL), the Environmental Impact Assessment and Strategic Environmental Assessment Directives find implementation through the Environmental Impact Assessment Act of October 3, 2008 (EIA Act PL, 2008). This legislation oversees the evaluation process for projects with potential environmental impacts. Before initiating projects—be they public or private—that could significantly influence the environment, the EIA procedure, outlined in the EIA Act, must be followed. The EIA Act also introduced provisions for SEA, a tool applied in the development of plans, programs, and strategies, integrating environmental considerations, including those related to climate change. Through these regulatory frameworks, Poland aligns with the environmental standards of the European Union, addressing climate-related aspects in its planning and decision-making processes.

The 2014 amendment to Directive 2011/92/EU underscored the importance of climate change issues within the EIA system. While these matters have been integrated into Polish regulations, they remain relatively new for decision-makers, investors, and consultants involved in environmental impact reports, despite the amended EIA Act being in effect for several years. These changes did not concern strategic assessment (Climate Change, 2021).

Methodologies, guides on the possibilities of implementing climate change management in SEA/EIA prepared in recent years in Poland (excluding handbooks of the European Union translated into Polish, which often served as the basis for the creation of these elaborations):

- "Guide for the Preparation of Investments Considering Climate Change, Mitigation, and Adaptation to These Changes and Resilience to Natural Disasters" (Guide, 2015). The guide was developed by the Ministry of the Environment, Department of Sustainable Development and is available on the Klimada 2.0 portal (https://klimada2.ios.gov.pl/pokaz-publikacje). The scope of requirements of this Instruction regarding climate issues applies to all types of projects - both those that may significantly impact the environment and those that potentially may signifi-

cantly impact the environment. However, this does not mean that climate issues should be limited only to the EIA/SEA stage.

- "Adaptation Handbook for Cities – Guidelines for the Preparation of the Urban Climate Adaptation Plan – above 100,000 inhabitants" (Adaptation Handbook, 2015), which served as the basis for the development of Urban Climate Adaptation Plans (UCAPs) in the years 2016-2018. 44 UCAPs with SEA were developed for the largest cities in Poland, inhabited by 30% of the country's population and half of the population residing in all Polish cities (Summary Publication, 2018).
- Publication "Climate Change and Adaptation to Climate Change in Environmental Impact Assessments. Handbook" created as part of a project implemented by the Institute of Environmental Protection – National Research Institute in Warsaw (Climate Change, 2021).
- Publication "Nature and Climate Indicators of Sustainable Urban Development. Guide for Cities" with a technical guide (Nature and Climate Indicators, 2022), serving as a tool to determine the scale of needs related to the implementation of appropriate climate change mitigation actions in cities.
- "Handbook of Climate Change Adaptation for Cities. Guidelines for the Preparation of the Urban Climate Adaptation Plan" (Handbook, 2023). The handbook is aimed at all stakeholders in climate change adaptation but particularly at local governments and public administration of cities with a population above 20,000 – key entities for climate change adaptation in Poland (on the Klimada 2.0 portal).

All the above-mentioned publications also address issues related to climate change mitigation and adaptation within the EIA and SEA frameworks. Specifically concerning EIA, the most practically significant publication for procedures in Poland is the "Climate Change and Adaptation to Climate Change in Environmental Impact Assessments. Handbook" (Climate Change, 2021), which provides analyses and assessments essential in the EIA report development process. It particularly focuses on the relationship between the project and the local climate, including aspects related to adaptation to climate change. The handbook contains information on correctly conducting climate characterization in EIA, assessing the impact of the project on climate, and evaluating the impact of climate on the project and its adaptation to climate change.

In Poland, there is currently no handbook specifically directed at assessing climate change within the strategic SEA. However, it is planned for development in the near future. Substantial material has already been gathered, but further work is needed.

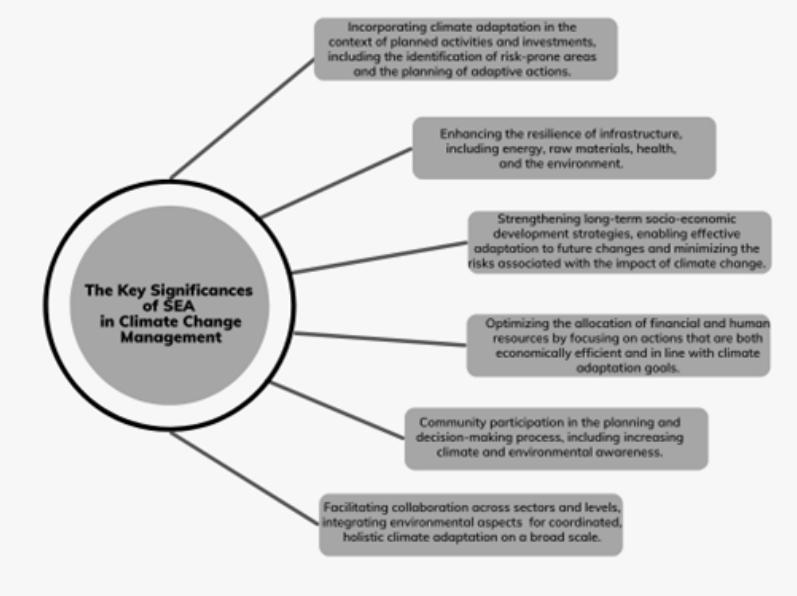
Klimada 2.0 is an online portal that serves as a crucial, centrally created source of information and communication in the field of climate change adaptation (https://klimada2.ios.gov.pl/).

3.2 Overview of Current Regulations and Policies Regarding Climate Adaptation in Slovakia in SEA/EIA

Under the conditions of the Slovak Republic (SK), SEA/EIA processes are systematically managed by the instruments of valid and effective legislation in the given area, i.e. existing directives and legislation. EIA procedures for public and private projects, with the probability of a significant impact on the environment, have been introduced in Slovakia since the adoption of the EIA Act, i.e. since the year 1994 (EIA Act SK, 1994). By updating the adopted directives of the European Parliament and the Council (EIA Directive and SEA Directive, listed in Part 1), transposition into the national legislation of the Slovak Republic was ensured through Act No. 24/2006 Coll. on environmental impact assessment and on amendment and supplementation of certain acts. As in the conditions of Poland, the amendment of the EIA Directive from 2014 emphasized the importance of the issue of climate change within the framework of EIA processes. This legislation ensures that aspects of climate change are taken into account in EIA/SEA processes through Methodological guidelines for assessing climate vulnerability and climate resilience of new investments and projects and inclusion in the EIA/SEA process.

The cross section and significance of the implementation of climate change management in SEA/EIA in Slovak conditions were further taken into account in the conceptual framework of selected documents adopted at the national, regional and local level:

- "Handbook for integrating climate change and biodiversity into strategic assessment of environmental impacts" (Handbook, 2013), serves as an information tool aimed at raising awareness of climate change issues in the context of Strategic Environmental Assessment,
- "Adaptation to climate change – the urgent role of cities" (Case study, 2014), informs about the current state and global development of climate change in Slovakia. It characterizes the steps of preparing an adaptation plan for climate change in Slovakia, including tools that can be used at the city level,
- "Methodological guide for assessing the impacts of climate change on large projects in the transport sector" (Methodological guide, 2018), is dedicated to the issue of incorporating the assessment of the impacts of climate change into the process of preparation and implementation of projects related to the transport sector. It defines the basic requirements and recommendations for ensuring the adaptation of infrastructure projects in the transport sector,
- "Value is water: An action plan to address the consequences of drought and water scarcity" (Action plan, 2018), serves as a basis, the aim of which is to prevent drought through preventive measures and thus eliminate the negative consequences of the climate – drought and lack of water in the conditions of the Slovak Republic,
- "Strategy for adaptation of the Slovak Republic to climate change" (Strategy, 2018), defines the range of requirements for improving Slovakia's preparedness to face the adverse consequences of climate change. It is an overview of the current adaptation processes in Slovakia, which in the processes of applied analy-



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ses bring a mechanism to ensure the effective implementation of adaptation measures at all levels,

- "Adaptation strategy for the consequences of climate change in the Košice Region" (Strategy, 2020), document is dedicated to a system of proposed measures and activities aimed at reducing sensitivity, vulnerability and increasing adaptation capacity to climate change at the regional and local level.
- "Handbook for integrating the cross-cutting topic of the environment and climate change into the Slovak Republic's cooperation development tools" (Handbook, 2020), is a tool for the systematic integration of aspects of the environment and climate change into the process of planning, management, implementation and evaluation of Slovak development cooperation activities,
- "How to understand the city and its people?" (Guide, 2021), this guide is dedicated to the issue of comprehensive, fair urban planning and increasing the importance of the topic of the climate crisis and its effects on cities in connection with the effects of the climate crisis caused by society's constant competition for increasingly scarce public space,
- "Adaptation guide for municipalities to the impact of climate change" (Guide, 2021), is a tool for local governments in the area of supporting their independence in the implementation of solutions related to measures close to nature aimed at retaining water in the country and thereby supporting the ability of soil and aquatic biotopes to retain water in the country.

4. Assessment of the current implementation of climate adaptation issues in SEA in Poland and Slovakia

At the national level, the assessment of climate change implementation in SEA has focused on projects such as the national waste management plan, state environmental policy, national shipping program, and state raw materials policy. At the regional level, attention has been given to projects like the regional environmental protection program, regional development strategy, and spatial development plan of the region. At the local level, the evaluation has targeted projects like the city's climate adaptation plan, city development strategy, sustainable urban mobility plan, and local spatial development plans for municipalities.

The incorporation of climate change issues in SEA reports must be tailored to the specific context of each plan or program. However, it should cover several coherent aspects, including (Fig. 3): from assessing the compliance of the assessed strategic document with other documents: plans and policies related to adaptation activities, through assessing the impact of the strategic document on identified climate factors, on climate change and vice versa: assessing the impact of climate change on the strategic document to monitoring the adverse impact of climate change on the strategic document and the effectiveness of adaptation actions. Individual aspects were subjected to a matrix assessment on a scale from: not included in the strategic document to completely included.

In the analyzed strategic documents, a detailed assessment of the alignment of the strategic document with other documents, plans, and policies regarding adaptive actions was conducted in the majority of cases in Poland (69%) and Slovakia (80%) (Fig. 3).

A detailed specification of climatic factors, such as temperature, precipitation, extreme heat, and intense rainfall, was noted in 62% of the analyzed strategic documents in Poland, while in none of the documents in Slovakia were these factors specifically outlined. In Slovakia, only superficial descriptions of climatic factors were found in 80% of the strategic documents.

A detailed assessment of the impact of the strategic document realisation on climatic factors and climate change was identified in 77% of the analyzed projects in Poland, whereas in none of the documents in Slovakia was such an assessment found. In Slovakia, 50% of the strategic projects did not evaluate the impact of the strategic document on climatic factors at all (Fig. 3).

The impact of climate change on the strategic document within a specific sector/industry covered by the document was not assessed in 92% of the documents in Poland and 60% of the documents in Slovakia. In Slovakia, 30% of the documents had a superficial assessment, and no document underwent a detailed evaluation. In Poland, detailed assessments were conducted for only 8% of the strategic documents (Fig. 3).

The evaluation of the susceptibility of the strategic document to climate change (sensitivity and exposure) was weak in both countries. In Poland, 77% of the strategic document projects did not undergo even a superficial assessment, and in Slovakia, the figure was 80%. This situation repeated in the assessment of climate risk, where in over 90% of the strategic documents in both Poland and Slovakia, no assessment was conducted (Fig. 3).

Proposed adaptive actions were outlined superficially in 23% and moderately in 38% of the strategic documents in Poland. However, in Slovakia, 90% of the documents did not specify any adaptive actions.

The assessment of the scope and need for regular monitoring of the adverse impacts of climate change on the strategic document was not proposed in 38% of the documents in Poland and 78% of the documents in Slovakia. In Poland, 31% of the documents briefly addressed this issue, while 31% addressed it in detail (Fig. 3).

Summarizing the results of the analysis, the following conclusions can be drawn in response to the research questions:

a) How effectively has the issue of climate change been incorporated into the SEA in Poland and Slovakia?

In the comprehensive assessment for both countries, the only positive aspect of incorporating adaptation and mitigation aspects to climate change in strategic impact assessments is the first aspect assessed: the detailed alignment of the strategic document with other documents, plans, and policies regarding adaptive actions, which was performed in the majority of analyzed cases (74%). The other aspects are considered weak links in addressing climate change in SEA—ranging from minimal to superficial or moderate.

b) To what extent and on what scale were each of the assessed aspects of climate change adaptations taken into account in the SEA reports?

The analysis of Strategic Environmental Assessment for Poland and Slovakia regarding climate change revealed that Poland incorporates climate aspects more comprehensively in its strategic documents than Slovakia. However, both countries have areas where the analysis is insufficient or even absent, indicating the need for improvement in the SEA process concerning climate adaptation and mitigation. Monitoring progress and implementing enhancements will be crucial in effectively addressing climate issues at all levels of strategic planning in the future.

c) Are there differences in the consideration of climate change issues at different levels (local, regional, national) of strategic assessment?

The analysis did not reveal differences in the levels of strategic assessment; similar conclusions can be drawn for strategic documents at both the national and local levels (Fig. 4).

d) Are there differences in the implementation of climate aspects in SEA between Poland and Slovakia?

The analysis showed several differences in the implementation of climate aspects in SEA between countries, for instance, in Slovakia, there is a higher percentage of documents that only superficially address or do not address at all aspects like detailed specifications of climatic factors, the impact of climate change on the strategic document, the evaluation of susceptibility, and the assessment of climate risk. In Poland, these aspects are more frequently addressed, although not always in a detailed manner.

In summary, the analysis of Strategic Environmental Assessments in Poland and Slovakia in the context of climate change adaptation has revealed areas for improvement in both countries concerning the integration of climate-related aspects into their strategic documents. Poland appears to be more advanced in this regard, especially in terms of assessing the impact of strategic documents on climate factors, evaluating the susceptibility of strategic documents to climate change, and proposing adaptive actions. However, there are areas where both countries need improvement, indicating the need for further optimization of SEA processes in terms of climate change adaptation and mitigation.

5. Prospects for the development of climate change management in SEA

Urban climate change adaptation plans (UCAPs) developed in Poland in 2016–2018 for the most populated cities (over 100,000 inhabitants) were well received. The projects focused on threats related to climate change in 44 urban areas, such as: precipitation - heavy rains, often resulting in urban floods, droughts, extreme temperatures and restrictions in air circulation (Summary Publication, 2018). Soil sealing and urban sprawl as well as and ecosystems fragmentation reduced retention capacity of urban areas and minimized ability of temperature regulation via processes of evapotranspiration (Gałaś et al., 2020). Residents of cities expect a reaction from the Municipal Council and more comfortably live with reduce air pollution. The solution is to change the organization of the functioning of cities, including transport, and the use of green and blue infrastructure (Šenfeldr et al., 2020). The main task includes (Summary Publication, 2018): mitigating of local climate, increasing the retention and infiltration of water in the soil, reducing effects of heavy rainfall, storms and urban flooding. Mitigation activities are aimed at preventing or reducing greenhouse gas emissions. They are mainly related to the improvement of energy efficiency and increasing the share of renewable energy sources in the final gross energy consumption (klimada2.ios.gov.pl). Adaptation aims to reduce or avoid the effects of threats resulting from climate change and their consequences (Gorgoń, 2019).

For example, the problems of the city of Katowice resulting from the threats related to climate change mainly concern the following sectors/areas: public health, undeveloped areas with the natural matrix, transport and water management. The objectives of the adaptation plan were to increase the city's resilience to the occurrence of: extreme hydrological phenomena, phenomena related to air temperature and wind, as well as to the negative effects of an increased concentration of air pollutants (UCAP, 2018):

- Technical measures-investment measures enabling a city's quick adaptation to climate change, (e.g. con-

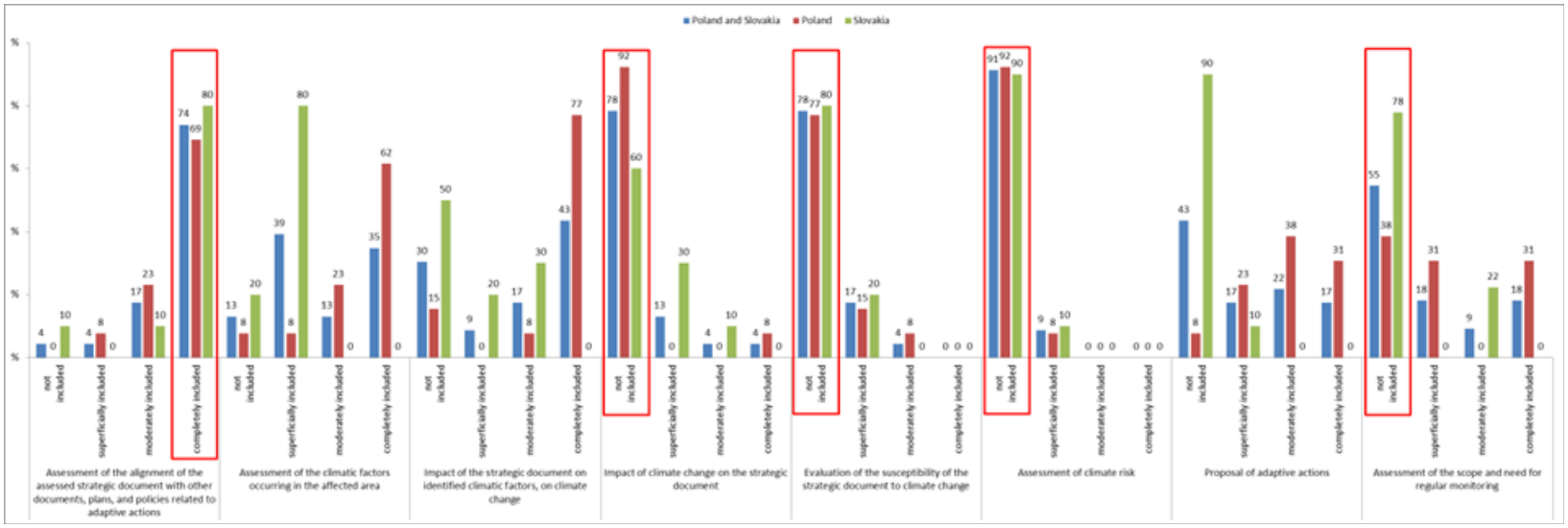

Fig. 3. Assessment of the effectiveness of taking into account aspects of adaptation and mitigation to climate change within SEA in strategic documents in Poland and Slovakia

Fig. 3. Ocena skuteczności uwzględniania aspektów adaptacji i łagodzenia zmian klimatu w ramach strategicznej oceny oddziaływania na środowisko w dokumentach strategicznych w Polsce i na Słowacji

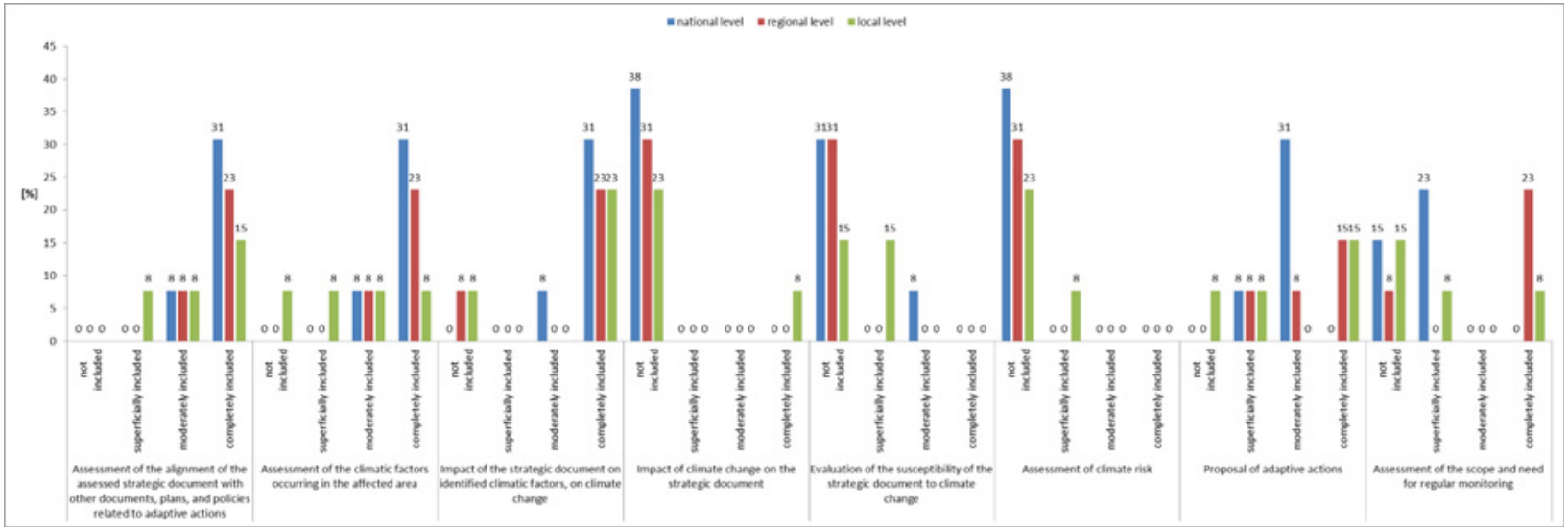

Fig. 4. Comparison of taking into account aspects of adaptation and mitigation to climate change under SEA in strategic documents in Poland at different levels: national, regional, local

Fig. 4. Porównanie uwzględniania aspektów adaptacji i łagodzenia zmian klimatu w ramach SOOŚ w dokumentach strategicznych w Polsce na różnych szczeblach: krajowym, regionalnym, lokalnym

struction of a rainwater sewage system and separation of a combined sewage system with retention reservoirs),

- Organizational measures-enforcing changes in spatial planning and management, changes to the local law, development of adaptation guidelines, (e.g. preparation and implementation of planning/town planning guidelines in shaping public space),
- Informational and educational measures-building cooperation, educating and providing information (e.g. educational and information program for the adaptation of the city to climate change).

Preparing Poland for new climatic conditions and extreme weather events is of great social and economic importance. Therefore, activities in this area should be aimed at covering the entire territory of the country with an effective system of spatial planning ensuring appropriate and sustainable land use, taking into account IT tools.

The existing UCAPs are currently being updated and this practice is being implemented in other cities in Poland – this time in cities with a population of up to 20,000. These projects also include the execution of a strategic environmental assessment, which further analyzes issues related to the adaptation and mitigation of cities. In the SEA for UCAP the assessment mainly used matrix methods, which enable easy collection of key parameters and tracking of results. It also made it possible to compare the effectiveness of the proposed actions in various scenarios of climate change and city conditions (UCAP, 2018). The assessment used a 5-step assessment in a matrix constructed in such a way that all environmental components and conditions for sustainable development were assessed. The impact on climate was assessed in connection with the state of atmospheric air. The following parameters were set for assessment: Increasing the area of forests and green areas to such an extent that they can have a significant impact on air purity and stabilizing the city's temperature, Reducing the demand for transport, achieving unprecedented efficiency in energy use and increasing the use of renewable energy sources.

It seems that the valuable experience gained in the implementation of UCAPs and the implementation of SEA for UCAPs could be transferred to the Act on Environmental Impact Assessments in the field of SEA and constitute the basis for the development of a manual on this topic. Due to Poland's similarity with Slovakia in aspects of socio-economic development and climate change, they can also be applied there as an example of good practice.

Other actions that could improve the inclusion of climate change in strategic environmental assessments include:

- Incorporating climate requirements into the strategic assessment process: Defining specific climate criteria and adaptive requirements that must be considered in every strategic document. This may include an assessment of greenhouse gas emissions, climate change adaptation strategies, climate risk assessment, adaptive actions, and monitoring.
- Training for specialists: Training specialists responsible for preparing strategic environmental assessments on climate-related issues. This allows for a better understanding of complex issues related to climate change and adaptation.
- Development of guides and industry standards: Creating standards for incorporating climate issues at various levels of strategic assessment. Guides can serve as reference frameworks for developing strategic assessments.
- Social dialogue and consultations: Introducing effective mechanisms for social dialogue that enable the participation of local communities and climate experts in assessment processes. This allows for the inclusion of different perspectives and knowledge.
- Monitoring and analysis of effectiveness: Regularly monitoring the effectiveness of adaptive actions introduced based on strategic assessments. Analyzing whether the steps taken yield the expected results.
- Financial support for sustainable projects: Financial support and incentives for sustainable projects, encompassing both mitigation and adaptation to climate change, contributing to sustainable development.
- Utilization and application of best practices: Adopting and applying best practices in the field.

6. Summary and conclusion

Development strategies, plans, programs at individual levels of administrative division (national, local) and for various sectors (transport, energy, urban planning) play a key role in promoting low-emission and climate-resilient design options. The choices made at this stage of management often have far-reaching consequences, as they determine long-term directions or intensity of development through decisions at the project level of individual investments. For example, in the case of infrastructure networks (e.g. transport, energy, communication), conducting a climate change vulnerability assessment at the level of strategic assessment of the draft strategy/plan can be a source of important and practical recommendations for taking climate change resilience into account in the management and development of the construction of these networks. It is therefore necessary to conduct a climate risk assessment at the level of the strategic decision-making process, when a much wider range of planned initiatives can be considered, and the results of this assessment can be the basis for a feasibility study for specific investment projects located in the relevant areas. In summary, integrating climate change mitigation and adaptation at the stages of strategy development and planning allows for supporting low-emission and climate-resilient development in an effective way. The assessment of climate change, adaptation and mitigation in strategic assessments in Poland and Slovakia indicates that climate change issues are not effectively taken into account in the analysed countries. While a positive aspect is the detailed alignment of strategic documents with other plans and policies related to adaptive actions, other aspects such as the assessment of climatic factors, the impact of strategic documents on these factors, and proposed adaptive actions show weaknesses.

Poland demonstrates a more comprehensive consideration of climate-related aspects in strategic assessments compared to Slovakia, but both countries require improvements.

The analysis does not reveal significant differences in the levels of strategic assessment at the national and local levels. The conducted research helps identify areas for improvement in both countries concerning the integration of climate-related aspects into strategic assessments.

It is crucial to apply an integrated approach to climate change issues, considering not only greenhouse gas emissions but also local conditions and the specificity of each area. In this context, SEA should address both global climate aspects and the unique features of individual regions or countries. Cultivating social awareness and educating specialists contribute to a better understanding and acceptance of adaptive actions at the local level.

Ultimately, the effectiveness of adaptive actions will require collaboration at various levels, from local communities to global decision-makers. The research conducted indicates the importance of monitoring progress and implementing improvements in the realm of strategic assessment to effectively address climate issues at all levels of strategic planning in the future.

Acknowledgment

This work was supported by the Polish National Agency for Academic Exchange, Faculty of Geology, Geophysics, and Environmental Protection at the AGH University as part of statutory research 16.16.140.315 and by the Slovak Research and Development Agency under the Contract no. SK-PL-23-0060.

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Ocena stanu wdrożenia zarządzania zmianami klimatu w strategicznych ocenach środowiskowych w Polsce i na Słowacji

Na podstawie danych geologicznych, informacji z lodowców i słojów drzew, a także monitoringu parametrów klimatycznych prowadzonego od około 150 lat, można z całą pewnością stwierdzić, że klimat na Ziemi ewoluuje. Obserwuje się wzrost średniej globalnej temperatury warstwy powierzchniowej atmosfery, jak również wzrost liczby zjawisk ekstremalnych, takich jak burze i susze.

Aby przeciwdziałać tym zmianom, w 2017 roku Unia Europejska podjęła wysiłki mające na celu włączenie łagodzenia i adaptacji do zmian klimatu w procedury Ocen Oddziaływania na Środowisko (OOŚ) planowanych inwestycji (zmiana dyrektywy UE 2014/52/EU, obowiązująca od 2017 roku). Zdaniem autorów, procedury Strategicznej Oceny Środowiskowej (SOOŚ) mają znacznie większe znaczenie dla łagodzenia zmian klimatu, ponieważ dotyczą projektów (strategicznych, rozwojowych, planistycznych), które zazwyczaj obejmują większy obszar i często mają charakter kompleksowy, organizacyjny oraz w dużej mierze poprzedzają proces OOŚ, który dotyczy konkretnych inwestycji.

Autorzy postawili sobie za cel określenie, w jaki sposób łagodzenie zmian klimatu i adaptacja do nich są integrowane w proces SOOŚ w Polsce i na Słowacji. W badaniu zastosowano analizę przekrojową istniejących i planowanych wytycznych oraz podręczników dotyczących uwzględniania aspektów klimatycznych w strategicznych ocenach środowiskowych. Dodatkowo przeprowadzono ocenę macierzową w celu kategoryzacji wdrożenia poszczególnych elementów związanych ze zmianami klimatu w SOOŚ dla różnych dokumentów rozwojowych, strategicznych lub planistycznych wdrażanych w ciągu ostatnich 10 lat na poziomie krajowym, regionalnym i lokalnym.

Analiza SOOŚ w Polsce i na Słowacji w kontekście adaptacji do zmian klimatu ujawniła obszary wymagające poprawy w obu krajach, jeśli chodzi o integrację aspektów klimatycznych w dokumentach strategicznych. Proces ten jest w Polsce bardziej zaawansowany, szczególnie w zakresie oceny wpływu dokumentów strategicznych na czynniki klimatyczne, oceny podatności dokumentów strategicznych na zmiany klimatu oraz proponowania działań adaptacyjnych. Według autorów istnieje pilna potrzeba uzupełnienia krajowych regulacji w procesie SOOŚ, tak, aby ściśle uwzględniały one problemy zmian klimatu.

Słowa kluczowe: *zmiana klimatu, strategiczna ocena oddziaływania na środowisko, dokumenty strategiczne*