

REPORT ON WP1 TOOLS ADAPTATION TO LOCAL & REGIONAL NEEDS

D.T2.1.2

Set of assumptions of AT14 tool adaptation
and testing for local pilot action needs.
(updated version)

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Project Partners



City of Križevci



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Table of content

1. Introduction	3
2. Assumptions for AT14 tool adaptation to local needs	5
2.1. Description of specific pilot action needs.....	8
2.2. Threats, pressures and conflicts diagnosed in the analysed health resorts in Lower Silesia ...	10
2.2.1. Legal aspects of water and resources protection.....	10
2.2.2. Social and economy impacts connected with the demographic changes.....	11
2.2.3. Environmental impacts identified	13
2.3. Description of the tool	16
2.4. Stakeholders involvement in tool testing for local needs	20
2.5. Results of consultations	21
3. Conclusions	22
4. References.....	23
5. Annexes	25



1. Introduction

The project HealingPlaces - *Enhancing environmental management capacities for sustainable use of the natural heritage of Central European SPA towns and regions as the driver for local and regional development* is funded by the EU Interreg Central Europe program and runs between April 2019 and March 2022. The project is coordinated by the Central Mining Institute (Katowice, Poland) as a lead partner, and implemented together with nine Central European partner institutions from Hungary, Austria, Croatia, Italy, Slovenia, and the Czech Republic.

In Poland, there are two partners responsible for project activities: Central Mining Institute from Katowice and Institute of Territorial Development from Wrocław.

In this document we are presenting the process and content of assumptions which must be considered during the process of building a tool for impact assessment & environmental capacity of SPA development. The tool impact assessment is part of the activities of HealingPlaces project Work Package 1, focused on environmental mapping and assessment. Within WPT1 the development of common tool for integrated assessment of threats & pressures on main SPAs' resources has been foreseen and is being implemented.

The aim of the tool is to determine the strength of the impact of SPAs on natural resources in different regions of the Central Europe area with a special focus on the regions that participate in the HealingPlaces project.

The tools developed in the framework of WPT1 have been tested in the framework of the WPT2 pilot actions in each of the Central Europe regions that take part in the HealingPlaces project. The logic of testing the tool is presented in the following diagram (Figure 1).

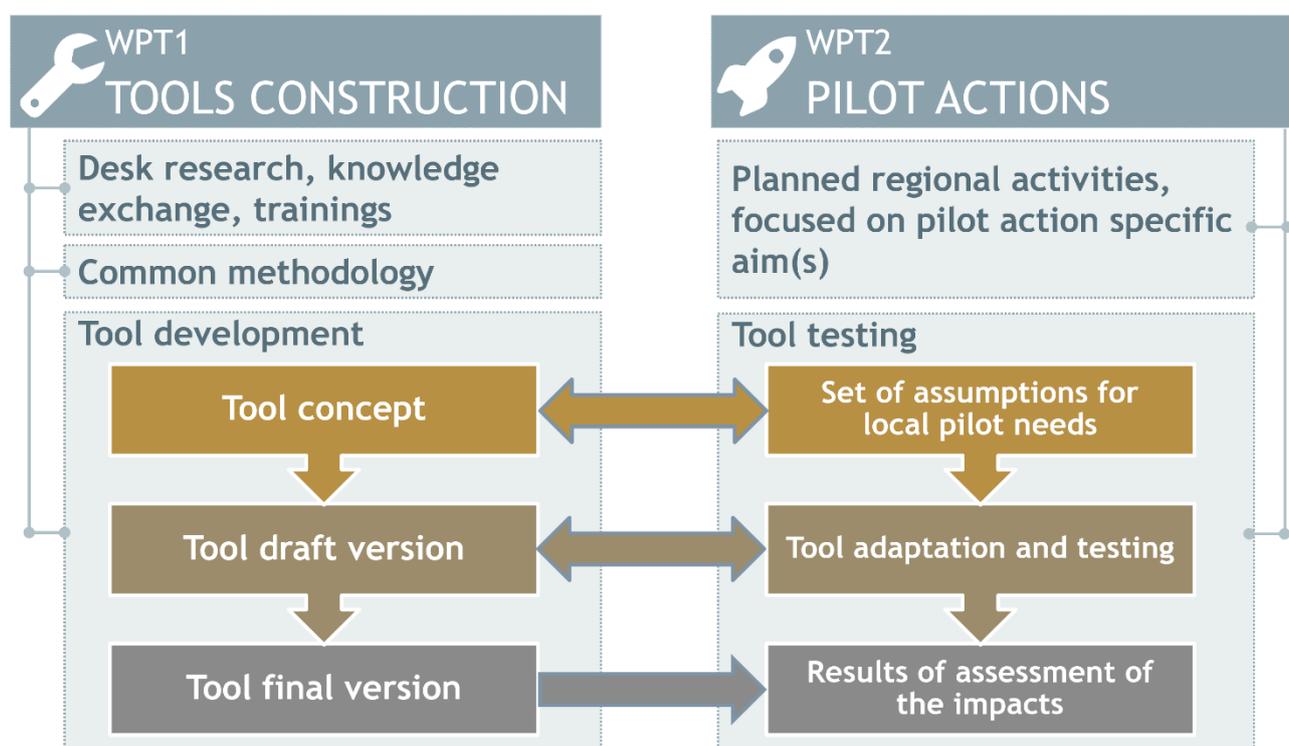


Figure 1 The logic of WPT1 tools testing

Source: GIG own study



Feedback from testing of the tools in the WPT2 framework has been an important input to the tool development process in the WPT1. The important strategic decision that was made in cooperation with all Project Partners is that the tool for assessment of the environmental pressures should be as simple for the user as possible in order to increase the probability of its wide use after the project end throughout Central Europe space also outside the partner regions. Moreover, due to the specificity of each pilot action, the development of assumptions for adaptation of the AT14 tool to local needs was necessary.

Generally, the main objective of WPT2 is the practical implementation of sustainable curative¹ water use in SPA. It is understood primarily as ensuring effective & rational use of identified resources & protection of ecosystems while realizing and enhancing its social & economic functions.

In particular, the objective of Pilot Action 1 - “Balanced and sustained management of mineral waters in Lower Silesia (PL)” is to be achieved through the integration of regional and local spatial planning policies with the management of curative water resources (including both mineral and thermal water).

One of the works which have been implemented within this pilot action are, among others:

- identification of key stakeholders involved in mineral water management and regional and local planning,
- tool adaptation to local needs,
- detailed and in-depth analysis of threats for mineral waters sensitive areas in pilot area,
- description and results of the tool application to assess the impacts on selected mineral water reservoirs within the borders of the Lower Silesia region.

¹ Including mineral and / or thermal water, if applicable



2. Assumptions for AT14 tool for impact assessment of SPAs development adaptation to local needs

These assumptions have been recognised and collected during internal project meetings & workshops between respective project partners, as well as the capacity building process of HealingPlaces project activities focused on local and regional key stakeholders. In the case of regional pilot action - the activities focused on Lower Silesian SPA municipalities. The participatory process consisted of numerous stakeholder meetings, regional working group sessions, and individual cooperation with SPA municipalities representatives, where challenges for SPA areas were presented.

Due to the fact that the work on building the tool in WPT1 was closely related to the further work on tool adaptation to local and regional needs and tool testing planned within WPT2, it was decided that the tool testing in the WPT2 framework should start before the finalization of the tool, using the internal working version of spreadsheets. In this way, the feedback from the testing of the tools in the WPT2 framework has been an important input to the iterative process of tool development in frame of the WPT1.

As the main idea behind the tool is to calculate the pressures on the environment that follow the development of SPA tourism, many aspects and indicators were taken into account as important to fully calculate the different pressures and to take into consideration all necessary aspects. Some of these are presented in the scheme below (Figure 2).

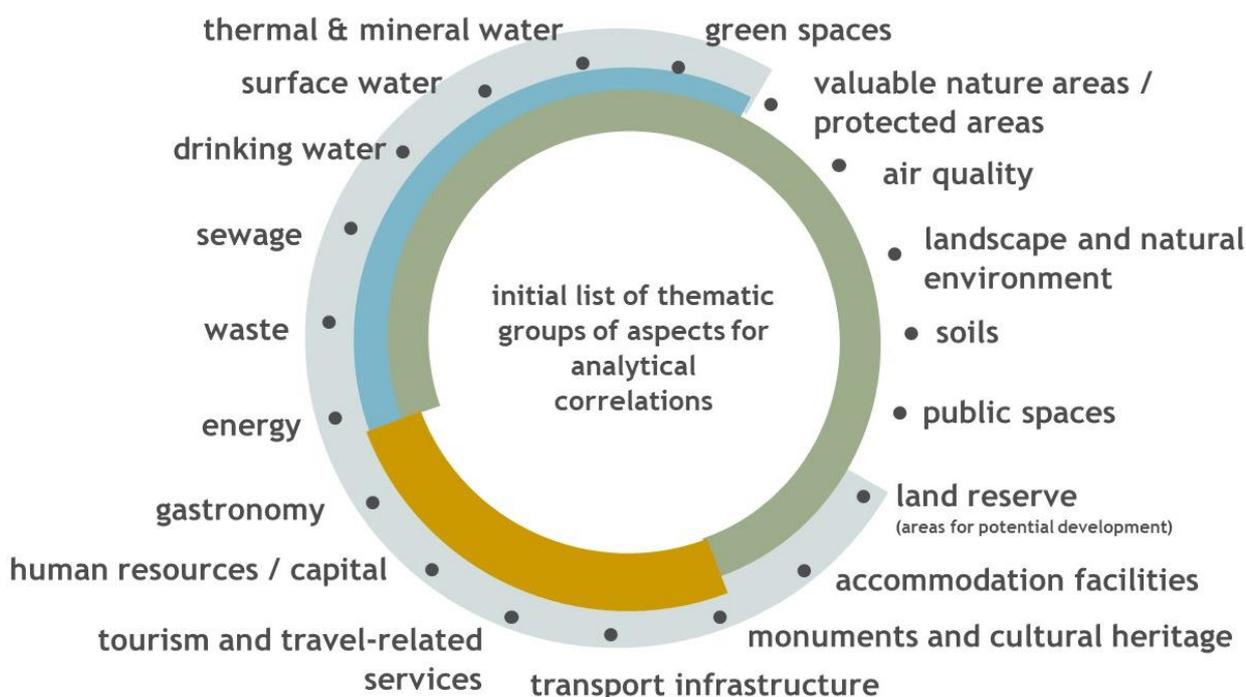


Figure 2 Aspects and indicators that had been taken into consideration as important during works on HealingPlaces tool for impact assessment of SPAs development



GIG (PL) and IRT (PL) have divided their staff experts into three groups related to three categories of indicators:

- **Water** (drinking water, sewage, surface water, groundwater, thermal and mineral water)
- **Environment** (components other than water - availability and quality of green spaces (areas), areas of natural value & protected areas, landscape, air quality, land reserve (land for potential development), soil, public spaces)
- **Socio-economic** (waste, energy, accommodation base, tourism and travel-related services, gastronomic base, transport infrastructure, human resources, monuments and cultural heritage)

In each group, both GIG and IRT experts have worked directly on data from Polish pilot area to formulate basic assumptions specific for Lower Silesia SPA municipalities.

After this step, the work on *tool for impact assessment of SPAs development* adaptation to local & regional needs and testing of tool usability for the specifics in other pilot areas of partners from Austria, Italy, Slovenia, Croatia and Hungary have been started.

At this step, due to the variety of partner pilot actions and especially due to: (1) very different approaches to the definition of SPA in specific countries and the resulting variability and (2) difficulty in obtaining some of the data in partner countries, as well as (3) difficulties in identifying threshold values for indicators, the important strategic decision that was done in cooperation with all Project Partners is that the tool for assessment of the environmental pressures should be as simple for the user as possible. Such approach should significantly increase the probability of its wide use after the project end throughout Central Europe space, also outside the partner regions.

Therefore, many bilateral meetings have been organized between the partner responsible for the tool preparation (LP- Central Mining Institute) and the respective partners responsible for the specific pilot actions to ensure that all assumptions from specific local needs are included into the tool.

The following starting points were agreed upon:

1. Definition and implementation of the architecture and main components of the Tool for impact assessment & environmental capacity of further SPAs development;
2. Available data on lower territorial levels, such as municipality (LAU 2) level, which were obtained during activities, such as:
 - a. HealingPlaces previous Deliverables within WPT1, including D.T.1.2.1 Guideline for standardized acquisition of harmonized data on mineral and thermal water and D.T1.2.2. Knowledge database (GIS map) and data acquisition tool on mineral and hot water resources/deposits, as well as environmental and socio-economic reports (D.T1.3.2 and D.T1.3.4.);
 - b. The entire process of elaboration of the Tool for impact assessment & environmental capacity of further SPAs development (meetings and discussions between project partners in period May 2020-June 2021, as shown in the table below) (Table 1).



Table 1 Process of elaboration of the *tool for impact assessment of SPAs development* concept, draft version and its adaptation to local needs

Activity	Deliverable	Works undertaken / meetings and workshops
AT.2.1. Pilot action 1 (PL)	D.T2.1.2. WP1 tools adaptation to local & regional needs	LP and PP2 (IRT) have cooperated in the preparation of the tool in order to best tune it to local circumstances in chosen two SPA municipalities in which the pilot actions will be conducted (Łądek-Zdrój, Polanica-Zdrój). The working online meetings were conducted, focusing on several thematic subtopics particularly important for these municipalities, including meetings on 12.10.2020, 03.11.2020 and many further workshops in one of thematic groups (water, environment, and economic). In the meantime, the changes to the tool implemented after GIG team working meetings with specific partners (e.g., on 10.02.2021, 05.03.2021, and 23.03.2021) have been implemented and tested in cooperation with regional stakeholders, including the meeting on 31.03.2021.
At.2.2 Pilot action 2 (IT)	D.T2.2.1. WPT1 tools adaptation to local conditions of Colli Euganei protected area	Meetings and discussion on interconnection between APP and other WPT1 tools - since October 2020 (e.g., 22.10.2020; 02.12.2020; 08.12.2020)
AT.2.4. Pilot Action 4 (AT)	D.T2.4.4. Assumptions for WP1 tools adaptation to local & regional needs	Works on WP1 tool and its implementation in the framework of the PA4 within WP2: 15.02.2021, 05.03.2021, HealingPlaces: testing/co-developing/applying WP1 tool - follow up: 25.02.2021, 18.03.2021; Healing Places: testing/co-developing/applying WP1 tool - discussion: 29.03.2021
AT.2.5. Pilot Action 5 (HR)	D.T2.5.2. WPT1 tools adaptation to local & regional needs	HP WPT1 tool application in PA5 workshop: 17.03.2021 Healing Places: testing/co-developing/applying WPT1 tool - discussion: 29.03.2021
AT.2.6. Pilot Action 6 (SI)	D.T2.6.3. Assumptions for WP1 tools adaptation to local & regional needs	Online tool meetings for A.T.1.4 (works on WP1 tool and its implementation in the framework of the PA6 within WP2) 18.11.2020; 27.11.2020; 10.12.2020; 16.12.2020; 15.01.2021; 26.01.2021; 28.01.2021; 05.02.2021; 01.03.2021; 05.03.2021; 23.03.2021; 29.03.2020



Activity	Deliverable	Works undertaken / meetings and workshops
AT.2.8. Pilot Action 8 (CZ)	D.T2.8.4. WP1 tools adaptation to local & regional needs	Work on WP1 tool and its implementation in the framework of the PA8: 26.01.2021; 11.02.2021; 25.02.2021; 05.03.2021, 18.03.2021

3. Available data on land use (change) from sources such as national authorities, European Space Agency, Copernicus Land Monitoring Service (<https://land.copernicus.eu/>), regional authorities, and sectoral agencies.

Feedback from the testing of the tools in frame of WPT2 has been an important input to the ongoing process of tool development in frame of WPT1.

2.1. Description of specific pilot action needs

The Lower Silesian Voivodeship pilot action is related to the widest possible implementation of the methodologies, ideas, and analytical tools developed in the project to conduct sustainable spa management, not only in the area of the spa municipalities themselves, but also in the areas of municipalities covered by the range of mineral and thermal waters resources on which the spa resorts are based.

However, the spa management is dispersed and lies within the competence of spa communes and treatment entities with small engagement of the region. Therefore, it is subject to strong local "pro-development" pressure, which is increasingly a serious challenge for the protection of valuable resources of healing waters, climate, and heritage elements. The aim of Pilot Action 1 is to create a joint Action Plan for the 11 existing spas of the region, containing general and specific recommendations for their development to strengthen the actions beneficial to the protection of the most valuable resources.

The goal is to increase awareness of threats and pressures to mineral water deposits, particularly related to inadequate land use and investments. The key steps in Pilot Action:

1. Establishment of the Regional Working Group for Sustainable Management of Thermal Water in Lower Silesian spas.
2. Establishment of two Local Working Groups in pilot health resorts: Łądek-Zdrój and Polanica-Zdrój.
3. Elaboration of the detailed analysis of environmental threats related to land development in two pilot SPA resorts: Łądek-Zdrój and Polanica-Zdrój.
4. Elaboration of the regional Action Plan on the basis of the work of the Local and Regional Group
5. Signing of a Letter of Intent on the implementation of the Action Plan in the Lower Silesia region.



Spa development is a very important sector of general development of the southern part of the voivodeship together with tourist activities. In the Lower Silesia region there are 11 municipalities that have the official status of “Healing Resort” (according to Polish law). The table below presents the list of Lower Silesian SPAs, together with the information in which commune they are located, as well as the information about the dates of the SPA establishment and the official status of SPA being granted (Table 2).

Table 2 List of Lower Silesian SPA municipalities

Name of the spa	Name of the commune (LAU 2 level)	Date of establishment of the health resort	Date of the official health resort (SPA) status being granted
Cieplice Śląskie-Zdrój	Jelenia Góra	1819	1967
Czerniawa-Zdrój	Świeradów-Zdrój	1860	1967
Długopole-Zdrój	Bystrzyca Kłodzka	1802	1967
Duszniki-Zdrój	Duszniki-Zdrój	XV/XVI w.	1967
Jedlina-Zdrój	Jedlina-Zdrój	1923	1967
Kudowa-Zdrój	Kudowa-Zdrój	1636	1967
Lądek-Zdrój	Lądek-Zdrój	1241	1967
Polanica-Zdrój	Polanica-Zdrój	XVIII w.	1967
Przerzeczyn Zdrój	Niemcza	1802	1997
Szczawno-Zdrój	Szczawno-Zdrój	1815	1967
Świeradów-Zdrój	Świeradów-Zdrój	1899	1967

From this group, two municipalities - Lądek-Zdrój and Polanica-Zdrój have been selected for deeper recognition of local circumstances regarding the management and protection of healing waters. The selection has been motivated by several reasons: a) different hydrogeological circumstances, b) different ownership structure, c) different level of popularity, and last but not least the interest and will of cooperation clearly expressed by municipality administration - the involvement of the authorities, openness to dialogue, and the growing importance of the problem of protection and management of healing waters. The experiences built on the basis of these two pilot actions will be generalized and utilized for broader consideration of Lower Silesian SPA managements. Lądek-Zdrój is an example of relict deposits, while Polanica-Zdrój is an example of deposits with renewable characteristics, therefore, these SPAs face different problems in the field of management for protection of water resources and preservation of the quality and quantity of the resource and the mitigation of conflicts of interest of the stakeholders involved.



2.2. Threats, pressures and conflicts diagnosed in the analysed health resorts in Lower Silesia

The deliverable DT1.3.2 *Report on important environmental pressures & conflicts in SPAs in Lower Silesian Voivodeship (Poland)* presents detailed information on threats, pressures and conflicts diagnosed in the analysed health resorts in Lower Silesia (PL), whereas the deliverable D.T1.3.4 *Report on comparison of societal awareness of threats for natural resources in SPAs project regions - case study of Poland* presents the socioeconomic aspects and societal awareness of these threats. In the following chapters, the most important information from the above mentioned reports is quoted.

2.2.1. Legal aspects of water and resources protection

In accordance with the *Act of 28 July 2005 on health resort treatment, health resorts and areas of health resort protection and health resort municipalities*, there are 45 health resorts in Poland. In most cases, the Polish spas have been privatized. However, some of them are still state-owned property or have been municipalised and become the property of the territorial self-governments (mostly voivodeship).

In Poland, the granting of the health resort status takes place in accordance with the procedure set out in the *Act of 28 July 2005 on health resort treatment, health resorts and areas of health resort protection and health resort municipalities*. The status of a health resort in Poland can only be granted to an area that simultaneously meets the following requirements:

- has deposits of natural healing resources,
- has a climate with proven medicinal properties,
- the infrastructure of the spa treatment operating within the area,
- meets the environmental requirements set out in environmental regulations,
- has technical infrastructure for water, energy, public transport, and waste management.

The issues related to activities of the health resorts are addressed in strategic documents both at the national and regional level. An example of a document at the national level relating to the health resort activities is the *National Strategy for Regional Development 2030 (pol. Krajowa Strategia Rozwoju Regionalnego 2030) related to the Strategy for Responsible Development until 2020 (with an outlook until 2030) (pol. Strategia na rzecz Odpowiedzialnego Rozwoju do roku 2020 z perspektywą do 2030 r.)*. One of the specific objectives contained in the aforementioned document is *to increase the use of development potential of medium-sized cities losing their social and economic functions*. Among the proposed measures dedicated to achieving this objective is *the development of areas with high natural and landscape values, as well as those based on health resorts and cultural values that constitute their high tourist attractiveness, inter alia, for the needs of the silver economy*,

In Poland, the deposits of exploited curative and thermal waters with recognised therapeutic properties are covered by the health resort protection zones (A, B, and C) defined in the *Act of 28 July 2005 on health resort treatment, health resorts and areas of health resort protection and health resort municipalities*.



All concessions for the extraction of mineral and thermal waters, including the therapeutic ones, determine the limits of exploitation and the range of possible damages. The restrictions related to transport infrastructure and agricultural activity in Poland do not apply directly to the areas with mineral and thermal waters deposits, but to the protection zones (A, B, C) mentioned above within and around health resorts. For the protection zone “A” , the values of permissible noise level caused by roads or railway lines, as well as take-offs, landings, and flights of aircraft are determined. In the all three zones the location of breeding farms and the use of crop protection products and fertilizers are not permitted.

According to Polish law, the thermal waters (above 20° C) may be used for installations in balneological facilities, but also for heating purposes. In recent years the use of groundwater heat (above 25° C) in individual heat pumps has seen a visible increase. In Poland, hydraulic fracturing and carbon capture and storage (CCS) are not currently used. The hydrocarbon extraction and carbon capture and storage method are regulated by the *Act of 9 June 2011 on geological and mining law*.

2.2.2. Social and economy impacts connected with the demographic changes

The risks related to the growing world population’s demand for minerals, plant and animal resources, as well as the increasing pressure that the industrial civilisation places on the natural environment of the entire planet and its individual ecosystems, not only have not diminished in recent years but have even intensified.

As a result of demographic processes and mainly related to the turning of the age pyramid, maintaining balance between the development and sustainability will be a serious challenge for Polish SPAs. Looking from a labour market perspective, the great challenge will be the need to maintain the long-term professional activity of the elderly. This, in turn, in the context of demographic challenges will force economies to reprofile them towards the so-called silver economy, i.e. creating services and products that meet the needs of the elderly. The indicated process will also significantly determine the development of the small and medium-sized enterprise sector, which in the vast majority will satisfy the necessary and necessary food products related to safety, occupational activity, leisure, maintain the independence and self-sufficiency of older people. The services of health resorts’ are one of the most important services of this aspect.

Four phenomena have been analysed to show the socioeconomic pressures on resource use and environmental pollution over the period 2000-2018. These include: population, gross domestic product (GDP), domestic material consumption and carbon dioxide emissions. In the years 2000 - 2018, among the characteristics analysed, the value of the Gross Domestic Product (GDP) increased the fastest, by 172.0%. The values of the remaining three described phenomena were characterized by much lower dynamics. The increased material consumption amounted to 36.2%, the carbon dioxide emissions to 6.3%, but the Polish population increased by only 0.4%. The ongoing stagnation of Poland’s population (which is beginning to regress) results in relatively lower material consumption and air pollution. However, the economic growth can still contribute to a greater demand for materials used in production and slow down the reduction of carbon dioxide emissions. Poland is one of the few countries in the European Union which, according to the European Environment Agency - the greenhouse gas emissions increased between 2005 and 2017.



However, the increase in pollution and material consumption is much slower than the economic growth (measured by the GDP).

In 2017, according to a study by the Central Statistical Office, entitled "Health and health care in 2018", the expenditure on the health care in Poland amounted to PLN 130.1 billion, which accounted for 6.5% of the country's GDP generated in this year. Of this sum, PLN 90.4 billion was the public expenditure (4.5% of Poland's GDP) and PLN 39.7 billion (2.0%) was the private expenditure.

According to data from 2019, the share of the tourism economy in the gross domestic product of Poland was 6.3%. Between 2005 and 2019, only in the year 2013 its share was higher and reached 6.4%. In this period, the lowest value was recorded in 2011 and amounted to 4.8%. The modest upward trend observed in recent years may be reversed in 2020 due to the coronavirus pandemic and the large losses recorded by the tourism sector.

In 2019, there were 578,684 year-round accommodation places in Poland, and between 1995 and 2019, their number increased by 120%. The number of year-round accommodation places per 1,000 population in 2019 reached 15.1 and has increased by 8.3 since 1995.

In 2019, Poland recorded 35 668,091 tourists who used accommodation in tourist accommodation establishments. Since 1995, the number of tourists has increased by 151%. The indicator showing the number of tourists per 1,000 population for Poland in 2019 reached 929 tourists per 1,000 population and in the years 1995-2019 increased by 562 tourists.

The next indicator analysed in relation to tourist traffic is the one showing the number of nights spent in tourist accommodation establishments per 1,000 population. In the country, the index reached 2 432 nights in 2019 and has increased by 1 450 nights since 1995.

Spa activities can be evaluated on the basis of statistical data related to the number of beds in spa hospitals and sanatoriums and the number of patients. In 2019, there were 45,335 beds in Polish spa hospitals and sanatoriums. In the years 2008-2019 in Poland, the number of these beds increased by 28.1%. The number of beds in spa hospitals and sanatoriums per 1000 population in 2019 reached 1.2 beds per 1,000 population and has increased by 0.3 beds since 2008.

In 2018, there were 759,843 patients treated in hospitals and health resorts in Poland. In the years 1995-2018, the number of patients increased by 82.1%. The index showing the number of patients treated in spa hospitals and sanatoriums per 1,000 population in 2018 in Poland assumed a value of 19.8 patients and since 1995 its value increased by 9.0 patients.

In 2018, the number of man days of treatment in Polish spa sanatoriums and hospitals amounted to 12,467,685. Between 1995 and 2018, the number of man days of treatment in Poland increased by 24.5%. The index representing the number of man days of treatment in spa hospitals and sanatoriums per 1,000 population in 2018 in Poland assumed a value of 325. In the years 1995-2018 its value increased by 65 man-days of treatment.

The data analysed on tourism activity show that the tourism and health tourism sector in Poland has been developing dynamically over the past decades. The number of beds, tourists, or overnight stays is growing rapidly, although the ongoing COVID-19 outbreak has changed these trends drastically. The Polish health treatment facilities in the resorts were fully closed from 14 March to 15 June 2020 and restrictions, including the number of patients and tourists, have been in place



ever since. At this moment (August 2021) it is difficult to exactly foresee what will be the long-term impact of the COVID-19 pandemic on the economy, including the health resorts and spa activities.

2.2.3. Environmental impacts identified

Health tourism, including SPA activities, is one of the areas focused on strengthening the economic development of the Lower Silesian Voivodship. At the same time, it is important that development should be conducted with minimizing environmental damage and functional - spatial conflicts, and should enable the creation of sustainable and stable spatial systems. That is why paying special attention to natural resources protection, thanks to which this activity can even operate, should be particularly important for the regional and local authorities as well as for the private enterprises based on their existence. However, the legal regulations and competences of all involved actors regarding water protection are not always clear, and awareness of the consequences of land use decisions in areas where mineral water deposits are present is low. The latter apply in particular to the areas adjacent to the SPA municipalities (also in transborder relation), where no direct activities with the use of mineral waters are conducted. These may lead to unintended conflicts and in worse case to the damage of natural resources.

Existing and potential pressures for biodiversity and protected areas

Health tourism is closely related to biodiversity and the attractions created by a rich and varied environment. It can also cause loss of biodiversity when land and resources are strained by excessive use, and when impacts on vegetation, wildlife, mountain environments, and water resources exceed their carrying capacity. The adverse effects of tourism on the natural environment, including forest areas include: land and water takeover, landscape deterioration, air pollution, water pollution, soil degradation (erosion, landslides, treading). One of the significant environmental threats arising from the development of health tourism is the degradation of the natural and landscape biodiversity. It is associated with the growing pressure of urbanization and economic development.

Special attention should also be paid to threats that may occur in relation to legally protected areas. (Figure 3). The high natural and landscape values of Lower Silesia have been confirmed by the establishment of many protected areas (share of legal protected area in total area of Lower Silesian Voivodeship is 18.6%): 2 national parks, 67 nature reserves, 12 landscape parks, 27 protected landscape area, 103 NATURA 2000 areas, 2 466 natural monuments, 4 documentation sites, 192 ecological areas, and 16 landscape-nature complexes.

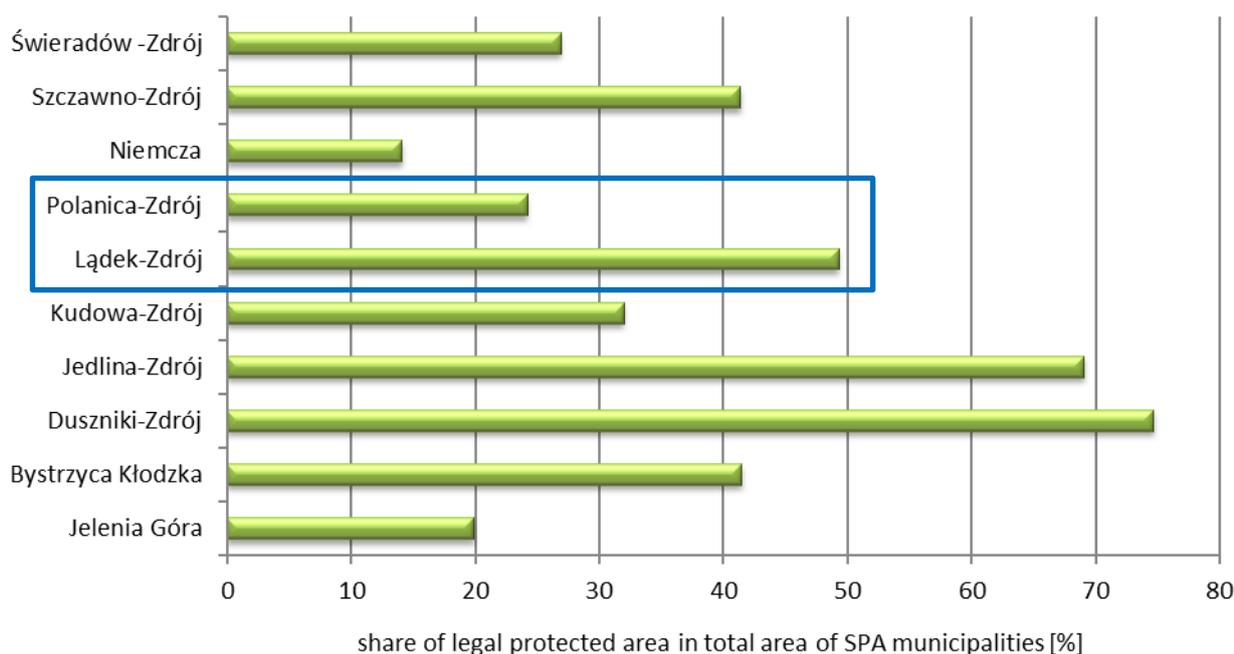


Figure 3 Share of legal protected area of Lower Silesian SPA municipalities

Almost half of the commune's area of Łądek-Zdrój is covered by protected areas. On the other hand, in the case of the Polanica-Zdrój commune, the protected area covers about 25%. A main goal of protected areas is to maintain species diversity and the integrity of biological assemblages. Intensifying land use in the matrix surrounding protected areas creates a challenge for biodiversity conservation. Habitat fragmentation is one of the most widespread transformation processes, leading to reduced biodiversity and accelerated disappearance of species of plants and animals. Spatial planning, development of biologically active areas, combining economic reasons, needs, and possibilities with ecological issues and environmental possibilities is important.

Spa tourism, characterized by high dynamics, consists of visiting areas famous for their health-promoting properties, which is why it is impossible to avoid patients' interference in the ecosystems surrounding health resorts, e.g. SPA parks (green areas in SPAs), that play a very important role as part of the health resort landscape.

Existing and potential pressures for soil

The situation of the soil environment in the Lower Silesian Voivodeship is exposed to pollution from industrial emitters located in the region, as well as in neighbouring countries (Czech Republic, Germany), and particularly in the regions: wrocławski, legnicko-głogowski, wałbrzyski, jeleniogórski and turossowski. These pollutants pose a threat to agricultural areas, forest complexes, and places of rest and recreation. Regular soil studies conducted indicate that there are new areas in the Lower Silesian Voivodeship where soil quality standards are being exceeded, especially with regard to heavy metals, such as zinc (Zn), lead (Pb), cadmium (Cd), and copper (Cu).



Existing and potential pressures for surface water and groundwater

Today, mineral and thermal waters are subjected to various pressures of anthropogenic origin. These threats are related to the actual spa activity, as well as come from sources not directly related to this activity. Detailed and in depth analysis of threats for mineral waters sensitive areas in the pilot area (spa municipalities of Łądek-Zdrój and Polanica-Zdrój, however it covers also the parts of adjacent municipalities of Szczytna and Kłodzko) enabled the identification and correlation of threats and hazards (anthropogenic threats to mineral waters deposits) associated with surface investment and development with mineral waters sensitive areas. Considering how valuable a resource the healing waters are, it seems highly justified to monitor the threats of anthropogenic origin that may contribute to their degradation. Threats may exist outside the SPA (area of analysis) due to hydrogeological conditions, i.e., situations when the water supply area is not spatially coincident with the drainage zone (water intake, spring) but is located at a certain distance, even outside the administrative borders of the analyzed area.

Existing and potential pressures for air

The air pollution problems in Lower Silesia SPAs are mainly the result of the so-called low-stack emissions from the household sector. The second major threat to air purity in the area of SPA communes is also the linear emission from road transport, especially when major traffic are in close proximity. In places exposed to the strong impact of automobile traffic-related emissions, increased concentrations of PM10 and PM2.5 (compared to background values) may also occur outside the heating season. The analysis of the activities carried out by the commune authorities of the health resorts indicates that they do not have legal instruments to limit car transit traffic.

Existing and potential pressures for landscape

The high attractiveness is connected with the constant pressure on the development of areas valuable in terms of nature and landscape related to the development of the tourist base. The literature analysis has shown that the Lower Silesian health resorts are characterized by average pressure related to the development of tourism and their intensification will take place in areas of extraordinary landscape values such as the Góry Izerskie and Karkonosze. The unique landscape, natural and cultural values Lower Silesian Voivodeship require proper protection and management to prevent permanent degradation of the landscape. It is also important to build coalitions between representatives of various sectors, including administration, industry, and citizens.



2.3. Description of the tool for impact assessment of SPAs development

The *tool for impact assessment of SPAs development* is intended as a support in the decision-making process. It is dedicated to SPA municipalities (the municipalities that have at least one SPA in their area regardless of having or not having an official status of SPA municipality). The main idea behind the tool is to calculate pressures on the environment that are following the development of SPA tourism.

The tool uses algorithms related to the determination of few significant correlations, including the following:

- The impact of SPA and tourism industry development on the availability of thermal and/or mineral water resources in quantitative terms,
- The influence of the development of spa communities and changes in land use on the threat to the quality of thermal and/or mineral water resources,
- The impact of spa development on the availability and carrying capacity of green areas.

It was agreed that the main input data required from the user is the number of new SPA guests expected, which was based on the idea of **Tourism Carrying Capacity²**, as defined by the World Tourism Organization.

The tool then will recalculate the number of new guests into series of individual pressures - each pressure with its own algorithm derived mainly from available statistical data for SPA regions.

The individual pressures will then be calculated to achieve 'maximum additional tourists numbers' to obtain a unified overall value of the impact of the development of the SPA on the environment. This process is illustrated in the flow chart below (Figure 4).

² Tourism Carrying Capacity = the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic, socio-cultural environment and an unacceptable decrease in the quality of visitors' satisfaction.

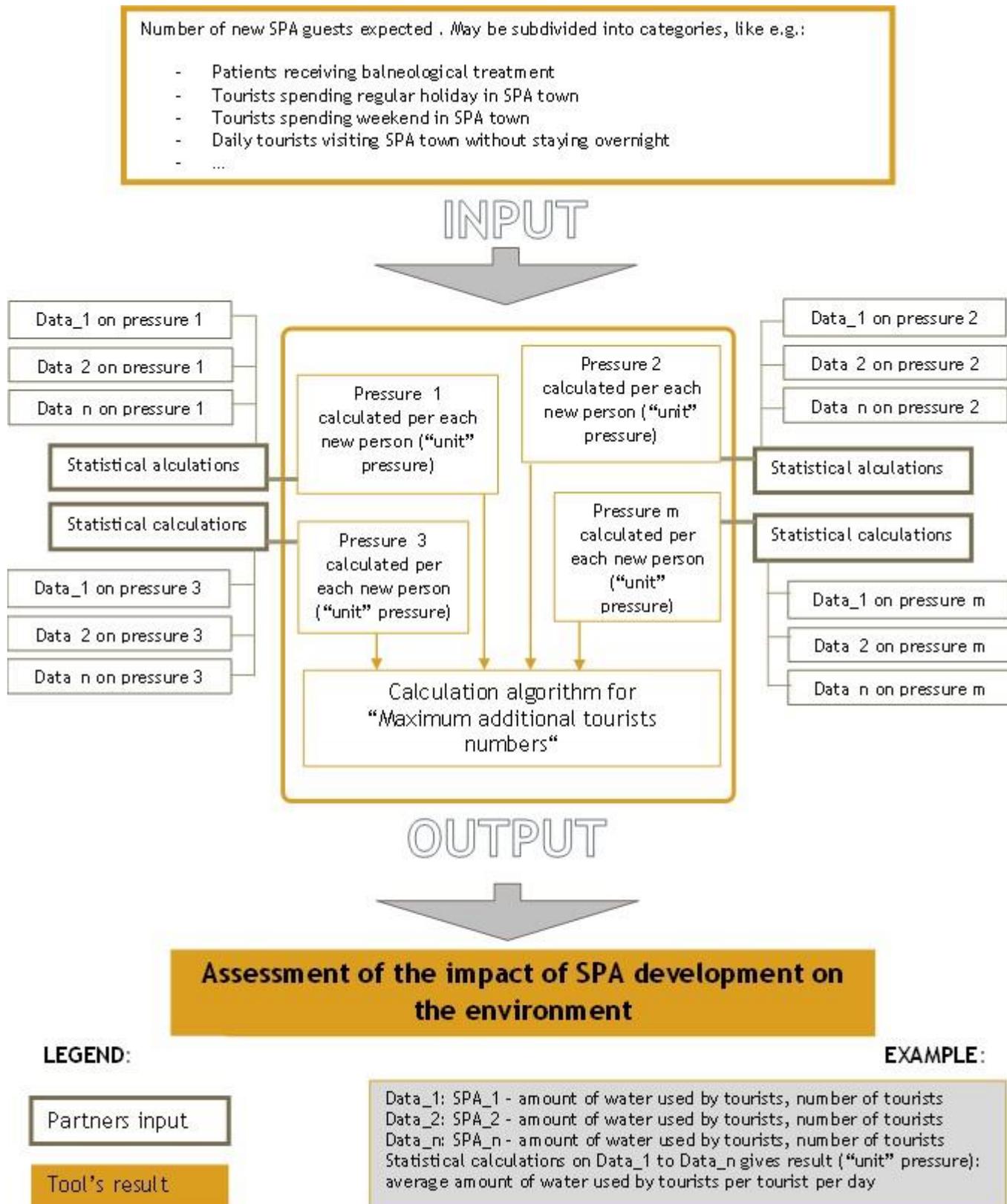


Figure 4. Tool for impact assessment of SPAs development logic

Source: D.T1.4.1. Common methodology & ranking criteria for assessment of impact strength on natural resources in SPAs, Central Mining Institute, 2020; amended



The basic and key value for the tool calculations is the number of beds available in all accommodations in the SPA municipality. It is assumed that this number represents the maximum number of tourists staying the night in high season, which is the value relevant for pressure assessment. The tool also offers the possibility of adding the number of daily tourists (tourists who do not stay overnight) to the number of total tourists if only this type of tourists seem to be relevant for given SPA municipality.

The Excel-based tool is divided into three parts (Figure 5).

	A	B	C	D	E	F	G
1	Country:	Poland					
2	Spa:	Ladek-Zdroj					- data received from database sheet
3	Municipality area [km2]	117.27					- to be filled by end user
4	Area of SPA parks [ha]	6.54					- result of calculations
5	Defert-Baretje's index						
6	Current No. of inhabitants [persons]	8276					Vulnerability
7	Current tourists accommodation capacity [persons]	1178				Overburden lithology	metamorphic
8	Current estimated daily visitors number [persons/d]	1767				Aquifer lithology	metamorphic
9	Current maximum tourists number [persons/d]	2 945				Groundwater table type	Unconfined
10							
11							
12	Main indicators						
13	Indicator (resource)	environmental capacity of the municipality area	environmental capacity of SPA parks	capacity of the legal protected areas	mineral water		sewage
14	units:	persons/km ²	persons/ha	persons/km ²	m ³ /d		m ³ /d
15	Current level of use	25.1	450.3	0.51	478		2 488
16	Limit value of scalable resource	58.0	500.0	25.00	1 224		8 000.0
17	Current use of capacity	43.3%	90.1%	2.0%	39.1%		31.1%
18	Maximum additional tourists number	3 857	325	141 590	17 502		24 864
19							
20	Limit of additional tourists	325					
21							
22	Illustrative indicators						
23	Indicator (resource)	Drinking water	Wastes	Energy	Financial income		Groundwater vulnerability
24	units:	m ³ /d	Mg/yr	MWh/yr	€/year		[descriptive]
25	Current level of use	742	3 174	3 736	13 155 831		moderate risk
26	Predicted level of use for min. Additional tourists number (estimated from main	763	3 266	3 844	14 607 662		
27							
28							

Figure 5. View of draft version of excel-based tool for integrated assessment of threats & pressures

The first section contains data describing the condition at a particular SPA, including such information as:

- municipality area [km²] (data source: online database),
- area of SPA parks [ha] within the municipality area (only if applicable, Data source: partner's data),
- Defert's tourist function (DTF) index, which measures tourist 'intensity' or 'activity' by comparing the population of a destination's with the number of tourists, calculated from current tourist accommodation capacity (data from the partner) / current number of inhabitants (online data or partner's statistics)
- current number of inhabitants [persons] (data source: partner's statistical data)



- current tourist accommodation capacity [persons/d] (data source: partner’s statistic data)
- current estimated daily visitors number [persons/d] (all day tourists spending less than 24 h in SPA, to be estimated by partners in the ‘database’ sheet within the Excel-based tool)
- current maximum tourists number of tourists [persons/d] (sum of “Current tourist accommodation capacity” and “Current estimated number of daily visitors”).

In this part, groundwater / thermal and mineral water vulnerability is also assessed through adaptation of the classical GOD method for groundwater vulnerability assessment (Foster, 1987). The assessment implemented in the tool is based on the following aspects:

- Overburden lithology (dominating lithology of rocks situated above the mineral/thermal water deposit (selected from predefined drop-down menu),
- Aquifer lithology (dominating lithology of rocks that host the mineral/thermal water deposit (selected from predefined drop-down menu),
- Type of groundwater table. The type of groundwater table of mineral/thermal water of concern (selected from drop down menu) is as follows:
 - Unconfined - the level of groundwater table changes with changing pressure of mineral/thermal water in the aquifer; there are no rocks of low permeability in the overburden;
 - Confined - the level groundwater table is constant, as there are low permeable rocks in the overburden and therefore mineral/thermal water is under pressure; there is no change of water table level with changing pressure of the water in the aquifer.

For this information, the tool is based on a specific data source - partner’s data from Google form, which was a part of D.T1.2.1. *Guideline for standardized acquisition of harmonized data on mineral and thermal waters.*

Aside of informative data, the tool consists of several indicators and for most of them the maximum number of tourists in high season is taken into calculations. There are two types of indicators in the tool: main indicators and illustrative indicators.

MAIN INDICATORS

There are five main indicators, which are used in the process of calculation of SPA development capacity. For each indicator, the “current level of pressure” is compared to the “limiting value of the pressure”. Then, for each indicator, the “Maximum additional tourist number” is calculated, meaning the number of additional tourists still allowed while the limit value of the pressure is not exceeded for a given indicator. Finally, the “Maximum additional tourist numbers” are compared for each indicator and the lowest number is selected to be displayed as “Limit of additional tourists”. This value represents the suggestion for decision makers about how many additional tourists are still allowed in order to keep the environmental pressure at the relevant level.

The main indicators are as follows:

- 1) environmental tourist capacity of the municipality area,



- 2) environmental capacity of SPA parks,
- 3) capacity of the legal protected areas,
- 4) sewage,
- 5) mineral water quantity.

ILLUSTRATIVE INDICATORS

There are five more indicators for which no clear limit of SPA tourism development could be defined; however, the indicators seem to be relevant for increasing the awareness about the environmental pressure that follows the SPA development.

Illustrative indicators are as follows:

- 1) drinking water,
- 2) wastes,
- 3) energy,
- 4) calculation of groundwater vulnerability.

Specific information about indicators, as well as specific instruction on how they are calculated, is available in Deliverable D.T1.4.3 - *User guide (Technical protocol / guideline for impact assessment & environmental capacity matrix)*.

2.4. Stakeholder participation in tool testing for local needs

As part of the deliverable, a detailed stakeholder identification procedure was carried out for the pilot actions in Poland, where from a wide range of stakeholders an additional group with the status of key stakeholders for the respective pilot action site was identified. The table below presents key stakeholders for the health resorts in Łądek-Zdrój and Polanica-Zdrój (Table 3).

Table 3 List of key stakeholders involved in tool testing for local needs in Łądek-Zdrój and Polanica-Zdrój (PL)

Interest group	Łądek - Zdrój	Polanica - Zdrój
Local public authority	Urząd Miasta i Gminy w Łądku-Zdroju Gmina Stronie Śląskie Urząd Gminy Kłodzko Město Javorník (CZ)	Urząd Miejski w Polanicy-Zdroju Urząd Miasta i Gminy w Szczytnej Urząd Gminy Kłodzko
Sub-regional public authority	Powiat Jeseník (CZ)	Starostwo Powiatowe w Kłodzku
Large enterprises	-	Producent Wody Mineralnej "Staropolanka"
Business support organisation	Izba Gospodarcza "Uzdrowiska Polskie" Fundacja Klaster Innowacyjny "Dla zdrowia - Sudety"	Fundacja Klaster Innowacyjny "Dla zdrowia - Sudety"



Interest group	Lądek - Zdrój	Polanica - Zdrój
Interest groups including NGOs	Stowarzyszenie Gmin Ziemi Kłodzkiej Fundusz Lokalny Masywu Śnieżnika Towarzystwo Przyjaciół Ziemi Lądeckiej Stowarzyszenie Gmin Polskich Euroregionu Glacensis Stowarzyszenie Kłodzka Wstęga Sudetów - Lokalna Grupa Działania	Stowarzyszenie Gmin Ziemi Kłodzkiej Stowarzyszenie Gmin Polskich Euroregionu Glacensis Stowarzyszenie Kłodzka Wstęga Sudetów - Lokalna Grupa Działania
Spa enterprise	Uzdrowisko Lądek Długopole S.A. 23 Wojskowy Szpital Uzdrowiskowo-Rehabilitacyjny Fundusz Wczasów Pracowniczych Sanatorium im. Dr A. Ostrowicza	Uzdrowiska Kłodzkie S.A. Grupa PGU - Uzdrowisko Polanica-Zdrój Sanatorium „Stary Zdrój” MEDICALSENSUS Sanatorium Polanica Sanatorium Uzdrowiskowe "MALWA" "KAMEA" Sp. z o.o.

2.5. Results of consultations

Polish project partners - IRT and GIG organized few meetings where aspects of the use of WPT1 tools for pilot action needs were discussed with external regional and local experts. GIG presented the tool during the 1st Meeting of the Regional Working Group for Sustainable Management of Healing Waters in Lower Silesia Health Resorts on March 31, 2021, when the adaptation of the AT14 tool for PA1 needs was discussed. In more detail the assumptions concerning the tool adaptation for specific pilot action needs were later undertaken via e-mail correspondence and explanations for involved experts, including preparation of the more in-depth explanations of the assumptions for the algorithms used in the calculation of 1) The impact of spa industry development on the availability of thermal and/or mineral water resources in quantitative terms, 2) The impact of spa community development and land use changes on the threat to the quality of thermal and/or mineral water resources (see Annex 1 - in Polish) and presented during the next regional working group meeting on 13 July.

Experts from the Lower Silesia Regional Working Group for during these meetings have underlined the significant level of simplification of tool assumptions in the case of many indicators, especially the indicator referring to mineral and thermal water vulnerability. GIG and IRT have explained that such a level of simplifications is necessary in order to keep the comparability and applicability of the tool across Central European regions. Regarding the mineral and thermal water vulnerability indicator, GIG and IRT fully agreed with the experts that the actual vulnerability of the mineral and thermal water resources quite often depends more on the land use outside the SPA municipality than on the land use inside the municipality. However, the tool is constructed strictly for SPA municipalities. Therefore the only way to proceed coherently is to keep the simplified version of the indicator calculations inside the tool, but to interpret its result only as a first warning signal and a need to perform detailed study in case of each SPA municipality for which the mineral and thermal water vulnerability indicator shows the risk at the moderate or higher



level. Such detailed studies have been performed in the case of Łądek-Zdrój and Polanica-Zdrój in Lower Silesia, Poland, and the results will be summarized in DT2.1.5.

3. Conclusions

The assumptions for tools adaptation to local & regional needs have been recognised and collected during internal project meetings & workshops between respective project partners, as well as the capacity building process of HealingPlaces project activities focused on local and regional key stakeholders. The feedback from testing of the tools in frame of WPT2 has been an important input to process of tool development in the WPT1 framework. The aim of the tool is to determine strength of impact of SPAs on natural resources in different regions of Central Europe area with a special focus on the regions that take part in the HealingPlaces project. The important strategic decision that was done in cooperation with all Project Partners is that the tool for assessment of the environmental pressures should be as simple for the user as possible in order to increase the probability of its wide use after the project end throughout Central Europe space also outside the partner regions. This document presents the process and content of assumptions that must be considered during the process of building a tool for the impact assessment & environmental capacity of the development of SPA.



4. References

Literature:

- Foster S.S.D., 1987. *Fundamental concepts in aquifer vulnerability, pollution risk and protection strategy*. N° 38 of the International Conference held in the Netherlands, in 1987, TNO Committee on Hydrological Research. Netherlands,
- Golba J., 2015. *Uzdrowiska Polskie - wyzwania i szanse*. Stowarzyszenie Gmin Uzdrowiskowych RP, Inowrocław.
- Gonda-Soroczyńska E., Soroczyńska A.M., 2014. *Obszary zagrożeń środowiska przyrodniczego w uzdrowisku na przykładzie Dusznik-Zdroju*, Zeszyty Naukowe Uniwersytetu Szczecińskiego, Studia i Prace WNEiZ nr 37, t. 3: Gospodarka regionalna I międzynarodowa, Szczecin.
- Marciniuk-Kluska A., 2013. *Zarządzanie środowiskiem w aspekcie zrównoważonego rozwoju gospodarczego*, Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humanistycznego w Siedlcach, Seria Administracja i Zarządzanie, nr 96, s. 129 - 140
- Markowska M., Kruczek M., Łabaj P., 2021. *Wspomaganie decyzji w zarządzaniu środowiskiem w uzdrowiskach*, [w:] M. Belof (red.) *Dobre praktyki w zarządzaniu uzdrowiskiem. Uzdrowiska pogranicza Polski i Czech / Dobrá praxe při řízení lázní: lázně pohraničí Polska a České republiky*, Wrocław: Difin, s. 67- 74
- Wiatr I., 2008. *Kształtowanie i zarządzanie środowiskiem - podstawy działań w turystyce i rekreacji*. Wyższa Szkoła Hotelarstwa, Gastronomii i Turystyki, Warszawa.
- Zaręba K., 2012. *Zrównoważony rozwój warunkiem zabezpieczenia funkcji rekreacyjnych uzdrowisk*, Inżynieria Ekologiczna Nr 30, s. 206 -218

Legislation acts:

- *Act of 28 July 2005 on health resort treatment, health resorts and areas of health resort protection and health resort municipalities / Ustawa z dnia 28 lipca 2005 r. o lecznictwie uzdrowiskowym, uzdrowiskach i obszarach ochrony uzdrowiskowej oraz o gminach uzdrowiskowych*, tekst jednolity z 16.09.2020 (Dz.U. 2020 poz. 1662)
- *Act of 16 April 2004 on nature protection / Ustawa z dnia 16 kwietnia 2004 r. o ochronie przyrody* (Dz.U. 2020 poz. 55)
- *Act of 9 June 2011 on geological and mining law / Ustawa z dnia 9 czerwca 2011r. Prawo geologiczne i górnicze* (Dz.U. 2020 poz. 1064)

Webpages:

- <https://land.copernicus.eu/>
- <https://www.gov.pl/web/zdrowie/wykaz-uzdrowisk-wraz-z-kierunkami-leczniczymi> (in Polish)



HealingPlaces previous deliverables:

- D.T2.1.1 *Identification of key stakeholders involved in mineral water management and regional/ local planning*, IRT & GIG, 2020
- D.T2.1.3 *Detailed and in depth analysis of threats for mineral waters sensitive areas in pilot area*, IRT, 2021
- D.T1.3.2 *Krajowy raport dotyczący uwarunkowań i presji środowiskowych rozwoju uzdrowisk - przykład województwa dolnośląskiego (Report on important environmental pressures & conflicts in SPAs in Lower Silesian Voivodeship (Poland))*, GIG, 2020
- D.T1.3.4 *Krajowy raport na temat porównania świadomości społecznej dotyczącej zagrożeń dla zasobów naturalnych w regionach uzdrowiskowych biorących udział w projekcie - przykład województwa dolnośląskiego (Report on comparison of societal awareness of threats for natural resources in SPAs project regions - case study of Poland)*, IRT 2020
- D.T1.3.4 *Annex 1: Socio-demographic conditions. Case study on the example of selected spa communities in Dolnoslaskie Voivodship*, GIG, 2020
- D.T1.4.3 *Technical protocol/ guideline for impact assessment & environmental capacity matrix - draft version*, GIG, 2021



5. Annexes

Annex 1: Założenia do narzędzia szacującego presje środowiskowe związane z rozwojem gmin uzdrowiskowych - aspekt zasobów wodnych (assumptions for a tool estimating environmental pressures associated with the development of spa communities - the water resources aspect) - (in Polish)

It's document presenting working version of the assumptions for the algorithms used in the calculation of two important indicators:

- a. The impact of spa industry development on the availability of thermal and/or mineral water resources in quantitative terms
- b. The impact of spa community development and land use changes on the threat to the quality of thermal and/or mineral water resources