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UNWTO INSTO World Tourism Organization International Network of Sustainable Tourism Observatories

The Sustainable Tourism Observatory of South Tyrol (STOST)

Annual Progress Report – 2021 edition

IMPRESSUM
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AUTONOME PROVINZ BOZEN SÜDTIROL
PROVINCIA AUTONOMA DI BOLZANO ALTO ADIGE
PROVINZIA AUTONOMA DE BULSAN SÜDTIROL

SÜDTIROL ALTO ADIGE

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Foreword

Sustainable tourism observatories have strengthened their role as a tourism intelligence tool during the Covid-19 pandemic. They were able to capture and assess short, medium and long-term changes in destinations and to support policies for a sustainable tourism future. As difficult as they are, the pandemic years represent a vacuum in which destinations have been able to rethink their development, without having to deal with their daily businesses. The Italian Autonomous Province of Bozen-Bolzano (South Tyrol) used the lockdown-seasons to strengthen a common understanding of sustainability in tourism and to set up a programme for destination labelling according to international standards. The crisis was a chance to make the necessary choices.

In its third year of activity, the Sustainable Tourism Observatory of South Tyrol (STOST) supported this repositioning process by implementing several monitoring tools. Besides the regular and timely monitoring of thirteen issue areas, sample surveys were used to rapidly assess and evaluate the recovery phase. These tools allowed to evaluate the impact of Covid-19 in economic terms, but also in terms of product and process innovation in accommodation facilities. They also highlighted changes in tourist markets, that are becoming less international and more interested in outdoor activities.

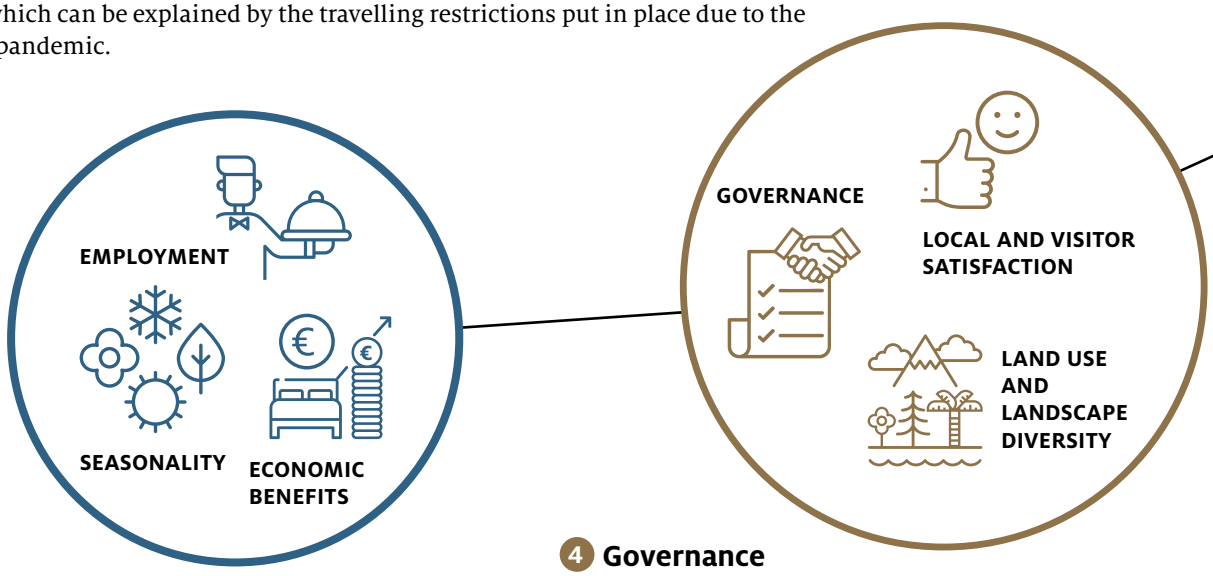
Tourism is changing and the main goal of STOST is to understand its new shape, and to support smart policy decisions.

Harald Pechlaner – *Head, Center for Advanced Studies, Eurac Research*

Executive Summary

Sustainable tourism "takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities" (UNEP & UNWTO, 2005).

STOST monitors, evaluates, and communicates tourism developments in South Tyrol (Italy). It examines benefits and costs of tourism for South Tyrol and provides recommendations and guidelines for policy makers to support sustainable tourism management. In 2020, South Tyrol registered 4.6 million tourist arrivals and 21.7 million overnight stays. This implies a decline of 40.0% in arrivals and of 35.5% in stays compared to 2019, which can be explained by the travelling restrictions put in place due to the Covid-19 pandemic.



1 Seasonality

Tourist arrivals in South Tyrol follow a clear seasonal pattern which has remained stable over the last 20 years. It is characterized by two high seasons, one in the summer and one in the winter. Monthly peaks in most municipalities are registered either in August or February, reaching 17% and more of yearly arrivals in one month. As a result of the pandemic, the seasonality was even more pronounced in 2020, with a winter season much shorter than usual.

2 Employment

Employees in the accommodation and food service sector make up about 15% of total employment in South Tyrol. As the tourism industry was the sector most affected by the Covid-19 pandemic, it was also the industry in which employment fell the most.

3 Economic benefits

In terms of value added, the accommodation and food service industries provide a substantial share of overall GDP (11.8% in 2018). Including induced and indirect effects, tourism contributes even more to the overall economy. The contribution of tourism to the GDP in South Tyrol is rather constant over the last 2 decades. While GDP data for 2020 are not yet available, it is to be expected that value added in tourism industries strongly declined in 2020.

4 Governance

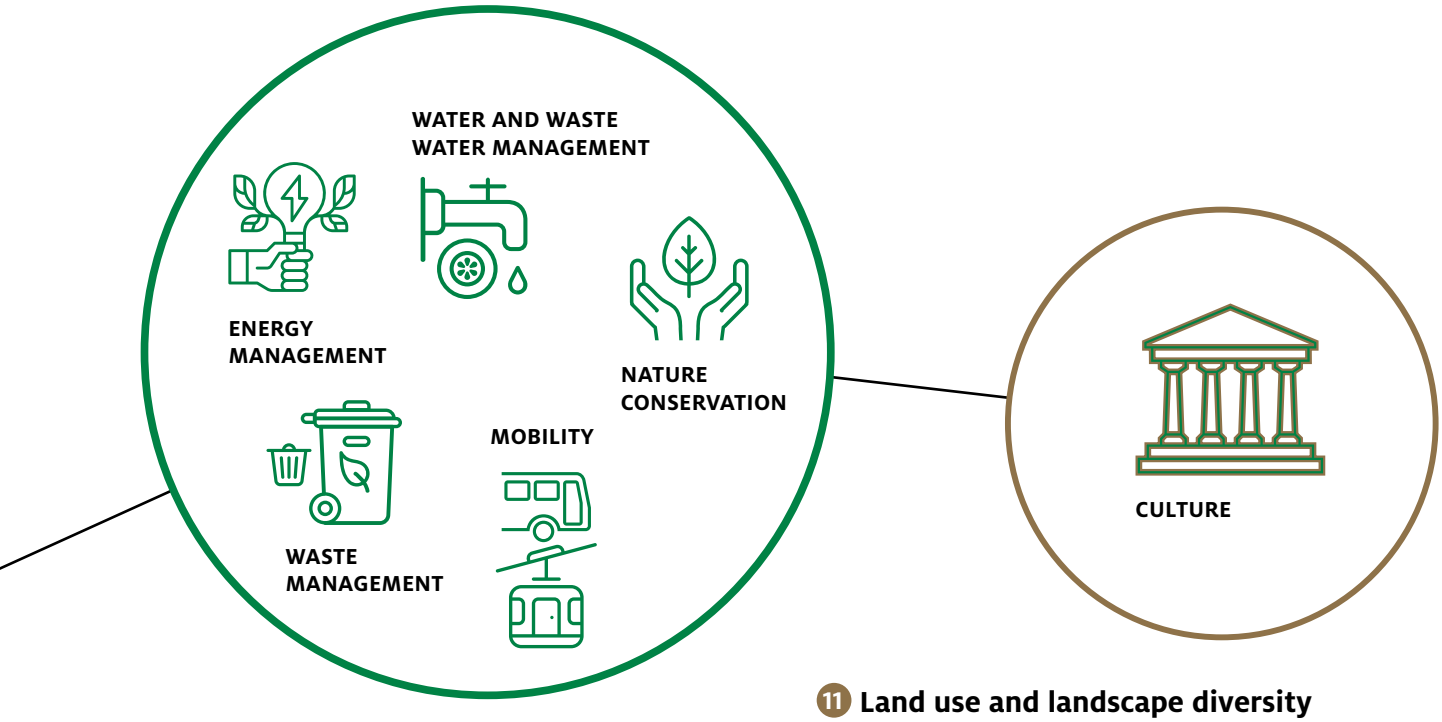
The number of municipalities and events certified as sustainable have decreased in 2020, probably because of the Covid-19 pandemic and its effects. However, the number of certified accommodation facilities has remained stable. The demand for local products (Red Rooster) has increased and also the percentage of organic milk sold to accommodation facilities has slightly risen, in spite of the decrease in the sale of organic milk in absolute numbers.

5 Local and visitor satisfaction

The Covid-19 pandemic has caused the trend of rising tourism intensity to stop, leading to a fall from 17.3 (2019) to 11.1 (2020) average daily overnight stays per 100 inhabitants in South Tyrol. The overall level of satisfaction of tourists with their holiday in the destination is extremely high (98.8%), even in the pandemic year. The share of South Tyrolean households who view tourism as beneficial for South Tyrol overall lies at 77.2%.

6 Energy management

In 2018, at least 9% of total electricity consumption in the destination was directly attributable to the tourism sector. However, the estimated electricity consumption of accommodation facilities has dropped by 42.7% in 2020, due to the general decline in arrivals and overnight stays. The number of charging stations for e-mobility has steadily increased in the past years. Currently, there are 366 such stations (206 of which in hotels and other accommodation facilities).



7 & 8 Water and waste water management

Tourism activities are directly and indirectly linked to water consumption. Water used for artificial snow production increased steadily over the last decade. During the winter season 2019/2020, Covid-19 caused the water used by snow canons to decline by roughly 25% with respect to the water consumed during the 2018/2019 winter. Used fresh water also needs to be treated. In South Tyrol, total users connected to sewerage and sewage treatment plants in South Tyrol were estimated at around 1,684,160 in 2014. Among them, tourists amount to 397,327, making up 23.6%.

9 Waste management

Tourism generates a considerable amount of waste in the destination. As it is difficult to directly observe waste production, we estimate it for accommodation facilities based on existing parameters and using overnight stays. Overall, accommodation facilities are estimated to account for about 9% of the total waste production in the region.

10 Mobility

Mobility has been impacted heavily by the pandemic and the process of decarbonising tourism travel has slown down. The imposed restrictions and the risk aversion of visitors have caused a drop in the use of public transport and a preference for car use, both to access the destination and to move around on site. In particular, 57.3% less uses of Mobilcards were registered in 2020 compared to 2019, a decrease that was more than proportional to the decrease in arrivals. Moreover, 69.9% of guests interviewed during the pandemic year 2020 reported to move around in South Tyrol mostly by private car –this corresponds to an increase of 14.4 percentage points if compared to the figures of 2013 (55.7%).

11 Land use and landscape diversity

South Tyrol has little more than 5% of area of permanent settlement. Therefore, a well-founded discussion about a sustainable usage of land is indispensable. In the period from 2015 to 2020, the areas for tourist facilities have increased in 74 of the 116 municipalities of South Tyrol. Overall, 40.83% of beds are located in residential areas (areas A, B, C), 37.6% in agricultural areas, 11.8% in areas for tourist facilities and 9.8% in other land use zones. Urban sprawl is a relevant issue that should be constantly monitored to make use of land sustainable and preserve landscape beauty in South Tyrol.

12 Nature conservation

A survey among the South Tyrolean tourism boards has shown that most organizations (82.6%) consider issues of nature conservation in their strategic plans and promote biodiversity through near-natural design and cultivation of native plants. Recent studies highlight the spatial overlap between areas of higher biodiversity in the Alps and tourism activities and the possible negative impacts of tourism activities. The lack of specific data on the interaction between tourism and biodiversity in South Tyrol stresses the importance for further in-depth studies.

13 Culture

The relation between tourism and culture is mostly perceived as harmonious and mutually beneficial both when considering the traditional practice of transhumance (qualitative case study with stakeholders from agriculture, culture and tourism), as well as the dynamics between local culture and tourism in South Tyrolean municipalities (survey with municipal annalists and tourism organizations). Museums continue to be strongly visited by tourists, although the Covid-19 pandemic and the respective closures have altered the trend that pointed towards increasing cultural interests by tourists.

South Tyrol in brief

South Tyrol is an Italian Autonomous Province and constitutes, together with the Autonomous Province of Trento, the region Trentino-South Tyrol, located in the northern part of the Italian Alps and bordering with Austria and Switzerland. The Province has an area of 7,400 square kilometers and a total population of over 530,000 inhabitants. Its capital is the city of Bozen/Bolzano, with about 100,000 inhabitants, but it also has a few other small towns with more than 20,000 inhabitants (Meran/Merano, Brixen/Bressanone, and Bruneck/Brunico). South Tyrol is officially a trilingual region, with German, Italian and Ladin speakers. The statute of autonomy came into force in 1972 and contains concrete measures to protect the German- and Ladin-speaking minorities, such as German and Ladin schools, minority- language radio and television broadcasts and administrative and law-making rights. The territorial morphology is characterized by mountains and valleys. South Tyrol is known for its mountain areas and natural landscapes covering approximately 90% of the territory. One fourth of the South Tyrolean surface is protected area (Morello, Oggiano, 2015). This includes those protected areas that form part of the core of the renowned Dolomites natural heritage site, which was declared a UNESCO World Natural Heritage (WHS) site in 2009 for its value in landscape aesthetics and its geologic and geomorphologic importance in science.

The role of tourism in South Tyrol's economy

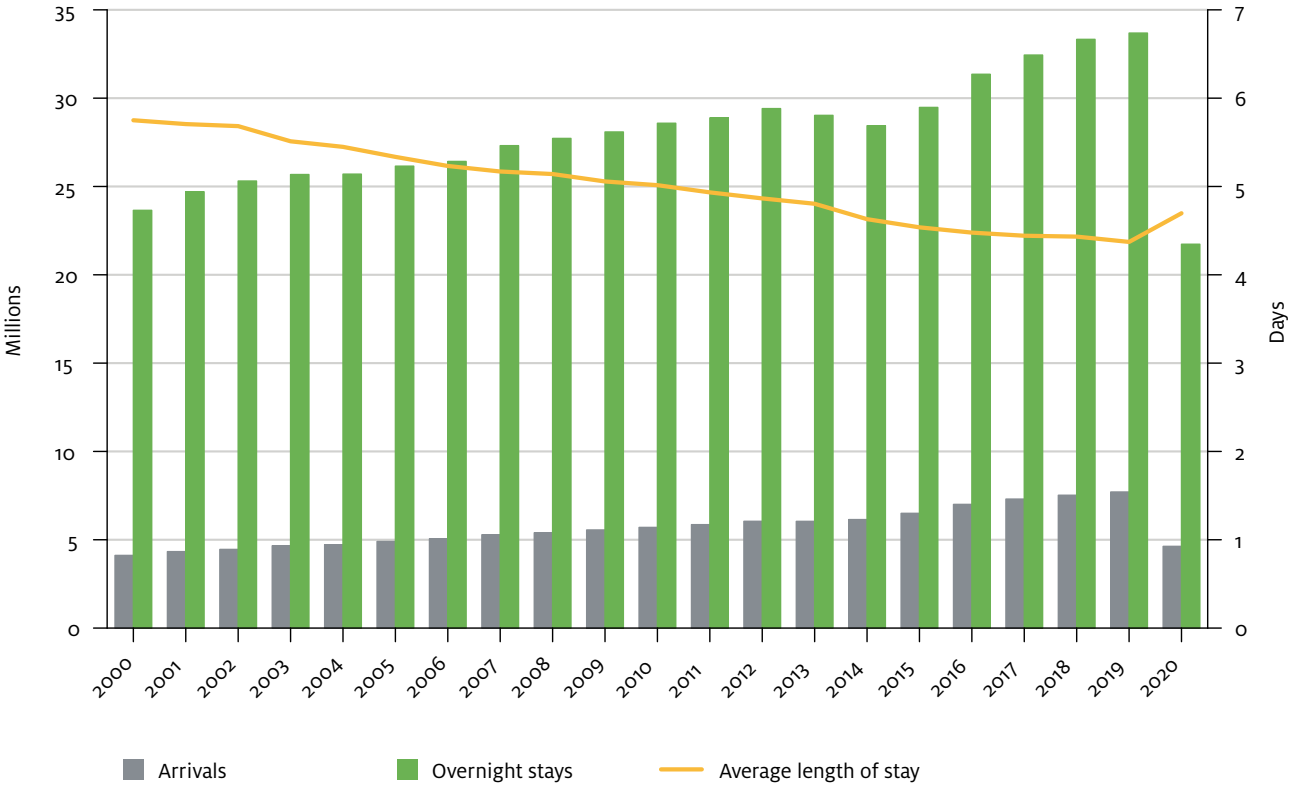


Figure 1: Arrivals and overnight stays (left axis) and average length of stay (right axis) in all accommodation facilities, South Tyrol, 2000-2020. Yearly data in millions. Source: ASTAT, 2021, own elaboration.

Tourism plays a major role for South Tyrol's economy, contributing to 11.2% of the local GDP in 2018 with direct effects only (ISTAT, 2021). In 2019, more than 7.7 million tourist arrivals and 33.7 million overnight stays were registered in South Tyrol (see **Figure 1**). However, in 2020, the massive travelling restrictions put in place as a reaction to the Covid-19 pandemic reduced these numbers to 4.6 million arrivals (-40.0%) and 21.7 million stays (-35.5%). At the same time, the average length of stay, which had been steadily decreasing for the last 20 years, has increased to 4.7 days (+7% compared to 2019). This might be linked to the fact that the winter season was much shorter than usual (only January and February), and tourists typically stay shorter in winter than in summer. The effects of the pandemic on tourism in South Tyrol are further explored in the Chapter *The Impact of Covid-19 Pandemic on Tourism in South Tyrol.*

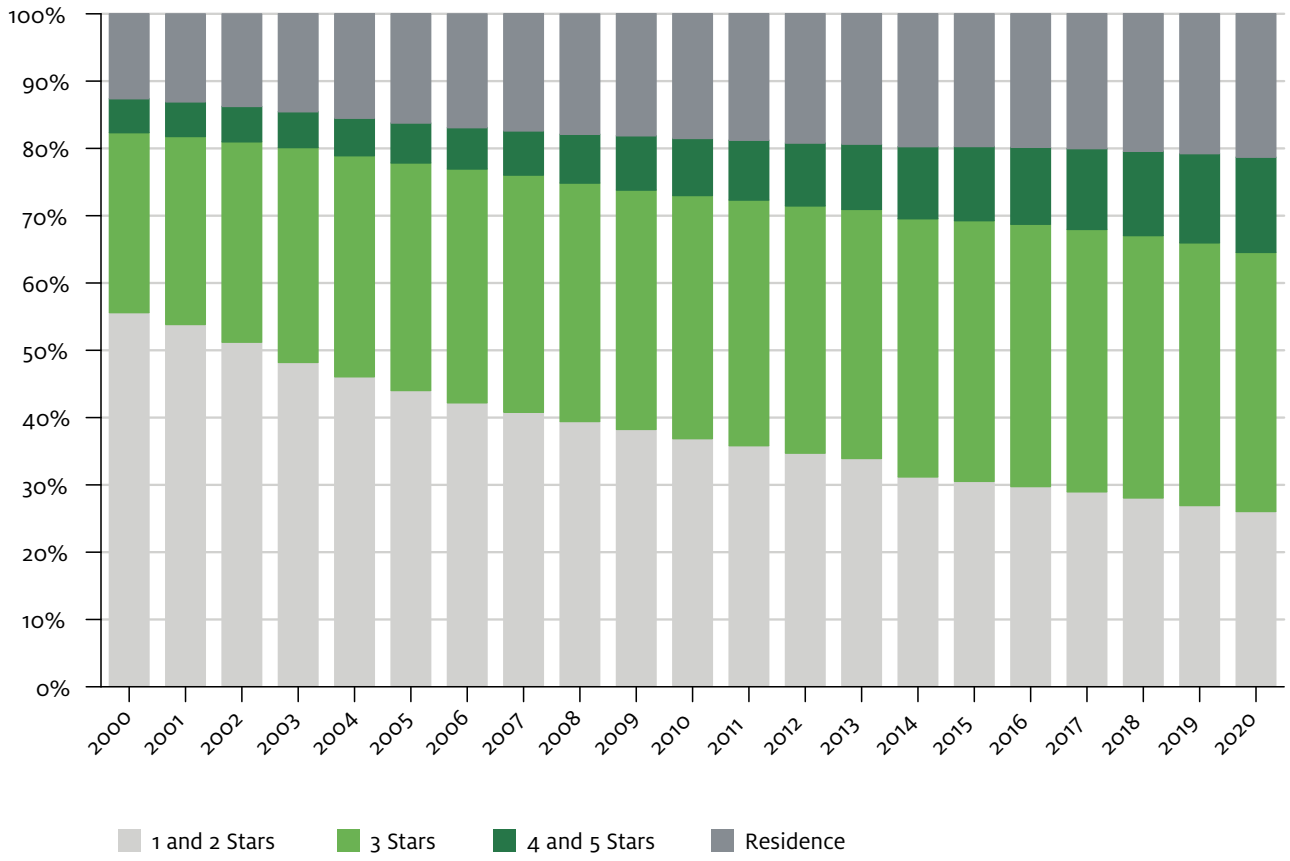


Figure 2: Hotels and similar establishments by accommodation category, South Tyrol 2000-2020. Percentage values. Source: ASTAT, 2021, own elaboration.

The number of hotels and similar accommodation facilities has decreased over the last two decades, from 4,521 in 2000 to 3,953 in 2020 (-12.6%) (ASTAT, 2021). By contrast, the number of beds in these facilities rose by 3.5% over the same period (from 146,147 to 151,575), implying an increasing average bed capacity per accommodation. In terms of quality, we can observe a continuous reduction of 1- and 2-star hotels and a rise in 3-, 4-, and 5-star hotels (see **Figure 2**). The number of other accommodation services, such as campsites, private accommodations and agritourism ventures, when compared to hotels and similar establishments, has experienced an opposite trend, increasing from 5,521 in 2000 to 6,622 in 2020 (+19.9%). Similarly, the number of beds in other accommodation services has increased by 16.5% (from 65,274 to 76,064), equalling about half of those offered by hotels and similar establishments.

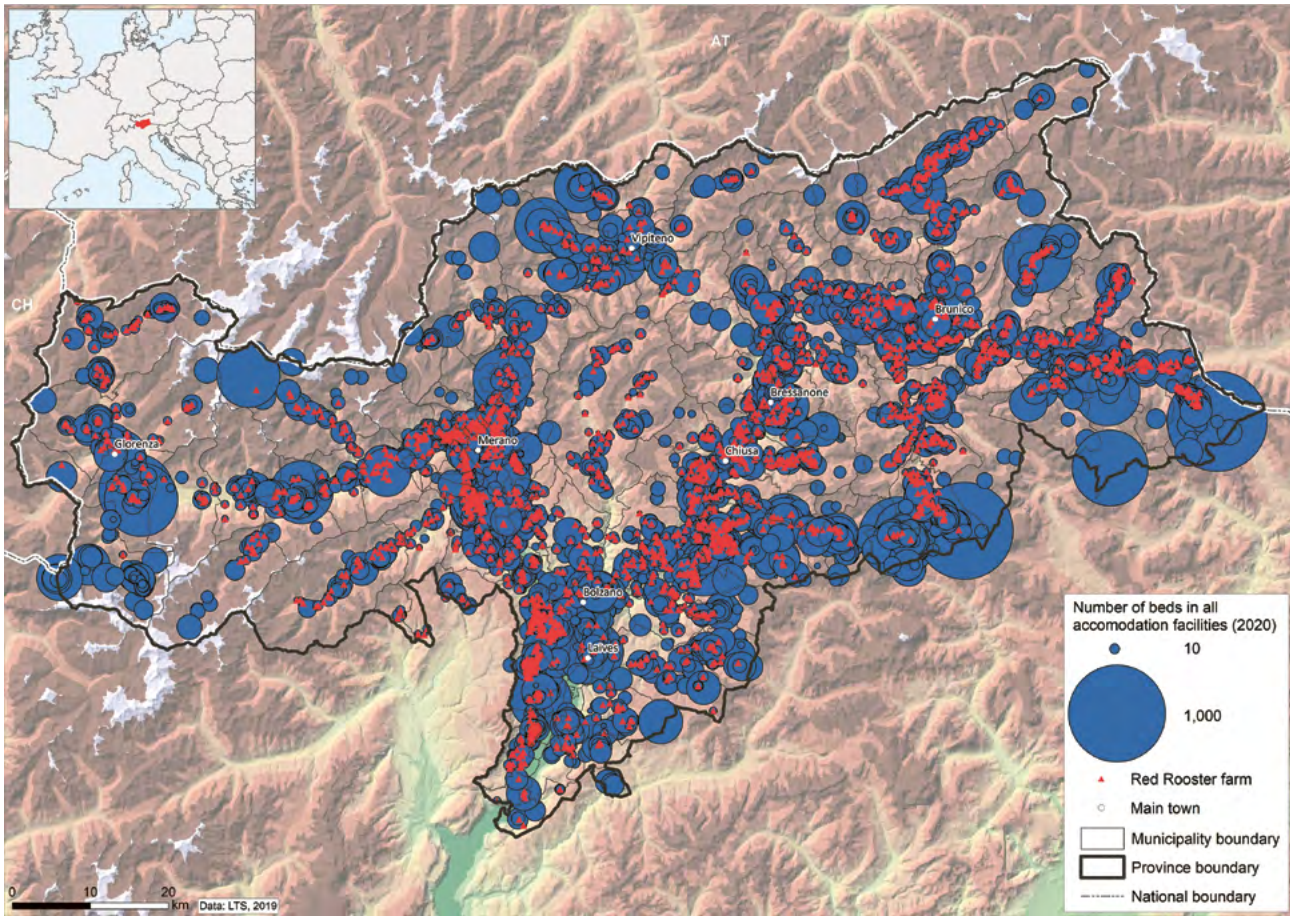


Figure 3: Geolocation and bed capacity of all accommodation facilities (in blue) and location of "Red Rooster" branded agritourism ventures (in red). Source: Open Data Hub Südtirol/Alto Adige Online Database, 2020, own elaboration.

The tourism hospitality sector is spread over all South Tyrolean valleys, with a particularly high concentration of beds in the South-Eastern part of the province (see Figure 3). "Red Rooster" branded agritourism ventures exist in almost all touristic areas, with only few exceptions, mostly in mountainous areas at higher altitudes, which are inadequate for farming activities.

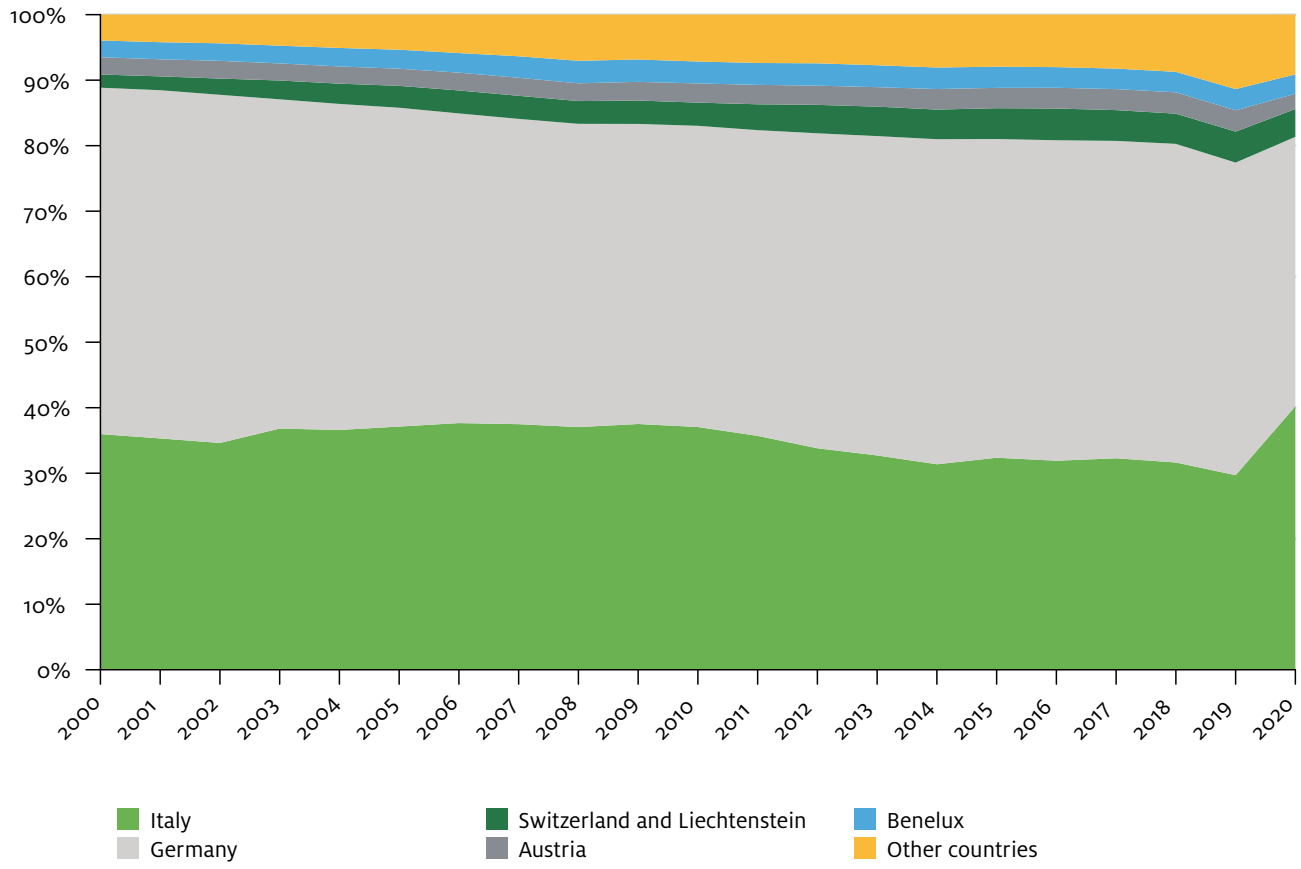


Figure 4: Overnight stays in all accommodation facilities by market of origin, South Tyrol, 2000-2020.
Source: ASTAT, 2021, own elaboration.

Concerning the origin of guests, proximity markets clearly prevail over long-distance ones. The main tourist markets for South Tyrol are the so called DACHI countries (a German abbreviation for Germany, Austria, Switzerland and Italy) (see **Figure 4**). In the past years, German tourists had consistently made up more than 50% of all overnight stays. This share has decreased to roughly 45% in 2020 due to the Covid-19 pandemic. In general, international tourism has suffered as a result of the pandemic, with numbers of international guests from all countries decreasing. This loss of international tourism was in part compensated by an increase in domestic, Italian guests. Consequently, their share among all overnight stays rose by 10.5 percentage points between 2019 and 2020, from 31.4% to 41.9%.

STOST: A Tourism Intelligence Tool

The Sustainable Tourism Observatory of South Tyrol (hereafter STOST) was launched in 2018. It belongs to the United Nations World Tourism Organization's (UNWTO) International Network of Sustainable Tourism Observatories (INSTO), a network of organizations monitoring the economic, environmental, and social impact of tourism at the regional level. The initiative is based on the UNWTO's long-standing commitment to the sustainable and resilient growth of the sector through measurement and monitoring, supporting an evidence-based management of tourism (see http://insto.unwto.org).

The observatory strives to achieve a series of objectives in line with the following vision and mission:

Vision

Through intersectoral and destination-wide cooperation as well as new monitoring and communication models, STOST seeks to contribute to the creation of a liveable socio-environmental habitat for South Tyrol's future generations and their guests.

Mission

STOST monitors, evaluates, and communicates tourism developments in South Tyrol. STOST examines benefits and costs of tourism for South Tyrol and provides recommendations and guidelines for policy makers to support sustainable tourism management. The enabling of awareness, learning, and evidence-based decision making for different target groups of South Tyrol's society lies at its very core.

Objectives

Striving towards the achievement of the vision and the implementation of the mission, various short-, medium-, and long-term objectives for the observatory were elaborated based on a synthesis of expert interviews conducted during the preliminary phase of the STOST settlement. They can be divided into five overarching goals: (1) be in the loop of developments and regularly inform about and communicate them; (2) serve as a think tank promoting sustainability in tourism; (3) raise awareness and enable learning processes; (4) provide evidence for decision makers; (5) build trusts between stakeholders and enable communication, cooperation and networking. The more specific goals for each of these blocks can be found on our website (https://sustainabletourism.eurac.edu/).

Governance of STOST

The governance of STOST is shaped by many different actors within and outside the destination. The observatory has been installed by the Center for Advanced Studies at Eurac Research in cooperation with the local destination management organization IDM South Tyrol (abbreviation for Innovation, Development, Marketing) and the provincial government of South Tyrol.

The stakeholder working group actively contributes to the development of the observatory by supporting Eurac Research and IDM in the design of monitoring issues, in data management and feedback processes, as well as in the validation of results. The stakeholder working group reflects: a) data providers, among which are, e.g., the Provincial Statistical Office, the Chamber of Commerce and Industry, the local Environmental Agencies; b) support and advice providers, such as, e.g., Institutes for Sustainable Development, the University of Bolzano/ Bozen, other local research institutions and local trade associations. A complete list of the organizations participating in the Working Group Workshops is listed in the Annex of this report. Finally, additional organizations such as UNWTO, the National Ministry for Agriculture and the Ministry of Tourism, the provincial administration, and international treaties such as the Alpine Convention support the advancement of the observatory by sharing their expertise and bringing in best practices. These entities are crucial because they offer benchmarking opportunities and access to a supraregional knowledge network.

In this year, the official Stakeholder Meeting was held on the 13th of January 2021. In the plenary session, we presented the results of our Covid-19-related surveys (see Chapter *The Impact of Covid-19 Pandemic on Tourism in South Tyrol*), while two additional presentations were given by stakeholders on their own activities related to sustainability in tourism. In addition, there were three break-out sessions in which the topics of 1) land use and landscape diversity, 2) culture and 3) public health were discussed in detail with the participants. Thanks to the vivid participation of the local stakeholders, valuable insights as to how to extend and improve the existing set of indicators could be gained, which informed our subsequent activities in the respective issue areas (or box, in the case of public health).

Among the participants at the Stakeholder Meeting 2021 were the following organizations: Institute for Regional Development of Eurac Research, Free University of Bozen-Bolzano, IDM South Tyrol, HGV, Dachverband für Natur- und Umweltschutz/ Federazione Protezionisti Sudtirolesi, Südtiroler Archäologiemuseum/ Museo Archeologico dell'Alto Adige, Messe Bozen/ Fiera Bolzano, STA – Green Mobility, HOGAST, Museumsverband Südtirol, LTS, WIFO – Handelskammer/ Camera di Commercio, Roter Hahn/ Gallo Rosso, ASGB, Südtiroler Bauernbund, Peer GmbH, Terra Institute, Amt für Landesplanung und Kartografie/ Ufficio Pianificazione territoriale e cartografia, Landesabteilung Natur, Landschaft und Raumentwicklung/ Ripartizione Natura, paesaggio e sviluppo del territorio, Ressort Landwirtschaft, Forstwirtschaft, Tourismus und Bevölkerungsschutz/ Dipartimento Agricoltura, Foreste, Turismo e Protezione civile, Landesabteilung Innovation, Forschung, Universität und Museen/ Ripartizione Innovazione, Ricerca, Università e Musei.

While providing support to policy makers and tourism businesses to make evidence-based decisions, STOST also aims to build a local culture for sustainable development among local communities. Therefore, the main target groups of the observatory are policy makers, the private sector, and the general public.

Methodological strategy: how to measure and understand?

In this report we refer to sustainable tourism according to the UNWTO definition, as a form of tourism that ***"takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities"*** (UNEP & UNWTO, 2005). Following this definition, "sustainability principles refer to the environmental, economic, and socio-cultural aspects of tourism development", implying that a "suitable balance must be established between these three dimensions to guarantee its long-term sustainability" (ibid.).

The UNWTO guidelines for INSTO observatories propose eleven mandatory issue areas to monitor sustainability in tourism. These are: tourism seasonality, employment, destination economic benefits, governance, local satisfaction, energy management, water management, waste water management, solid waste management, climate action and accessibility. However, further monitoring topics are welcomed to assess place-specific issues. Therefore, based on 29 qualitative interviews undertaken with local and international tourism experts during the preliminary phase, the STOST research team defined three additional issue areas: mobility, nature conservation, land use and landscape diversity (see **Figure 5**). In the year 2020, an additional issue area on culture was added with the

Figure 5: Mandatory (in black) and additional (in green) issue areas. Source: own elaboration.

goal to measure the reciprocal effects of culture and tourism. Thus, currently, STOST is monitoring 13 issue areas. Accessibility and Climate Action are planned to be addressed in more detail in the upcoming report of 2022.

For each of these issue areas, indicators were selected with reference to international standards (e.g. European Tourism Indicators System for sustainable destination management - ETIS, Global Sustainable Council Tourism Criteria for Destinations - GSTC-D). This was done in collaboration with different administrative and private stakeholders. Some indicators were revised and improved over the years, based on the feedback of stakeholders gathered during so-called think tanks. These think tanks are viewed as opportunities – usually during a working group workshop – to discuss emergent or innovative aspects in the respective fields, for which quantitative data is often not available yet. In 2021, we organised two think tanks, one of them on the 18th of May and focused on "Culture" (Issue Area 13). The other one was held on the 11th of June, revolving around the topic of "Land use and landscape diversity" (Issue Area 11).
With a view to the subsequent creation of a general indicator for sustainability (e.g. using the standard by Pulido Fernández, Sánchez Rivero, 2009), indicators were classified according to the DPSIR framework (an acronym that stands for Driving forces, Pressures, States, Impacts, Responses) (Burkhard, Müller, 2008). This framework enables the classification of indicators based on their typology as: a) driving forces of an impact (DF); b) indicators of pressure on the environment (P); c) indicators of the state of the environment (S); d) indicators of impact measured on the environment (I) and finally d) indicators of response (R), typically undertaken by civil society to minimize impacts. Below is a table illustrating the indicators and their classification. Beside each indicator, a circular symbol helps the reader to identify the DPSIR typology, as well as the pillar it refers to: a blue circle indicates the economic, a brown one the social and a green one the environmental pillar. In addition, a reference to the Sustainable Development Goals (SDGs) linked to each issue area is provided.

ISSUE AREA	INDICATOR	DESCRIPTION	PILLAR	TYPOLOGY (DPSIR)	SDGs
1 **Seasonality**	**1.1**	Tourist arrivals by month and market	Economic	Driving forces (DF)	
	1.2	% of annual tourist arrivals occurring in peak months by municipality	Economic	Pressure (P)	
	1.3	% of annual tourist arrivals occurring in peak weeks by municipality	Economic	Pressure (P)	
2 **Employment**	**2.1**	Number of employees in the accommodation and food service sector	Economic/ Social	Driving forces (DF)	
	2.2	% of female enterprises in the accommodation and food service sector	Economic/ Social	State (S)	
3 **Economic benefits**	**3.1**	Value added by industries	Economic	Driving forces (DF)	
	3.2	Profit situation for the accommodation and food service sector (business climate index)	Economic	State (S)	

ISSUE AREA	INDICATOR	DESCRIPTION	PILLAR	TYPOLOGY (DPSIR)	SDGs
4 **Governance** 	**4.1**	Number of municipalities, accommodation facilities and events involved in voluntary certification schemes for sustainability	Environmental/ Social	Responses R	
	4.2	Number of "Red Rooster" branded agritourism ventures producing and selling regional products	Environmental/ Social	Responses R	
	4.3	Organic milk sold to members of the main local buying syndicate	Environmental/ Social	Responses R	
5 **Local and visitor satisfaction** 	**5.1**	Tourism intensity index	Environmental	Pressure P	
	5.2	Differences in rent prices between touristic and non-touristic municipalities	Social	State S	
	5.3	Tourist satisfaction with prices	Social	State S	
	5.4	Tourist satisfaction with overall stay	Social	State S	
	5.5	Local population's perception of the overall impact of tourism on the destination	Social	State S	
6 **Energy management** 	**6.1**	Estimated minimum electricity consumption in accommodation facilities	Environmental	Pressure P	
	6.2	Electricity consumption by ski lifts and snow cannons	Environmental	Pressure P	
	6.3	Number of charging stations offered for e-mobility in hotels and public spaces	Environmental	Responses R	
7 **Water management** 	**7.1**	Estimated minimum water consumption in accommodation facilities	Environmental	Pressure P	
	7.2	Water use by snow guns	Environmental	Pressure P	
8 **Waste water management** 	**8.1**	Discharge of sewage water attributable to tourism	Environmental	Pressure P	

ISSUE AREA	INDI-CATOR	DESCRIPTION	PILLAR	TYPOLOGY (DPSIR)	SDGs
9 **Waste mana-gement** 	**9.1**	Estimated waste production in accommodation facilities	Environ-mental	Pressure (P)	
10 **Mobility**	**10.1**	Mobilcards, bikemobil cards, museumobil cards and guest tickets	Environ-mental	Responses (R)	
	10.2	Number of ski-lift and cable car users by season	Environ-mental/ Economic	Driving forces (DF)	
	**10.3**	Kilometers travelled using car sharing services by non-local users	Environ-mental	Responses (R)	
11 **Land use and landscape diversity**	**11.1**	Beds in hotels and similar establishments per land use zone and category	Environ-mental/ Social	Pressure (P)	
	11.2	Development of the areas for tourist facilities	Environ-mental/ Social	Driving forces (DF)	
	**11.3**	Bed density of hotels and similar establishments in residential zones	Environ-mental	Pressure (P)	
12 **Nature conser-vation** 	**12.1**	Nature conservation survey	Environ-mental/ Social	State/ Responses (S, R)	
13 **Culture**	**13.1**	Transhumance case study	Cultural	State (S)	
	13.1	Survey on culture and tourism	Cultural	State/ Responses (S, R)	
	**13.1**	Entries in museums by tourists using mobility cards	Cultural	State (S)	

Table 1: List of indicators and their classification. Source: own elaboration.

The impact of the Covid-19 pandemic on tourism in South Tyrol

The outbreak of the Covid-19 pandemic has heavily shaped tourism dynamics in South Tyrol in 2020 and 2021, as everywhere around in the globe. In South Tyrol it abruptly ended the winter season 2019/2020 by the beginning of March. From March to June, i.e. during the shoulder season, South Tyrol basically had no tourist arrivals. Contrary to all believes, the summer season 2020 reached almost pre-crisis levels of tourist arrivals. In spring 2020, we decided to conduct three surveys with the objective to enhance our understanding of the impact of Covid-19 on tourism in South Tyrol along three dimensions. The first survey was designed to examine the economic impact of Covid-19 and its effects on firms. We wanted to understand how the reduction of tourists affected firms operating in the tourism sector and how they reacted to it. The second survey focused on possible changes in behaviours and needs of tourists because of Covid-19. We interviewed the first tourists arriving after the first lockdown with the objective to investigate the effect of Covid-19 on their behaviour and requirements. Finally, the third survey focused on households in South Tyrol. We conducted a household survey among the local population to understand the effects of Covid-19 on the perception of tourism among the population residing in South Tyrol.

Effects of Covid-19 on firms in South Tyrol

To evaluate the economic consequences of Covid-19 on firms in the hospitality industry, we conducted an exploratory survey in collaboration with the Hoteliers- and Gastwirteverband (HGV), the local association of firms in the hospitality industry that covers a large fraction of all firms in the hospitality industry in South Tyrol.
Together with HGV we designed an online survey that we sent out via email invitation to all members of HGV on August 3rd, 2020. The participants were given one week to answer. Overall, 659 firms participated in our survey corresponding to a return rate of approximately 16%.
In South Tyrol, tourists could return by mid-June 2020. In August, we asked firms about their turnover in July 2020 and asked them to indicate the change with respect to 2019. Overall, the turnover was reported to be 33% lower in 2020 compared to 2019. We found considerable heterogeneity in the way firms were affected. The drop in turnover was more pronounced for accommodation establishments compared to bars and restaurants. Accommodation establishments with 3 stars or less experienced a larger drop in turnover compared to establishments with 4 or 5 stars. Besides turnover, we also asked firms to state the change in number of employees that were employed at the beginning of August 2020 compared to August 2019. Overall, the number of employees in August 2020 was indicated to be 13% below the level of 2019.
Besides the direct economic consequences, we also wanted to understand if and how firms reacted to the Covid-19 pandemic and what measures were taken by single firms. Most firms stated some form of adjustment. Already in August 2020, approximately 40% of all participants stated that they had adapted their products and services offered to the new needs on the side of guests. Around 35% of all firms stated they had strongly intensified their marketing activities and more than 40% indicated that they had actively contacted their regular guests during the first lockdown in Spring 2020. Our survey results show that especially accommodation facilities with 4 and 5 stars have actively contacted their regular guest during lockdown. Contrasting these efforts with the actual number of regular guests arriving in August 2020 shows that those firms that connected more actively to their regular guests during lockdown were also more successful in convincing them to return to their establishments after the lockdown (see **Figure 6**).

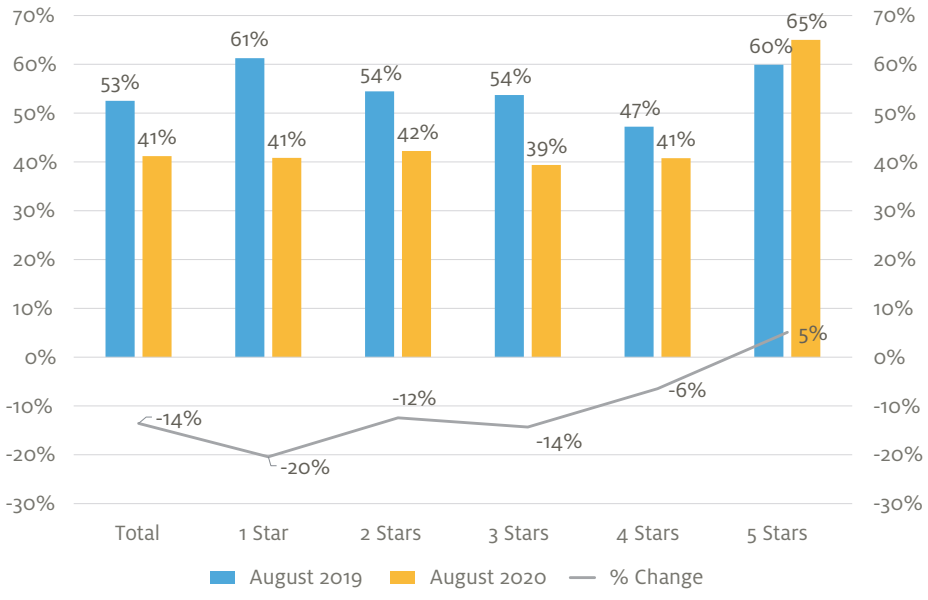


Figure 6: Share of regular guests (August 2019 - August 2020), South Tyrol, Source: STOST.

Effects of Covid-19 on the behaviour of guests

The Covid-19 pandemic led to a sudden stop of tourism around the world. Also in South Tyrol arrivals and overnight stays dropped to zero in Spring 2020. The strong decrease of tourism around the globe started various debates on the future of tourism and triggered discussions on how the pandemic might shape the behaviour and needs of future tourists. In order to understand how the Covid-19 pandemic and the associated lockdowns have changed the behaviour of tourists, we decided to survey the first guests arriving in South Tyrol after the lockdowns. We aimed to identify possible new challenges for South Tyrol and tried to understand how the destination can adapt to cope with newly created needs.
We conducted this study together with Apollis, an empirical research institute located in South Tyrol. We organized a representative survey among the first guests arriving in South Tyrol and sent out interviewers to 30 towns to conduct 874 face- to-face interviews in hotels. The survey period started on August 10th, 2020 and ended on October 4th, 2020. The survey is representative for tourists arriving in South Tyrol in hotels in September and October.
The main goal of the survey was to understand how Covid-19 has changed the needs of tourists and in how far guests have changed their behaviour. Most guests interviewed claimed that their need for hygiene had increased because of Covid-19. However, while most people interviewed claimed that they did not seek greater distance to other guests, they reported to avoid larger clusters of people. Most guests (approx. 70%) tried to spend as much time as possible outside and minimize their time in the hotel. The majority of guests also tried to avoid public transportation and use their own means of transportation. The use of buses and trains by tourists heavily decreased because of Covid-19 leading to an increase in the use of private vehicles such as cars, motor bikes and caravans. As the destination South Tyrol has limited street capacity, and tourist in- and outflows during peak seasons cause massive congestion, this development could turn out rather problematic for the region.
Besides possible changes in behaviour and needs of guests, we were also interested in a possible effect of the Covid-19 pandemic on the host-guest relationship. Little more than 82% of all guests stated that the host-guest relationship was not affect by Covid-19. Approximately 40% of all guests claimed that their relationship with their host had intensified. Almost 60% stated to keep greater distance to their host.

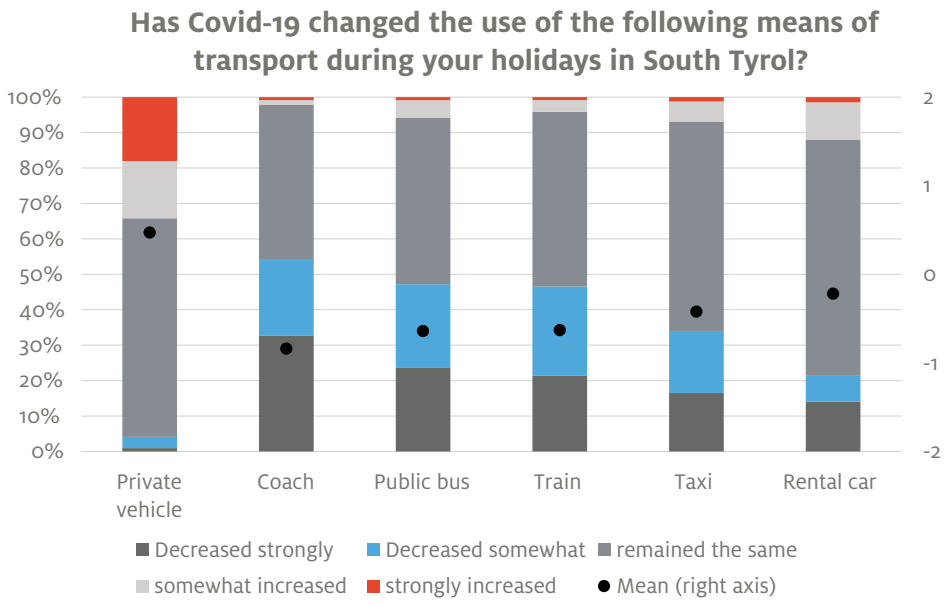
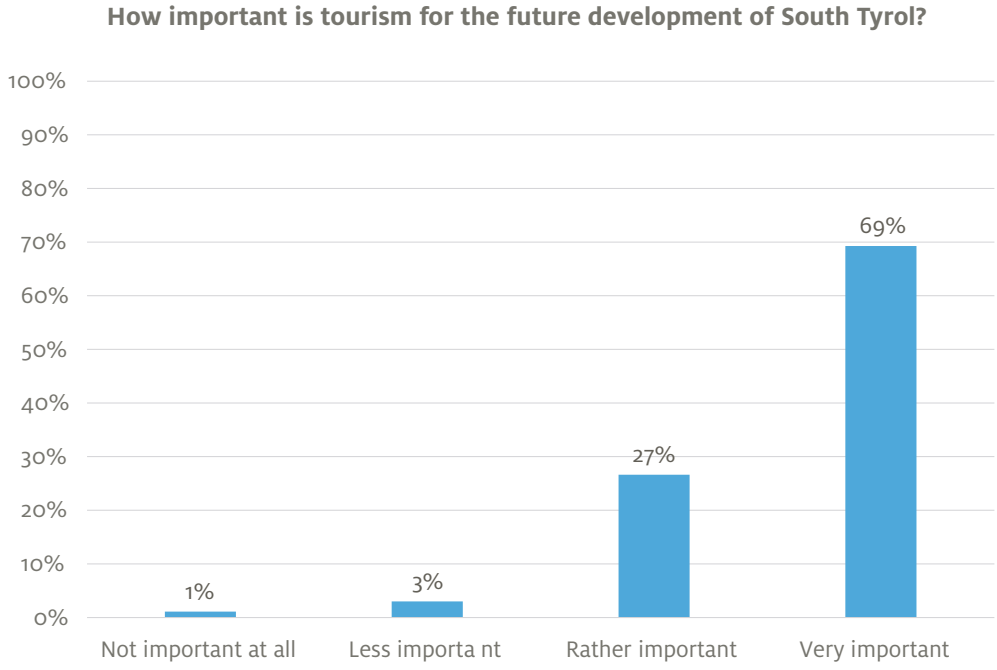


Figure 7: Change in means of transport, South Tyrol, Source: STOST.

We acknowledge that this study has several limitations. We conducted the survey among tourists that arrived in South Tyrol after the first lockdown in spring 2020 and stayed in hotels. However, one could argue that tourists changed also in the way they visit the region and that because of Covid-19 many tourists preferred staying in apartments rather than hotels. These dynamics could potentially bias our results.

Effects of Covid-19 on the perception of tourism in South Tyrol

In December 2020, STOST organized a representative household survey in South Tyrol. The objective was to understand if and how Covid-19 had influenced the perception of tourism in South Tyrol. For this we contacted 1,007 households via phone and interviewed one representative of each of these households.
The central question of this survey asked participants about the effects of tourism on South Tyrol. Thereby participants could either state that *the advantages of tourism outweigh the disadvantages* or that *the disadvantages of tourism outweigh the advantages*. Overall, 77% of all participating households stated that advantages would outweigh the disadvantages. While in absolute terms this number is high and tourism received broad support from residents, in 2018 the number of households stating that advantages of tourism outweigh disadvantages was at 95%. We can differentiate this the finding of the 2020 survey according to various socio-economic characteristics. Younger people (18-24) and the elderly (65+) are less positive compared to residents that are between 25 and 64 years old. Respondents with a higher education value tourism more on average. The same holds true for residents working in the food service and accommodation industry. In order to obtain a more refined picture of perceived advantages and disadvantages of tourism, we asked participants to rate various factors. Factors positively contributing to the perception of tourism include value added generated by tourism and the increased offer of cultural and leisure activities because of tourism in the region. Tourism-related factors that have been rated particularly negative include the increased traffic caused by tourists and increased costs of living associated to tourism. Moreover, households were asked to express their opinion about tourism and Covid-19. 80% of participants stated that, according to their beliefs, tourism had increased the cases of Covid-19 in the region. Finally, we asked participants to evaluate the importance of tourism for the future development of the region. The contacted households univocally stated that they considered tourism as a *rather important* or *very important* pillar for South Tyrol's future development. In addition, we asked them in which direction tourism should develop in the future. Almost two thirds of all households believe that the current level of tourism is optimal, and one should try to maintain this level. About 12% stated that they wished for more tourism in the future. 23% of all households prefer less tourism in the future.



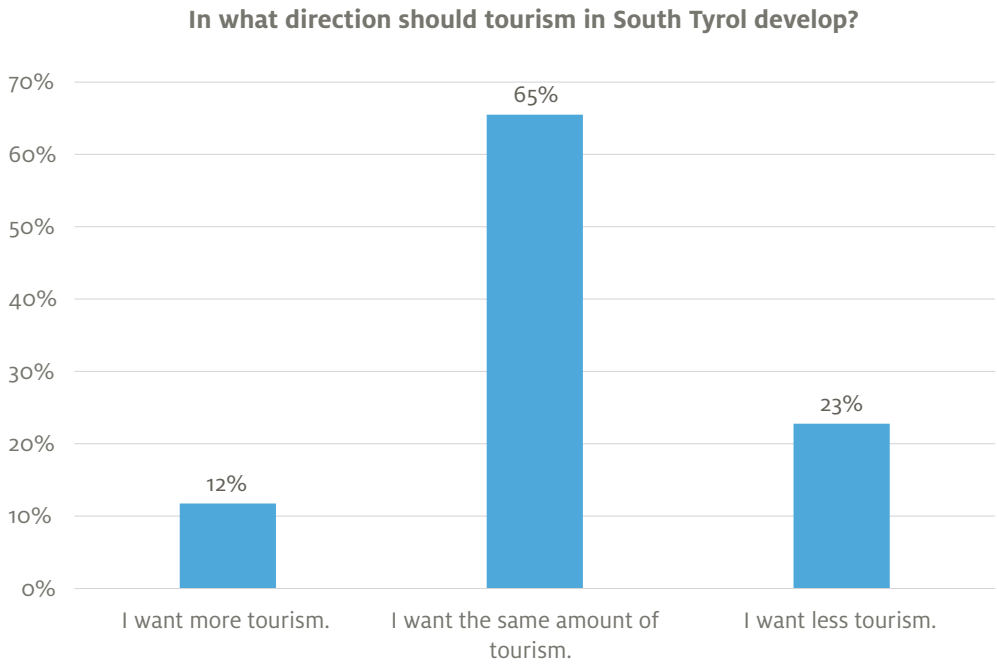


Figure 8: Future of tourism, South Tyrol, Source: STOST

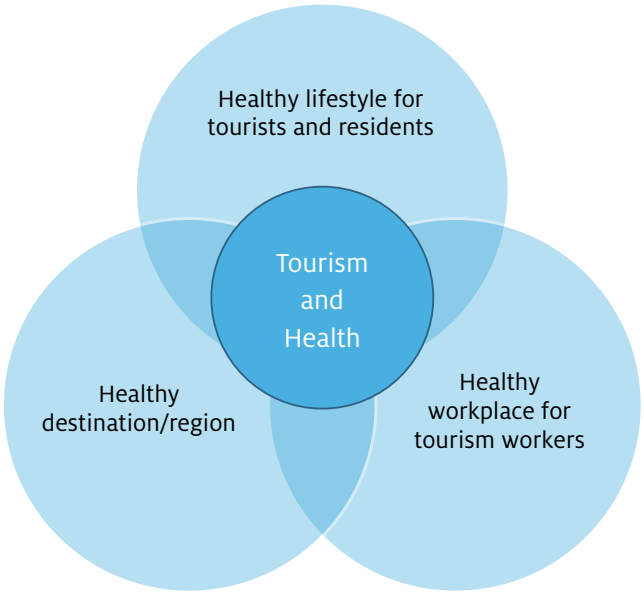
BOX 1 :

PUBLIC HEALTH AND TOURISM: EXPLORING THE INTERFACE

Following the definition of the WHO (1946), "health is a state of complete physical, mental and social well-being". Being considered "one of the fundamental rights of every human being" (Ibid.), the topic of health has received special attention in recent years, not least because of the Covid-19 pandemic. In this context, several definitions of public health have emerged over the years, most of which share the common focus on the health of an entire population as well as the collective and organized efforts to protect and improve it (see, for instance, Institute of Medicine, 1988). There are many factors which, combined, affect the health of individuals and communities. These "determinants of health" include the broader social, economic, cultural and physical environment in which a person is embedded, their living and working conditions, their social, family and community networks, their individual behaviour and lifestyles as well as innate individual traits and characteristics (Dahlgren & Whitehead, 1993).

Healthy lifestyles, workplaces and destinations

Based on these determinants, several points of intersection between tourism and public health can be identified (see Figure below) which are linked to different target groups, such as tourists, locals, employees, employers and the destination as such. Typical examples are wellness and outdoor tourism, which have a positive impact on the visitors' well-being while also promoting **healthy lifestyles**. Moreover, the interaction and exchange between tourists and locals allows for positive emotional experiences, which can increase well-being and health on both sides. However, tourism can also have negative impacts on locals, for instance by causing stress due to congested streets and overcrowded cities or by putting pressure on the health care system during high seasons. Another aspect frequently overlooked is the physical and mental stress to which employees in the tourism industry can be exposed, due to specific working conditions not uncommon in the industry. Creating a **healthy workplace** is thus essential to protect and promote the health of employees. More generally, an intact natural environment constitutes a prerequisite for the health of all target groups and a **healthy destination**. This makes environmental sustainability a key goal also from a public health perspective.



Covid-19 and public health: vacation styles of cautious and adventurous guests

Based on the guest survey mentioned in the previous section, some important dimensions to analyse health and hygiene during the Covid-19 crisis were investigated. Using Principal Component Analysis (PCA), it was possible to group items from the questionnaire according to their reciprocal affinity and identify latent dimensions to better describe the vacation styles during Covid-19. This study has been accepted for publication recently on the open access journal Sustainability. Survey items grouped with the PCA included the main questions abouth hygiene, travel behaviour and host-guest relationships. The following two dimensions were identified to describe the activities on site: *isolation*, including the avoidance of contact with other locals, with guests and the desire to spend the holiday time in the hotel; *cautious exploration*, including the practice of outdoor activities on site, while still avoiding crowded places and public transport. The PCA analysis revealed also an additional latent factor describing the attitudes towards the accommodation facilities: *information and communication* needs and requests, both to self-check the own health status, to collect evidence on the situation of the Covid-19 cases on site and, ultimately, on the safety of on-site activities; the second latent dimension relates to *hygiene* requirements to hotels, including innovative hygiene systems; finally *skepticism* as an individual attitude towards other guests. These latent factors were used as descriptors of two clusters of tourists, generated through cluster analysis: the *cautious guests* and the *carefully adventurous guests*. The cluster of adventurous guests refers mostly to international guests, especially Germans, that are seeking for less additional data or information on site than cautious guests, and are much less sceptical towards other guests. They tend to be less isolated and to practice more outdoor activities. Conversely, the cautious guests are mostly the domestic (Italian) ones, seeking for more isolation and trying to collect information about on-site conditions, and showing higher levels of skepsis towards other guests. In sum, this study seems to suggest that the more international the tourist during the pandemic, the more risk-tolerant. This hypothesis should be further investigated, together with the latent dimensions of health related to tourism.

Issue areas

1

1 Tourism seasonality

Seasonality is one of the distinctive features of the global tourism industry. It implies the concentration of tourist flows in specific periods of the year. This can contribute to various problems such as overcrowding, high prices, inadequate infrastructure in peak seasons and a lack of services and job opportunities in shoulder seasons. In order to mitigate these negative effects and the entailed burden on physical and social resources, a good understanding of seasonal patterns in the destination is important. Monitoring the number and share of tourist arrivals per market of origin, months and weeks can help to identify lows as well as peaks and make it possible to anticipate and tackle issues connected to seasonality in a timely manner. It also provides the foundation for efforts to effectively manage visitor flows and balance out systemic demand fluctuations (e.g. by increasing demand outside peak seasons, reducing demand in peak season or redistributing demand geographically).

1.1 TOURIST ARRIVALS BY MONTH AND MARKET

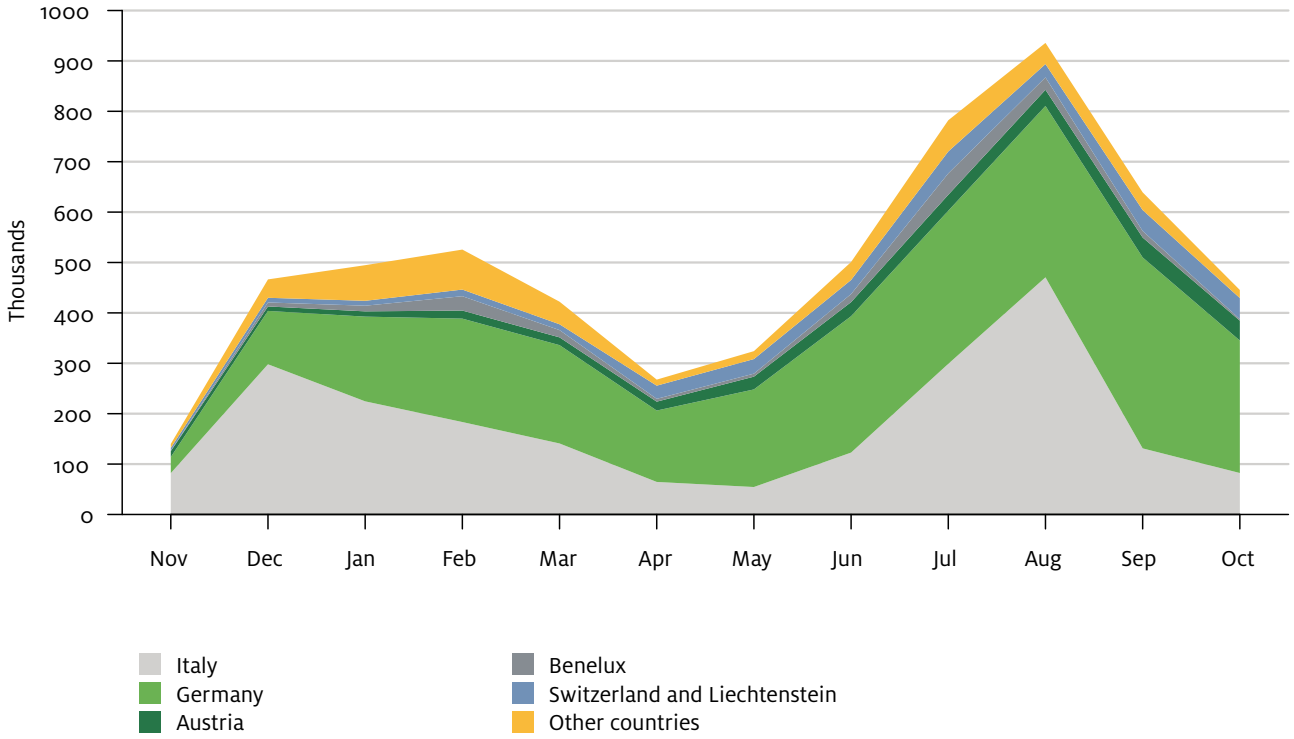


Figure 9. Total tourist arrivals by month and market, South Tyrol 2011-2020. Monthly average values in thousands.
Source: ASTAT, data available on demand.

Figure 9 shows the average number of tourist arrivals per month in South Tyrol in the last 10 years, distinguished by market of origin. One can clearly identify a seasonal pattern, which is characterized by a winter and a summer season. This can be explained by climatic and weather-related conditions, which make these periods ideal for outdoor activities (e.g. hiking, mountain biking and skiing). In addition, cultural/religious events and festivities such as Christmas and the popular Christmas markets are likely to contribute to the seasonal peaks. The overall seasonality pattern has remained relatively stable over the last 20 years, although absolute numbers of arrivals have increased. Regarding the countries of origin, proximity markets (in particular Italy and Germany) clearly prevail over long-distance markets. The various countries of origin display different seasonal patterns. While Italian tourists arrive predominantly in December (14.3%) and August (21.6%), the arrivals of German visitors are more evenly distributed across the year. Tourists from the Benelux countries display a particularly high concentration in July (23.9%), whereas guests from other countries (i.e., long-distance markets) tend to visit South Tyrol in the wintertime. This long-term seasonal pattern has been further pronounced by the pandemic, with the two peaks having become more condensed and higher in 2020 compared to the period from 2011 to 2020 portrayed in Figure 9. In five months of the year (March, April, May, November and December), virtually no tourist arrivals were registered, implying a much shorter winter season than usual.

1.2 PERCENTAGE OF TOURIST ARRIVALS OCCURRING IN PEAK MONTHS BY MUNICIPALITY

Looking at the number of arrivals at the municipal level in the last ten years (2011-2020) confirms their concentration in the two main seasons. Among the ten municipalities with the highest tourism exposure, eight experience their peak of arrivals in August, when Italians are likely to go on holiday. For the remaining two it is in February, during the winter holidays. These are Wolkenstein in Gröden/Selva di Val Gardena and St. Ulrich in Gröden/Ortisei, which are situated in the Dolomites World Heritage Site (WHS) and are well-known for ski tourism. The highest concentration in one month is reached in Dorf Tirol/Tirolo, where 17.6% of annual guests arrived in August, followed by Wolkenstein in Gröden/Selva di Val Gardena (17.0% in February) and Corvara/Corvara in Badia (17.0% in August). The phenomenon of seasonal peaks is, however, not restricted to highly touristic areas. Also many municipalities with low or average tourism exposure experience high seasonal peaks, mostly in the month of August. They are sometimes even stronger than in more touristic places, reaching 20% of annual arrivals and more in one month (e.g. in Laurein/Lauregno, Proveis/Proves, and Glurns/Glorenza).

1.3 PERCENTAGE OF TOURIST ARRIVALS OCCURRING IN PEAK WEEKS BY MUNICIPALITY

In line with these observations, also the highest weekly concentrations among the municipalities with the highest tourism exposure lie in February (week 8) and August (week 33 and week 34). These weeks constitute the moments of the year with the highest demands to infrastructure such as road and railways. The three municipalities with the highest shares are Wolkenstein in Gröden/Selva di Val Gardena (4.5%), Abtei/Badia (4.5%), and Corvara/Corvara in Badia (4.4%), all of which lie in the south-eastern part of the province in the Dolomites WHS and have their peak week in February. In terms of absolute numbers, Meran/Merano reaches the highest value with more than 10,000 guests in August (3.6% of yearly arrivals). As for peak months, also peak weeks are an issue in less touristic municipalities too, in some cases exceeding the maximum share of arrivals in one week of the year of highly touristic municipalities. In four of them, the share is above 6% (Laurein/Lauregno, Proveis/Proves, Moos in Passeier/Moso in Passiria, and Waidbruck/Ponte Gardena)


2

2 Employment

Employment within the tourism sector is a crucial area, as it impacts both the quality of life of the local population as well as tourist experience and, therefore, satisfaction. Monitoring the percentage of people employed within the tourism sector and comparing it to the other sectors is a good proxy of the importance of tourism within the overall local economy. At the same time, indicators related, for example, to gender equality help to understand the quality of such employment.
The gender composition of the workforce is a crucial aspect in this context, as it is widely recognized (see, for instance, Baum 2013) that the labor market is characterized by horizontal and vertical gender segregation, especially within the tourism sector. Women and men typically perform different jobs (horizontal segregation), with women working mostly as waitresses and cleaners and men as maintenance and construction workers, gardeners etc. Moreover, occupations at the lower level with few career developments are usually dominated by women, while men are more likely to hold managerial positions (vertical segregation) (see Campos-Soria et al. 2011).

2.1 NUMBER OF EMPLOYEES IN THE ACCOMMODATION AND FOOD SERVICE SECTOR

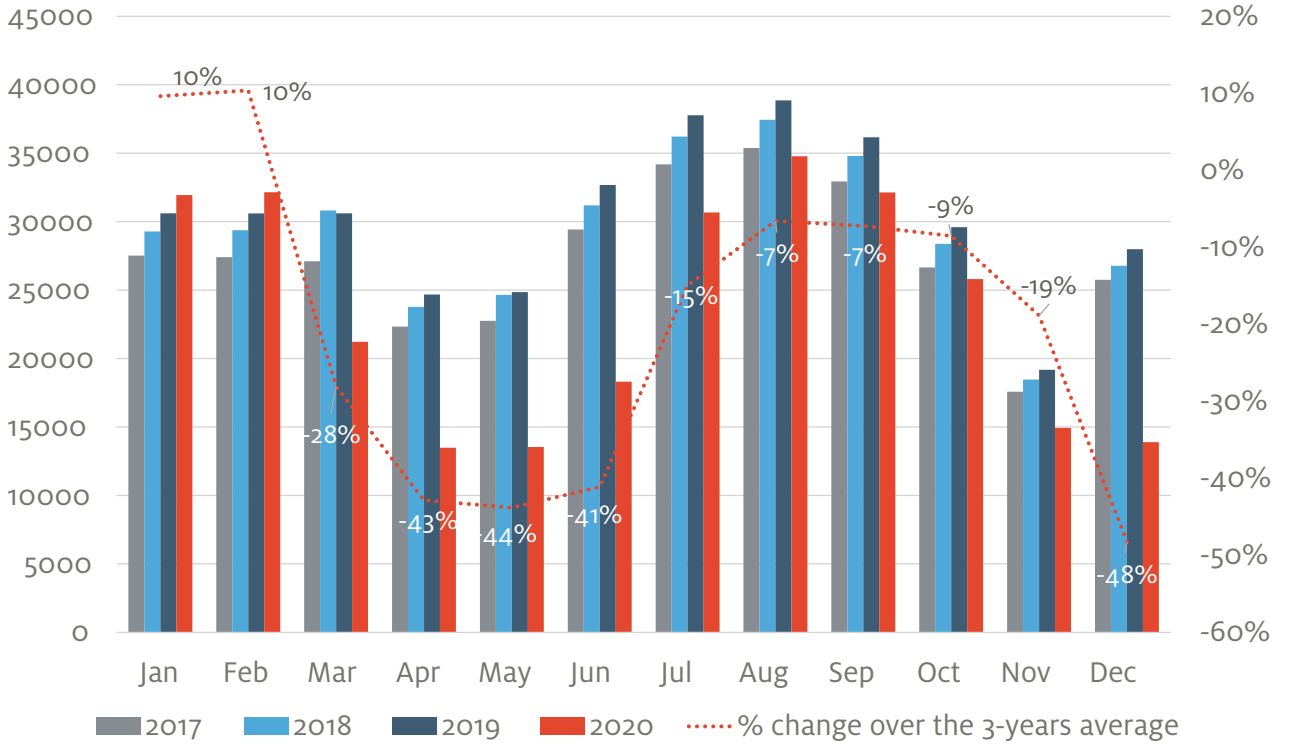


Figure 10: Employees in the accommodation and food service sector by month, South Tyrol 2017-2020 and percentage difference values over total the 3-previous-years average. Source: AMB, data available on demand.

Employees in the accommodation and food service sector make up about 15% of total employment in South Tyrol. In 2020, the pandemic hit this sector heavily: the closure of borders and travel restrictions between regions drastically reduced the number of tourists and thus potential customers (see Chapter *The Impact of Covid-19 Pandemic on Tourism in South Tyrol*). Not being able to work implies that the proportion of employed people dropped dramatically in almost every month of the year. Figure 10 shows us how, compared to the average for the same month in the previous three years, the number of people employed fell drastically even in the months in which employees were able to work. The worst months were those in which restrictions were most restrictive, such as April and December 2020. Additionally, in May and June, the partial reopening and uncertainty about the rules limited the number of hirings consistently in comparison with the same month in the last three years. It is important to mention the fact that the numbers displayed in Figure 10 refer to employees and do not include the self-employed. They also exclude all other tourism-related economic activities (e.g. museums, natural parks, commercial activities). Thus, the total share of workers (employees and self-employed) in the tourism sector who was not employed might be higher. Employment in the tourism sector is highly seasonal with notable differences between the two sub-sectors.

2.2 PERCENTAGE OF FEMALE ENTERPRISES IN THE ACCOMMODATION AND FOOD SERVICE SECTOR

Among the 8,108 enterprises active in the accommodation and food service sector in 2020, 2,851 (35.2%) were defined as female enterprises according to the definition provided by the Institut für Wirtschaftsforschung (Institute of Economic Research, hereinafter WIFO) of the Chamber of Commerce of Bolzano[1]. Data from 2020 witness a slight increase in the percentage of female enterprises, given that this percentage was relatively stable around 33% between 2014 and 2018. This is due to both an increase in the overall number of active enterprises within the sector, as well as in the number of female enterprises.

1 Data are based on Stockview (Infocamere), Infocamere is the digital innovation company for the Italian Chambers of Commerce, which manages the data coming from the Companies Registers in Italy.


3

3 Economic benefits at the destination level

Tourism brings economic growth and prosperity to regions (Brida & Risso, 2009). Tourism creates jobs, fosters private investment, and increases public spending in infrastructure. In South Tyrol, tourism plays a central role for the local economy. Besides employing more than 30,000 people, the tourism industry also contributes a significant share to the local gross domestic product. The monitoring of the value added by the hotel and food service industry over time is a good proxy of the relative contribution of tourism to total GDP, since the last tourism satellite account of South Tyrol refers to 2007/2008. Further indicators to assess the economic benefit of tourism at local level are reports by entrepreneurs on their profit situation, and the occupancy rate of accommodation facilities by tourism exposure. Combining objective indicators (value added and occupancy rate) with a subjective assessment of profit situation and issue area 2 on employment provides a well-structured image of the local benefits related to tourism. Within this issue area, a think tank has been established in order to reflect on the concept of post-growth society, i.e., how tourism can be measured according to new criteria, that do not necessarily take into consideration the mere economic growth.

3.1 VALUE ADDED BY INDUSTRIES

Table 2 depicts the relative contribution of single industries to total value added (economic output). The percentage value in the fourth line represents the share of the tourism industry. In 1995, the tourism industry produced goods and services corresponding to a nominal worth of 1,345.8 million EUR, 12.7% of the total output.

In 2018, the sum of all goods and services produced by the tourism sector amounted to almost 2,510.8 million EUR, which corresponds to 11.2% of the total output. If we exclude the public sector, tourism is the third most important driving force of the South Tyrolean economy.

Sector	Contribution to the total GVA (2018)
Public Administration; Arts; Other Services	21.3%
Manufacturing	11.9%
Trade; Rep. Motor Vehicles	11.6%
Accommodation and Food Service	11.2%
Real Estate Activities	10.2%
Prof., Scient. and Techn. Act.; Admin., Supp. Serv. Act.	6.8%
Construction	5.7%
Financial and Insurance Activities	5.5%
Agriculture, Forestry, Fishing; Mining	5.3%
Energy; Water	4.8%
Transportation and Storage	3.9%
Information and Communication	1.8%

Table 2: Sectoral share of value added in South Tyrol, 2018, Source: ASTAT

The difference to the other driving sectors is not large if we consider that national account data does not take into account the induced economic activities produced by tourism, i.e. how much the output of other sectors depends on demand from the tourism sector itself. Referring, for example, to the input-output tables released by ASTAT in 2019 for the year 2015[2], around 44% produced by food manufacturing is directed to the accommodation and food service sector. On the other hand, outside the official statistics, a more accurate estimate is difficult to provide given the incidence of other intervenient factors. A very insightful result comes from the Tourism Satellite Account provided by ASTAT[3] for the economic year 2008. They showed how considering the induced effects (i.e. the effects resulting from the reuse of income) increases the incidence of tourism value added from 11.2% to 16.2%.

2 Tavola Input-Output 2015, ASTAT, report n.13, 02/2019, https://astat.provincia.bz.it/it/news-pubblicazioni-info.asp?news_action=4&news_article_id=624153

3 Impatto economico del turismo, L'utilizzo del Conto Satellite del Turismo, ASTAT, report n.15 03/2012, https://astat.provincia.bz.it/it/news-pubblicazioni-info.asp?news_action=4&news_article_id=389255

3.2 EARNINGS SITUATION FOR THE ACCOMMODATION AND FOOD SERVICE SECTOR

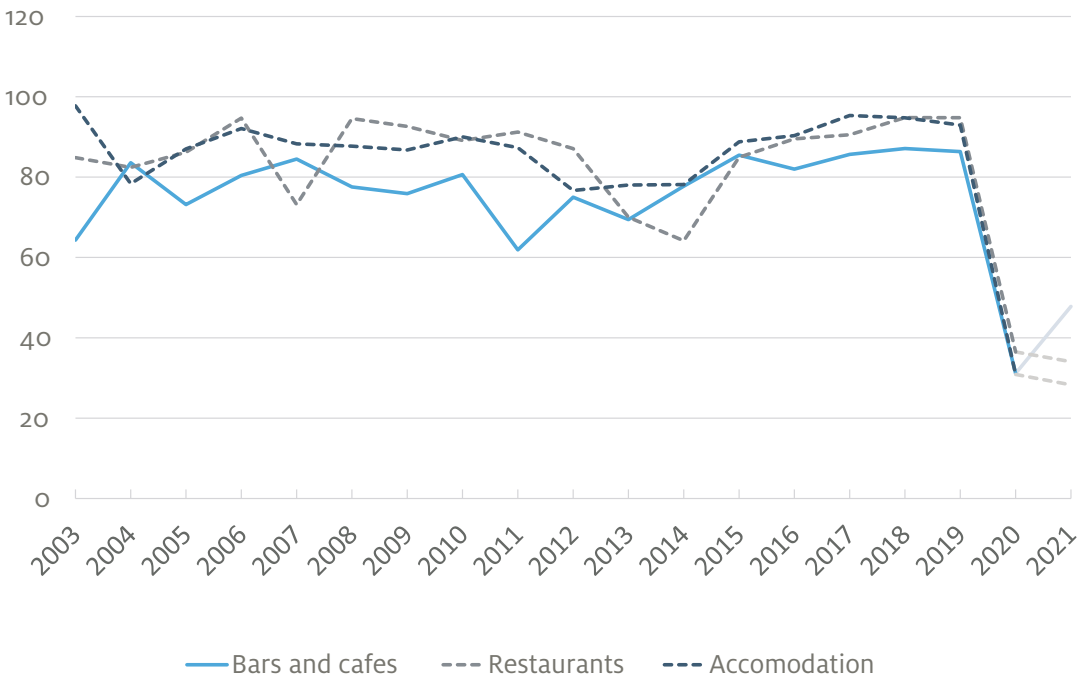


Figure 11: Earnings situation in the accommodation and food service sector, South Tyrol 2008 – 2020 Index and expectations for 2021. Source: WIFO, data available on demand, own elaboration.

Figure 11 illustrates the profit situation for hotels (Accommodation), restaurants and bars and cafes in South Tyrol. The indicator is based on business tendency surveys conducted by WIFO among a large panel of firms. At the beginning of each year, WIFO asks firms to assess their profit situation of the past year. Therefore, we report the reference year and not the survey year. The graph reports the share of enterprises for each subsector of the tourism industry who have reported an at least satisfactory profitability in the reference year. Between 2003 and 2015 the satisfaction of enterprises fluctuated around 80% for all categories within the tourism industry. Bar and cafes were a bit less happy about their profits in the same period. After 2015, the share had been above 80% until 2019. The dramatic drop due to the pandemic led to a loss of about 55%, on average, for all categories. Expectations for 2021 tend to be more optimistic for bars, but remain low for restaurants and accommodation.

4

4 - Governance

Monitoring different steering approaches with regard to sustainability is key to understand local decision-making capacities, observe the presence of a common vision and strategy and track the coherence of local and cross-sectoral policies. In the following section, sustainable certification schemes and labels that appear relevant for the tourism sector are presented.

4.1 NUMBER OF MUNICIPALITIES, ACCOMMODATION FACILITIES AND EVENTS INVOLVED IN VOLUNTARY CERTIFICATION SCHEMES FOR SUSTAINABILITY

R

A possible way to grasp local steering mechanisms at destination level is to monitor voluntary certification schemes adopted by stakeholders in the tourism sector. In South Tyrol, these include both municipal certification strategies (ComuniClima and Alpine Pearls), certification schemes in the accommodation sector (Bio Hotels, ClimaHotels, Ecolabel) and events certified as "Green" or "Going Green".

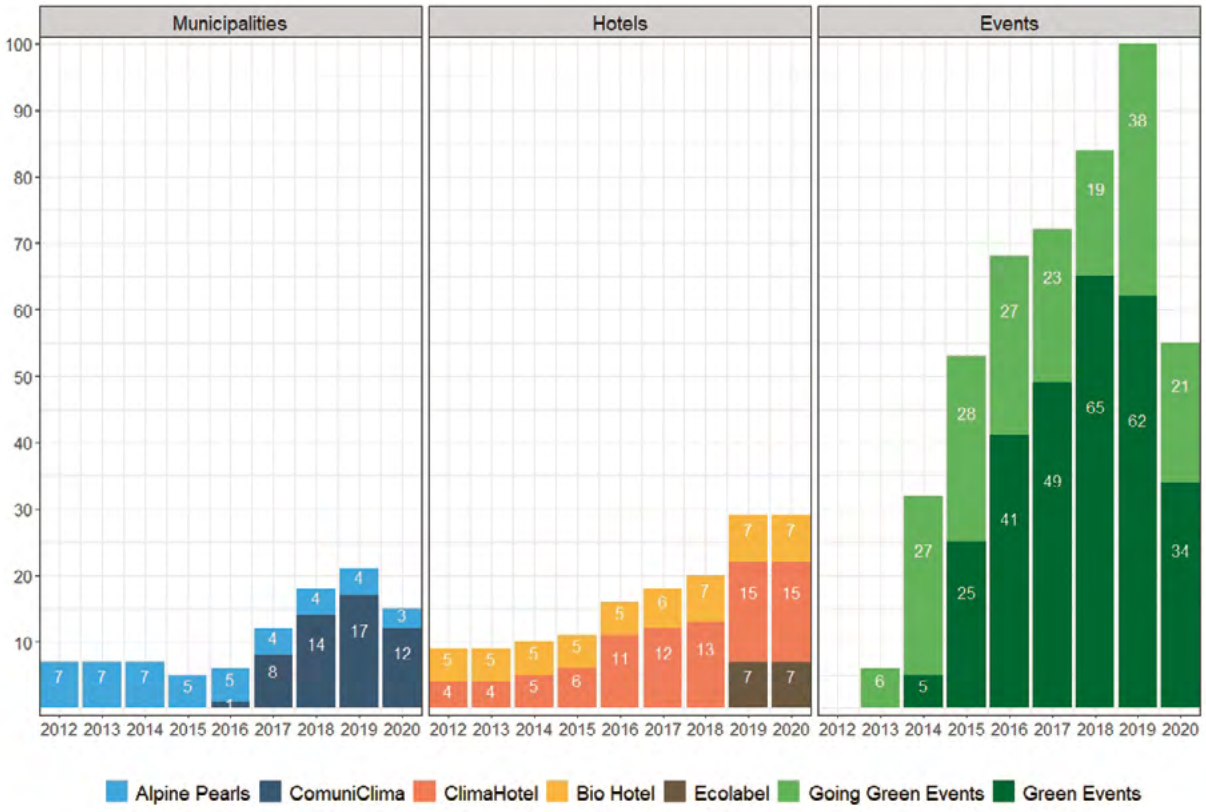


Figure 12: Number of sustainability certifications for accommodation facilities, municipalities and events, 2012 – 2020.
Source: Bio Hotels, KlimaHaus, ISPRA, Provincial department for waste management. Data available on demand, own elaboration.

Figure 12 shows the temporal development of stakeholders' sustainability engagement since 2012. It is observable that sustainability schemes have become more diversified over time both for municipalities, hotels and events. Moreover, the total number of awarded certifications has significantly increased until 2019, but dropped considerably in 2020. In this context, the impact of the pandemic has played a significant role, in particular for what concerns the certification of "Green" or "Going Green" events, as the holding of events was generally impossible during the various lockdowns and heavily restricted throughout the whole year. On the other hand, sustainability certificates in the accommodation sector, namely "Bio Hotels", "Climahotels" and "Ecolabel", have not experienced any changes since 2019. This could be due to the steady importance of environmentally friendly tourism in general, as well as to more exigent and conscious tourist preferences in times of a global pandemic. It should be noted here that there might be additional certifications and labels adopted by different institutions (e.g. GSTC certifications of hotels), that are not presented because of data lack or unavailability.

BOX 2 :

INITIATIVE FOR SUSTAINABLE TOURISM DEVELOPMENT OF SOUTH TYROLEAN DESTINATIONS

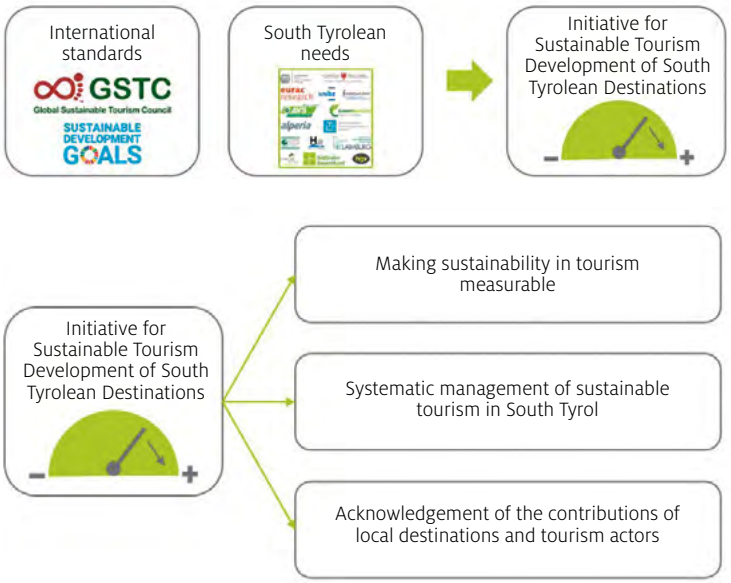
IDM South Tyrol stands for Innovation, Development and Marketing and is a signpost for economic sustainable development in South Tyrol. Thereby, IDM Südtirol creates the framework that ensures a sustainable development for entrepreneurs in South Tyrol. The "Initiative for Sustainable Tourism Development of South Tyrolean Destinations" is intended to make sustainability in tourism measurable and give destinations and tourism stakeholders appropriate recognition for their achievements.

It is based on the criteria of the Global Sustainable Tourism Council (GSTC), an international UN-supported organisation that defines guidelines for sustainable tourism and sustainable travel and has established one of the most reliable and credible certifiable standards for sustainable tourism. Together with representatives from science, business, tourism and society, these standards have been expanded by IDM to include region-specific elements in order to implement the international guidelines at regional and local level in the best possible way. An important cornerstone here are the findings from the annual reports of the Sustainable Tourism Observatory of South Tyrol (STOST). The "Initiative for Sustainable Tourism Development of South Tyrolean Destinations" covers four major areas: management, socio-economy, culture and ecology.

The area of management specifies the basics for sustainable management of the destination, such as a long-term sustainability strategy and a corresponding implementation plan for sustainable tourism. The area of socio-economy ensures that tourism is accessible to all and that other economic sectors also benefit from tourism, e.g. by promoting regional cycles and the interaction of agriculture and tourism. The area of ecology intends to reduce the impact of tourism on the environment, which can be done, among other things, by promoting biodiversity. And in the area of culture, everything revolves around how to preserve the country's cultural assets and make them accessible to guests and the population.

The "Initiative for Sustainable Tourism Development of South Tyrolean Destinations" functions primarily as a tool for a more sustainable orientation of tourism destinations. The criteria and indicators are intended to help decision-makers and employees of a destination to better understand the various aspects of a "sustainable destination" and can also be seen as inspiration for various measures. Destinations that meet the defined criteria and take appropriate measures can certify their efforts in an audit by an external organisation and receive an internationally recognised certificate.

In the first phase, four destinations in South Tyrol will be accompanied by IDM Südtirol on their way to certification. Subsequently, the project "Initiative for Sustainable Tourism Development of South Tyrolean Destinations" will be extended to other destinations in South Tyrol. Eventually, the index will also be extended to accommodation businesses in order to bring the sustainable development of South Tyrolean tourism to other levels as well.



4.2 NUMBER OF "RED ROOSTER" BRANDED AGRITOURISM VENTURES PRODUCING AND SELLING REGIONAL PRODUCTS

The South Tyrolean quality label for agritourism “Red Rooster” certifies a wide range of products, such as fresh fruit and vegetables, fruit juice, fruit syrup, jam, dried fruit, sauces and pickles, spirits, vinegar, herbs, dairy products, fresh meat, bacon and sausages, bread, pasta, and cereals as well as free range eggs and honey. Wine was additionally introduced in 2020. A total of 74 South Tyrolean farms produced Red Rooster branded products in 2020, representing an increase compared to the 66 farms involved in 2019. Similarly, the total number of Red Rooster labeled products for sale increased from 57 in 2005 to 687 in 2019 and to 705 in 2020. The development for regional products thus seems to be on a steady rise. (Source: Red Rooster, 2021, data available on demand).

4.3 ORGANIC MILK SOLD TO MEMBERS OF THE MAIN LOCAL BUYING SYNDICATE

Similarly, the demand for organic products – and particularly organic milk – in the food and accommodation service sector seems to be rising. In fact, since 2016, the sale of organic milk as compared to the sale of non-organic milk has increased from 0.6% up to 24% in 2020. However, the heavy reduction in tourist overnight stays due to the Covid-19 pandemic has lowered the overall demand of milk in the accommodation and food service sector by 39%. Nevertheless, compared to 2019, organic milk demand has risen by 1% in absolute terms, showing that the interest and awareness of local stakeholders and tourists for high-quality, locally produced, and certified regional products persists (Source: HOGAST, 2021, data available on demand).


5

5 Local and visitor satisfaction

Sustainable tourism implies considering both the positive and negative effects of tourism on the local population and on visitors, trying to stimulate the former, while avoiding or minimizing the latter (UNWTO, 2004). This requires a continuous effort in monitoring the level of satisfaction of both groups. In doing so, concerns, potential problems and conflicts can be detected and addressed, even before they can enfold a negative impact on the guest-host relationship. In the following, we present various indicators which aim to measure the local and visitor satisfaction both directly (e.g. the percentage of guests satisfied with their holiday in the destination) and indirectly (e.g. inflation effects on rent prices).

5.1 TOURISM INTENSITY INDEX

Tourism intensity is the ratio of the average daily overnight stays in tourist accommodation establishments relative to the total permanent resident population of the area (see **Annex 2**). Between 2014 and 2019, tourism intensity has continuously increased (from 15.03 to 17.30), implying a rising presence of tourists compared to inhabitants, driven by the steady increase in overnight stays over the same period (see **Figure 1**). In 2020, however, the value fell to 11.12, due to the general sharp decline in overnight stays as a result of the Covid-19 pandemic (see **Table 3**). It is important to be aware of the high variance of this indicator across the provincial territory (https://sustainabletourism.eurac.edu/issue-area/local-and-visitor-satisfaction/). As in previous years, also in 2020, some municipalities experienced a much higher tourism intensity than the provincial average, such as Corvara/Corvara in Badia (141.6) and Wolkenstein/Selva di Val Gardena (96.4).

5.2 DIFFERENCES IN RENT PRICES BETWEEN TOURISTIC AND NON-TOURISTIC MUNICIPALITIES

High touristic intensity is likely to pressure upwards inflation on goods, prices and accommodation. In order to be able to identify a possible impact of tourism on rent prices, indicator 5.2 in **Table 3** shows the differences in rent prices between municipalities with high and low tourism exposure. In 2011, the average minimum price per square meter in municipalities with high tourism exposure was 2.8€/m^2 higher than in municipalities with low tourism exposure. This gap has widened over time, increasing by more than 10% between 2011 and 2019. What this implies is, first, that people living permanently in highly touristic locations need to pay more for renting a flat than residents of less touristic places, and second, that they are also subject to a higher inflation of rent prices. House owners in these municipalities, on the other hand, benefit from higher (and faster rising) rents. In the long run, such a phenomenon might cause an erosion of the number of houses rented to the stable population and an increase in temporary rental services, such as Airbnb. While, in 2020, the Covid-19 pandemic has caused the widening of this gap between rents in highly and less touristic municipalities to stop, this stop is expected to be only of temporary nature.

Indicator			Absolute values		Percentage change	
5.1	Tourism intensity		2011	2020	2011-2019	2019-2020
			15.7	11.1	+10.3%	-35.7%
5.2	Differences in rent prices between touristic and non-touristic municipalities		2011	2020	2011-2019	2019-2020
			+2.8 €/m2	+3.1 €/m2	+10.4%	-0.8%
5.3	Percentage of guests satisfied with prices	... of the accommodation	2013	2020	2013-2020	
			95.4%	76.8%	-19.5%	
		... of the food service	2013	2020	2013-2020	
			90.8%	73.7%	-16.7%	
5.4	Percentage of guests satisfied with their holiday in the destination		2013	2020	2013-2020	
			98.3%	98.8%	+0.6%	
5.5	Percentage of residents for whom the advantages of tourism in the destination outweigh its disadvantages		2018 [1]	2020 [1]	2018-2020 [1]	
			95.0%	77.2%	-18.7%	

Table 3: Indicators for local and visitor satisfaction. Sources: ASTAT (5.1), Agenzia del Territorio (5.2), ASTAT and Eurac Research (5.3 and 5.4), HGV and Eurac Research (5.5). [1] It is to be noted that due to different sampling strategies, the comparability of the percentage values for 2018 and 2020 is limited.

5.3 TOURIST SATISFACTION WITH PRICES

Notwithstanding the higher level of prices in touristic municipalities, a survey conducted by Eurac Research (see Chapter *The Impact of Covid-19 Pandemic on Tourism in South Tyrol*), representative for the guests arriving in South Tyrol between August and October 2020, shows that 76.8% of tourists were satisfied with prices of accommodation facilities (see **Table 3**). Yet, if compared to the results of another representative survey conducted by ASTAT and Eurac Research in the summer of 2013 (ASTAT, 2015), where satisfaction levels reached 95.4%, we can observe a negative trend (-19.5%). A similar development is reported for the level of satisfaction of guests with the food service, which fell from 90.8% in 2013 to 73.7% in 2020. While this harsh decline might reflect an increased price sensitivity, it might also be related to the different samples of the surveys: in 2013, guests in all types of accommodation facilities were interviewed, whereas the 2020 survey only included guests staying in hotels, where prices tend to be higher than in other accommodation facilities. Another plausible explanation could be the aggravated financial situation among guests as a result of the pandemic, or the changed composition of the origin of guests, given that visitors from different markets tend to have different spending powers. In fact, in September and October, the share of Italian tourists among total tourists was much higher than in previous years. By contrast, the percentage of German visitors was much lower than usual during the same period.

5.4 TOURIST SATISFACTION WITH OVERALL STAY

In terms of the overall evaluation of their holiday in South Tyrol, 98.9% of visitors reported high levels of satisfaction. This value has remained stable when compared to the value in 2013 (98.3%). This hints at a very positive overall subjective experience of guests in the destination, which can lead to positive word-of-mouth endorsements, recommendations and repeat visits (Žabkar et al., 2010). In order to keep track of future developments of tourist satisfaction, we plan to repeat this survey among guests in the destination every two years. This would allow to identify critical changes in the level of satisfaction (as well as in demands and needs) and react to them timely and adequately.

5.5 LOCAL POPULATION'S PERCEPTION OF THE OVERALL IMPACT OF TOURISM ON THE DESTINATION

An additional representative survey was conducted by Eurac Research in December 2020 among the local population (see Chapter *The Impact of Covid-19 Pandemic on Tourism in South Tyrol*). It revealed that 77.2% of South Tyrolean households believed that the advantages of tourism in South Tyrol outweigh its disadvantages (see **Table 3**). While this number is high in absolute terms, comparing it to the results of a previous study, conducted in 2018 by the local association of firms operating in the hospitality industry, shows that the attitude of the local population towards tourism might actually have deteriorated. In fact, in 2018, 95.0% of survey participants saw tourism as beneficial for the destination overall. Although the two studies are not perfectly comparable due to different sampling strategies, the fact that the items asked were identical and the survey designs very similar, justifies the use of the 2018 results as a benchmark.
A factor that might have contributed to this potential decline is the role the tourism sector has played during the pandemic. Indeed, in the 2020 survey, around 80% of the households reported to believe that tourism had increased Covid-19 numbers in South Tyrol. This hints at the importance of monitoring the local population's perceptions, making it possible to identify emerging issues and concerns and address them. It is planned to repeat this survey on a regular basis in the upcoming years.


6

6 Energy management

The tourism industry requires vast amounts of energy to produce and provide its products, services and visitor experiences. Since the total (direct as well as indirect) energy consumption of the tourism sector is quite difficult to capture, in the following, we focus on areas in which the consumption of (electric) energy is relatively easy to attribute to the tourism industry: accommodation facilities, ski lifts and snow cannons. In addition, we monitor the number and geographical location of charging stations for e-mobility. The support for e-mobility is among the most prominent strategies for climate mitigation promoted in South Tyrol.[4] It is crucially dependent on the availability of charging infrastructure. This relates to tourism in two ways: on the one hand, charging stations in accommodation facilities are usually open not only to guests, but also to the local community, creating an indirect positive effect on the destination as well as the local population. On the other hand, the existence of a capillary e-mobility infrastructure might encourage tourists to use e-vehicles during their stay, contributing to a general shift towards fossil-free, climate-friendly forms of mobility (Scuttari and Isetti, 2019).

4 www.greenmobility.bz.it/en/

6.1 ESTIMATED MINIMUM ELECTRICITY CONSUMPTION IN ACCOMMODATION FACILITIES

We estimate the amount of electricity consumed by tourists based on overnight stays and coefficients for electricity consumption per accommodation category (Bundesministerium für Wirtschaft, Familie und Jugend, Wirtschaftskammer Österreich, Fachverband Hotellerie, Fachverband Gastronomie, Österreichische Hoteliervereinigung, 2011). These coefficients represent the energy consumption of an energy-efficient accommodation facility in South Tyrol. Hence, the estimate is to be interpret as a lower bound. Indicator 6.1 in Table 4 shows that between 2011 and 2019, the minimum electricity consumption has steadily increased, reaching 278 million kWh in 2019. However, due to the Covid-19 pandemic and the restrictions on travelling put in place, in 2020, this value fell by 42.7% to 159 million kWh. In 2018—the latest year where we have data for the total electricity consumption in South Tyrol—accommodation facilities thus accounted for at least 9% of the region's total electricity consumption (equal to 3,129 million kWh, ASTAT[5]).

Table 4: Indicators for energy management. Sources: own calculation based on data from ASTAT (6.1), Agenzia del Territorio and ASTAT (6.2), Neogy and Tesla (6.3).

Indicator		Absolute numbers		Percentage change	
6.1	Estimated minimum electricity consumption in accommodation facilities	2011	2020	2011-2019	2019-2020
		234 million kWh	159 million kWh	+18.7%	-42.7%
6.2	Electricity consumption by ski lifts and snow cannons	2011	2018	2011-2018	2017-2018
		116 million kWh	150 million kWh	+29.2%	-1.2%
6.3	Number of charging stations offered for e-mobility in accommodation facilities and public spaces	2019	2021	2019-2021	
		300	366	+22.0%	

6.2 ELECTRICITY CONSUMPTION BY SKI LIFTS AND SNOW CANNONS

Being surrounded by mountains, skiing and snowboarding represent important activities for tourists in South Tyrol. However, due to increasing temperatures (+0.8°C in winter since the 1960s in South Tyrol) and the trend towards less snowfall – two phenomena related to humanly induced climate change (Zebisch et al., 2018) – winter sports are increasingly dependent on artificial snow making. In 2018, a total of 4,132 snow cannons operated on the 3,868 ha of ski slopes in South Tyrol to ensure snow quality standards, extend the ski seasons and counterbalance moments of scarcity of natural snowfall (ASTAT, 2019). The energy consumed by artificial snowmaking systems and ski lifts rose from 116 million kWh in 2011 to about 150 million kWh in 2018, implying an increase of 29% (see Table 4). However, compared to the previous year, less electricity was consumed in 2018 (-1.2%).

5 https://astat.provinz.bz.it/de/raum-umwelt-energie.asp

6.3 NUMBER OF CHARGING STATIONS OFFERED FOR E-MOBILITY IN ACCOMMODATION FACILITIES AND PUBLIC SPACES

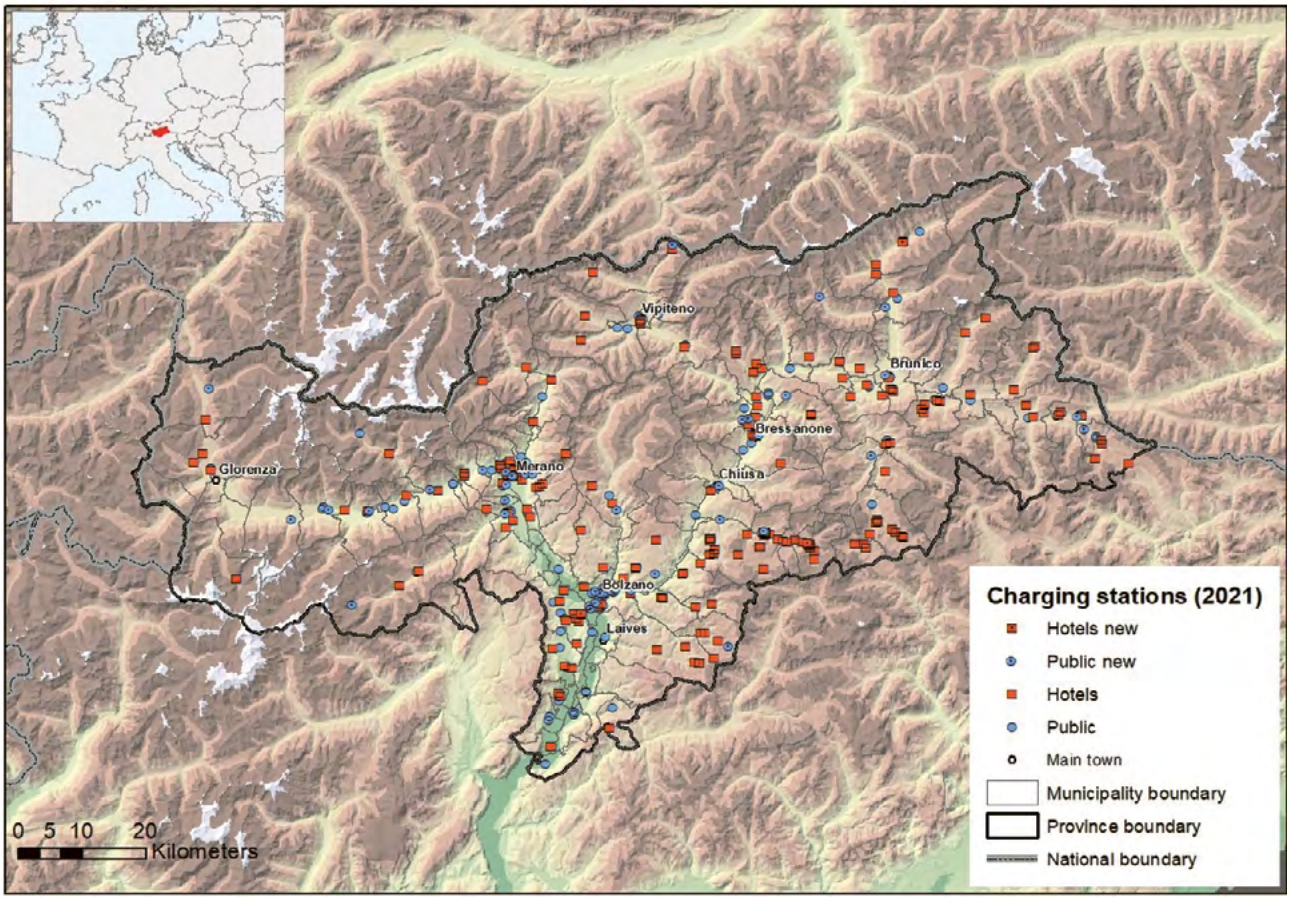


Figure 13: Map of hotel-based and other charging stations for e-mobility, South Tyrol 2021.
Source: Neogy and Tesla, elaboration by Eurac Research.

Figure 13 depicts the location of e-mobility charging stations in accommodation facilities (in red) and in public spaces (in blue) available in South Tyrol (as of April 2021). New stations are marked with an additional black point. Out of the 366 stations available, 206 are located in accommodation facilities (56.3%). This underlines the major role the accommodation sector plays in promoting e-mobility. Compared to the previous year, there were 47 new charging points (43 of which in public spaces, hinting at the increased public effort to foster e-mobility), while 3 have been closed (2 of which in accommodation facilities). The South-Eastern part of the province, which has the highest tourism intensity and accommodation density, shows a higher concentration of charging stations. This might suggest that more touristic areas are more reactive to sustainability challenges, with local businesses trying to leverage on e-mobility to sharpen their strategic positioning.


7-8

7 and **8**
Water & Waste water management

Fresh water represents a central resource for tourism. Tourists consume fresh water directly, e.g., for hygienic purpose or drinking, and indirectly, e.g., for the irrigation of gardens, to fill up swimming pools and supply wellness and spa facilities, and for cleaning rooms and washing bed and table linen. Moreover, in tourism water is also needed for leisure activities, such as swimming, golf and skiing (Gössling, 2015). Thereby, tourism affects not only water use, but also waste water treatment. In order to better understand the link between water and tourism, STOST monitors the water consumed as well as waste water generated by tourism in South Tyrol. Due to climate change, which causes reduced snowfall and a greater evapotranspiration, water is an increasingly scarce resource in South Tyrol (Zebisch et al., 2018), and in the future there might be cross-sectoral conflicts for its use, e.g. between tourism and agriculture in rural areas. Monitoring water consumption is therefore essential to foresee and warn local stakeholders against potential water shortages and stresses. However, direct data on tourism-related water use are only partly available. Therefore, we estimated water use in accommodation facilities using literature-driven coefficients specific for each hotel category (see **Annex 2**). In addition, we also included available data for water consumption by snow guns. Figure 14 displays the water used to produce artificial snow in South Tyrol.

7.1 WATER USED BY GUNS

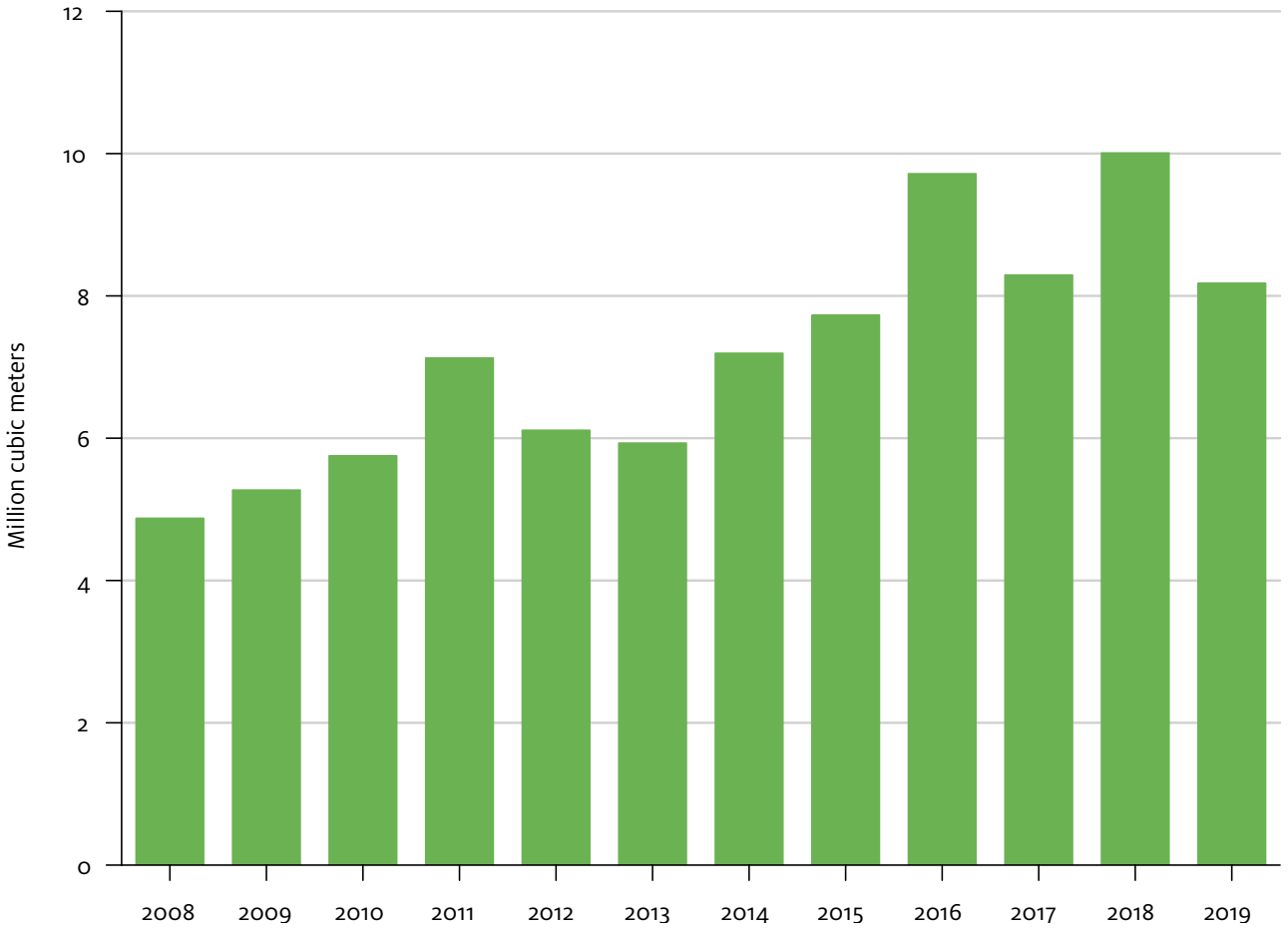


Figure 14: Water used by snow guns, South Tyrol 2008-2020. Million cubic meters. Source: APAC , own elaboration.

8.1 DISCHARGE OF SEWAGE WATER ATTRIBUTABLE TO TOURISM

According to the data provided by APAC (2015), it is possible to classify users connected to sewerage and sewage treatment plants in four main categories: industry, residents, tourists, and others. To estimate the capacity of these plants, APAC calculates the number of estimated users per category. While resident users are estimated based on population data, tourists are assessed by calculating a population equivalent according to hydraulic engineering standards that link back to available beds in accommodation facilities. Therefore, total users connected to sewerage and sewage treatment plants in South Tyrol were estimated at around 1,684,160 in 2014. Among them, tourists amount to 397,327, making up 23.6%. It should be noted here that this is an upper-bound assessment of the impact of tourism on waste water, and that more specific and more recent data should be generated in this field, as outlined above.

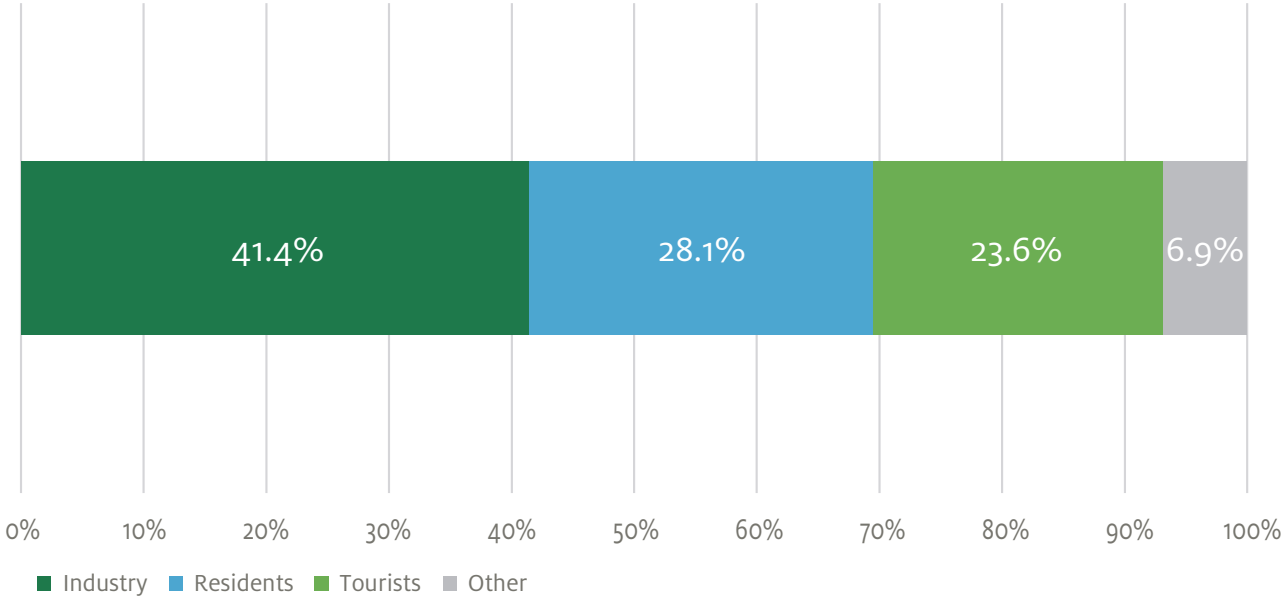


Figure 15: Users connected to sewerage and sewage treatment plants, South Tyrol 2014. Percentage values, population equivalent. Source: APAC (2015).


9

9 Solid waste management

Nearly all human activities generate solid waste. The academic literature shows that tourism-related activities produce amounts of waste well above those encountered in normal domestic usage (Hamele & Eckardt, 2006). In fact, they often expect higher standards of hygiene and a wider range of choices in food and other services, which translate into more waste. Moreover, while on vacation, people tend to use more disposable products than at home, a habit that also increases waste volumes. To mitigate the impacts of these phenomena, a good waste management system and well-made information policies for guests and staff members can help. In turn, to sensitize guests and staff members to waste reduction mechanisms, a solid background of knowledge on the waste volumes produced, and the management processes implemented is needed (UNWTO, 2004). Strategies to minimize waste generally include reduction, reuse, recycling, residual treatment, and residual disposal of waste: their adoption should be considered at destination level and particularly within accommodation facilities. An efficient waste management might also represent a source of cost savings for a tourism business, whose entity depends also on the business location and the local waste management regulations (Pirani & Arafat, 2014).

9.1 ESTIMATED WASTE PRODUCTION IN ACCOMMODATION FACILITIES

Notwithstanding the relevance of waste management for the tourism sector, the literature on the topic is very limited, making it difficult to pin down the impact of tourism on waste production. In order to circumvent this problem, similar to energy and water management, the decision was taken to estimate the production of waste in accommodation facilities using a coefficient retrieved from Hamele & Eckardt (2006) on the production of waste per overnight stay. The resulting graph shows the output of this estimation. As in the issue areas related to energy and water management, an additional effort is necessary in the future to produce more place-specific estimations.

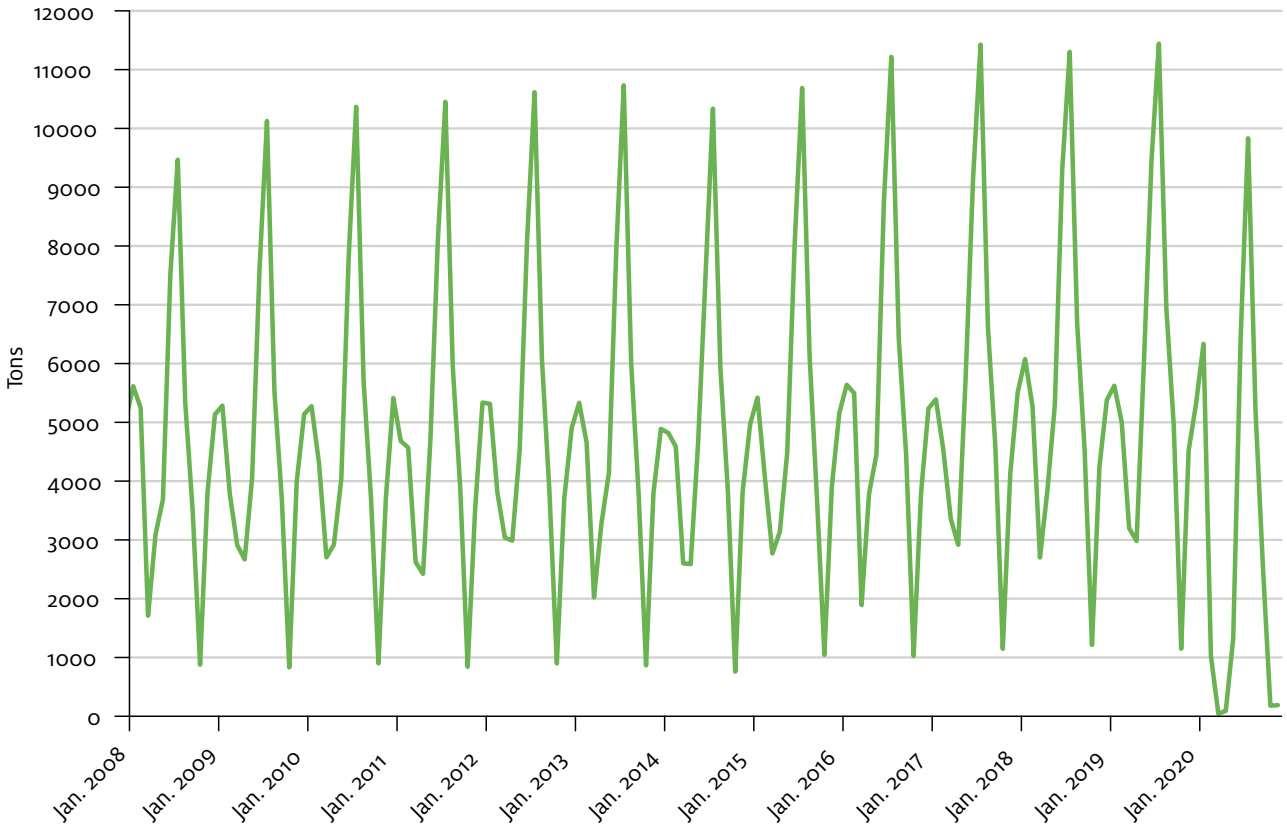


Figure 16: Waste production estimated for accommodation facilities by month, South Tyrol 2008-2020. Tons. Source: own elaboration.

The production of waste in accommodation facilities shows a clear seasonal trend, reproducing that of overnight stays: production rises in peak seasons (especially in August) and sharply declines in low seasons (April and November). Notwithstanding seasonality, waste production – like energy and water consumption – has been increasing throughout the last decade. In Spring 2020, tourist arrivals in dropped to almost zero a consequence of the Covid-19 pandemic. Hence, also waste production by tourist dropped to almost zero. Given that the estimated waste production in accommodation facilities in 2017 amounted to 32,436 tons, accommodation facilities are estimated to account for 9% of the total waste production (the total production of waste in South Tyrol in 2017 amounted to 347,900 tons, see APAC 2018).

10

10 Mobility

De-carbonising tourist mobility is key to achieve sustainable tourism as tourism without transportation is unconceivable. However, sustainable tourism transport is not only linked to carbon emission reduction: the sustainable use of land for transport infrastructure, efficiency in energy consumption for transport, air and noise pollution reduction are as much relevant, particularly for remote regions. Monitoring possible modal shifts towards more sustainable forms of transport that meet these objectives is crucial in this issue area. These include public transport, but also shared transport, e.g. car sharing, and the use of cable cars in Alpine contexts.

In South Tyrol, previous statistics showed that 85.5% of incoming tourists entered the region by means of private transport and 55.7% used this means to travel around during their holiday (ASTAT, 2009). During the pandemic the modal split has changed. Indeed, data from the INSTO sample survey in 2020 showed that both the percentage of arrivals by private means of transport slightly increased (88.8%, i.e. +3.3 percentage points), and the use of the car on site was much more common (reaching 69.9% , i.e. + 14.4 percentage points).

Indicators in this issue area were selected to show the actions taken to tackle this problem and shift modal choices towards public transport or shared use of vehicles, rather than to estimate the magnitude of impacts. The table below should offer a summarized overview over the magnitude and change of each indicator over the last year of data collection.

Indicator			Absolute values		Percentage change	
10.1	Mobilcards, bikemobil cards, museumobil cards and guest tickets	Activated cards	2012	2020	2012-2019	2019-2020
			255,700	1,180,846	+ 548.7%	-28.8%
		Uses	2012	2020	2012-2019	2019-2020
			1,066,437	2,955,814	+ 549.3%	-57.3%
10.2	Number of ski-lift and cable car users by season	Summer	2006	2018	2006-2018	2017-2018
			6,269,501	10,132,236	+61.6%	+7%
		Winter	2006	2018	2006-2018	2017-2018
			118,733,342	134,430,085	+13.2%	+1.1%
10.3	Kilometres travelled using car sharing services by non-local users	Kilometres	2013	2020	2013-2019	2019-2020
			1,286	24,806	+1,460.3%	+23.6%
		Trips	2013	2020	2013-2019	2019-2020
			13	213	+1,300%	+17.0%

Table 5: Indicators for mobility. Sources: ASTAT (2019,2020); STA - Südtiroler Transportstrukturen AG, Car Sharing South Tyrol.

10.1 MOBILCARDS, BIKEMOBIL CARDS, MUSEUMOBIL CARDS AND GUEST TICKETS

Mobilcards, i.e. tickets to use the integrated transport system and some additional services, can be purchased in hotels, tourist offices, train stations and local sale offices. They are valid for either one or three days or for a whole week. Furthermore, some special forms of Mobilcards include additional benefits: bikemobilcards allow tourists to rent bikes and to bring them in public transport, museumobil cards are at the same time travel ticket for public transport and admission ticket to around 80 museums in South Tyrol. All these benefits should promote more frequent and more easy travel with buses and trains. Since its introduction in 2006 we could observe a steady increase in both the activation and in the use of Mobilcards[6]. This trend was broken in the last year, probably due to the drop in tourist overnights and the Covid-driven fear to share public transport. In 2020 1,180,846 Mobilcards were activated, compared to 1,658,620 in the year 2016, which constitutes a decrease of 28.8%. An even bigger shrinkage can be observed in the use of the Mobilcards if comparing data to the pre-Covid year: in 2019 the cards were used 6,924,319 times on site, while in 2020 there were less than half the uses (2,955,814, corresponding to –57.3%). This means that not only the users were less, but also the frequencies of use decreased substantially. Indeed, we can also observe a lower average use of Mobilcards[7]. Since 2016 the average use of the Mobilcards was at around 4 times per card, while in 2020 the average use dropped to 2.5 times. This is consistent with the increase modal share of cars on site mentioned in the introductory section.

6 Each card can be initially activated (Activation) and then used repeatedly (Uses) in the according time limit.

7 Total number of uses divided by the total number of activations.

10.2 NUMBER OF SKI-LIFT AND CABLE CAR USERS BY SEASON

DF

Another form of transportation, especially to more mountainous destinations, is offered through cable cars and ski-lifts. The most recent data refers to the year 2018, which means that for this indicator, we cannot observe the change the pandemic caused. In general, we can observe a steady increase in the use of cable cars and ski-lifts over the last years (see Table 5). It should be noted that these figures include both tourists and locals. Since 2006 the use of cable cars and ski-lifts increased by 61.6% in summer and by 13.2% in the winter months. This unequal development can be connected to the fact that ski tourism has a long tradition in the region, whereas only recently some lift operators started to offer their lifts for transportation also during summer. Still, 134,430,085 users in winter correspond to about 93% of the total number of users in the year 2018. Both, in winter and in summer of 2018, a new record for the number of cable cars and ski lifts use could be recorded. In the summer months, a stronger growth can be observed with an increase of 7% compared to the previous year, which is related to the beforementioned trend. The use of cable cars and ski lifts in winter increased by around 1% compared to 2017.

10.3 KILOMETRES TRAVELLED USING CAR SHARING SERVICES BY NON-LOCAL USERS

R

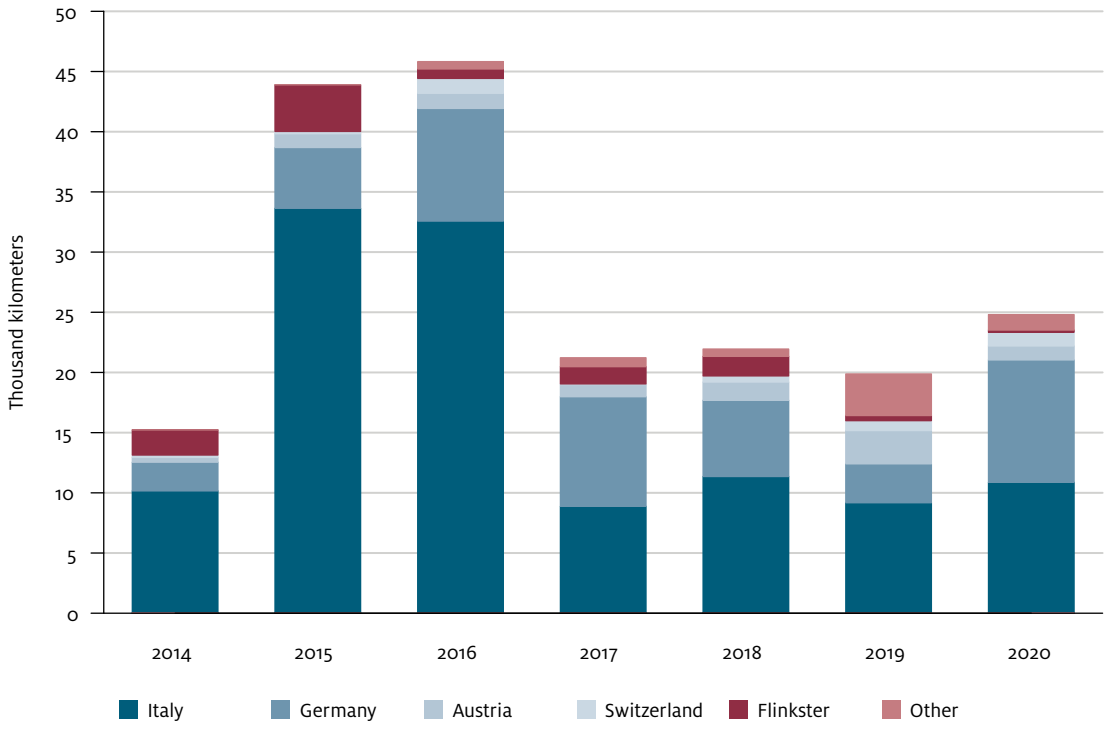


Figure 17: Kilometres travelled using car sharing services by non-local users, South Tyrol 2014-2020.
Source: Car Sharing South Tyrol, data available on demand, own elaboration.

Figure 17 illustrates the distances travelled by non-locals using car sharing services. Despite of, or precisely because of the pandemic we can observe an increase in the use and kilometers travelled with car sharing services. In respect to the previous year, 27 more trips were recorded. The beforementioned survey of guests in summer 2019 showed that the preferred transport mode in the last year to get around in the region was by car.

11

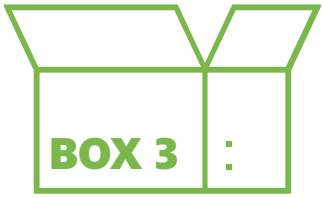
11 Land use and landscape diversity

A permanently environmentally friendly land use should contribute to the preservation of natural ecosystems, guarantee the supply of mankind with natural resources and thus not endanger the basis of life and economy of present as well as future generations. In the Agenda 21 formulated in 1992 the United Nations referred to the urgency and relevance of sustainable settlement development (Chapter 7) and to integrated, sustainable planning and management of land resources (Chapter 10) (United Nations, 1992). Similarly, reference to this topic was also made by the United Nations in 2015 in the 17 Sustainable Development Goals as well as in its adaptation by the UNWTO for tourism, particularly in goals 11, 13 and 15 (United Nations, 2015). Especially for an alpine region like South Tyrol, characterized by a lot of natural landscape and little more than 5% of area of permanent settlement, a well-founded discussion about the finite resource land is central (Zebisch et al., 2018).

Humans are the main factor influencing land use and landscape through their consumption and lifestyle habits as well as through economic activities. Beside other economic sectors, such as agriculture or industry, tourism also shapes the natural landscape and the land use of South Tyrol. At the same time, an intact nature, a well-kept and attractive natural as well as cultural landscape are the basis for a functioning and successful tourism in South Tyrol. Against this backdrop, an analysis of the influence of tourism on landscape diversity and land use is particularly important.

11.1 BEDS IN HOTELS AND SIMILAR ESTABLISHMENTS PER LAND USE ZONE AND CATEGORY

Land use zones, such as for example residential or agricultural areas, are areas with specific provisions and building regulations. In South Tyrol, 40.8% of beds are located in residential areas (areas A, B, C), 37.6% in agricultural areas, 11.8% in areas for tourist facilities and 9.8% in other land use zones. Concerning the accommodation category, the majority of the "star establishments" (hotels) are located in residential areas (44.2%), agricultural areas (31.9%) and areas for tourist facilities (15.6%). The majority of the "flower establishments" (farm residences , including Red Rooster facilities), namely 82.7%, are located in the agricultural areas, followed by the residential areas (10.5%) and the forest areas (3.6%). About 58% of the "sun establishments" (private room rental facilities) are located in the residential areas, followed by the agricultural areas (34.1%) and the forest (1.9%). The following box on land consumption and urban sprawl expands this analysis.



LAND CONSUMPTION AND URBAN SPRAWL DUE TO ACCOMMODATION FACILITIES IN SOUTH TYROL

As the economic sector of tourism also shapes the landscape and land use of South Tyrol and must follow legally defined spatial planning goals, a closer look was taken to accommodation facilities and their contribution to urban sprawl.

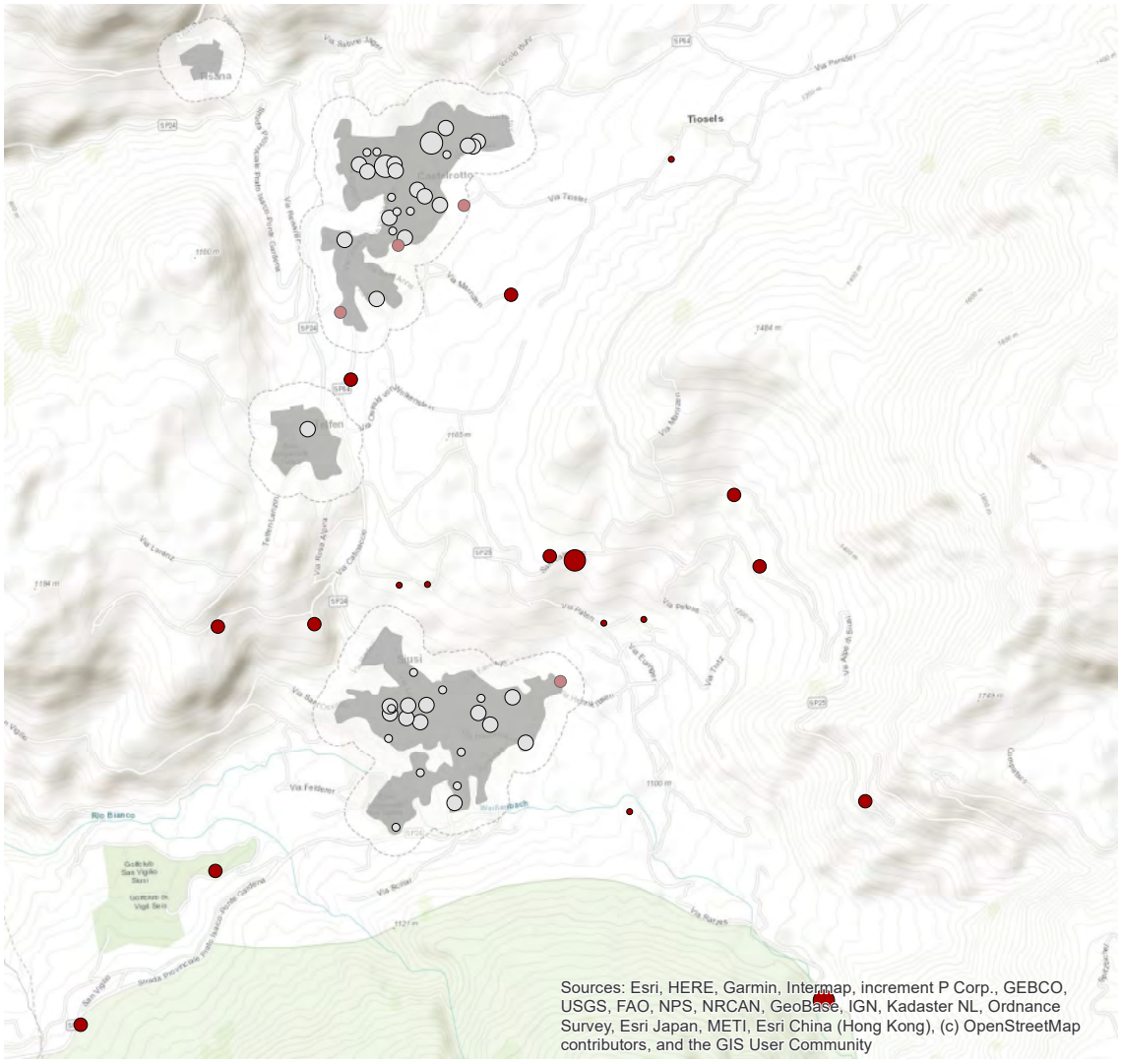
Regulations of the new Spatial Planning Law

The newly introduced Spatial Planning Law defines that the ongoing urban sprawl and land fragmentation should be avoided, and further soil consumption should be limited. Already developed areas are to be used efficiently and a compact settlement structure is to be developed. Therefore, every municipality will have to define settlement boundaries in the future, which are intended to limit building in the natural landscape. Since settlement boundaries are still in elaboration, the "built-up urban centres (LG10/91)" are considered as settlement boundaries for the time of transition (Spatial Planning Law 2018, Art.103, §5). Groups of at least 10 buildings with a certain density also count as settlements, but this was neglected in the following analysis.

Measuring urban sprawl

Urban sprawl can be measured in geoinformation systems by the absolute number of buildings or inhabitants and the dispersion of buildings across the landscape (Jaeger & Schwick, 2014). The density of an area as a third factor was neglected here. The location of the accommodation facilities (see **Figure 18**, data source LTS, 2020) and the corresponding number of beds as a unit of size was intersected with the built-up urban centres. These are based on individual decisions for each municipality, have a legal basis and their geodata are freely accessible (GeoKatalog Südtirol, 2021). Therefore, they were used as a simplified assumption for the settlement boundaries. To compensate minor mislocations of accommodation facilities, a 100m buffer was applied around the built-up centres. The 100m distance was thus considered as an assumption to buildings directly bordering the settlement area.

Location of the accomodation facilities and beds with regard to the built-up centres



kilometer
0 0,25 0,5 1

Sources: Accomodation facilities: Provincial Association of Tourism Organisations LTS; Built-up urban centres, municipal boundaries: GeoKatalog Südtirol, Basemap: ESRI

Accomodation facilities outside 100m from the built-up centre
[Beds]
0 - 29
30 - 74
75 - 205
206 - 500
501 - 1072

Accomodation facilities outside bulit-up centres, within 100m
[Beds]
0 - 29
30 - 74
75 - 205
206 - 500
501 - 1072

Accomodation facilities within bulit-up centres
[Beds]
1 - 29
30 - 74
75 - 205
206 - 500
501 - 800
Bulit-up urban centres (LG10/91)
100m buffer
Municipal boundaries

Eurac Research
Institut for Regional Development
Cartography: Peter Laner

Figure 18: Location of beds with regard to the built-up centres of Kastelruth and Seis.
Sources: LTS & GeoKatalog Südtirol, own elaboration.

Location of accommodation facilities in South Tyrol

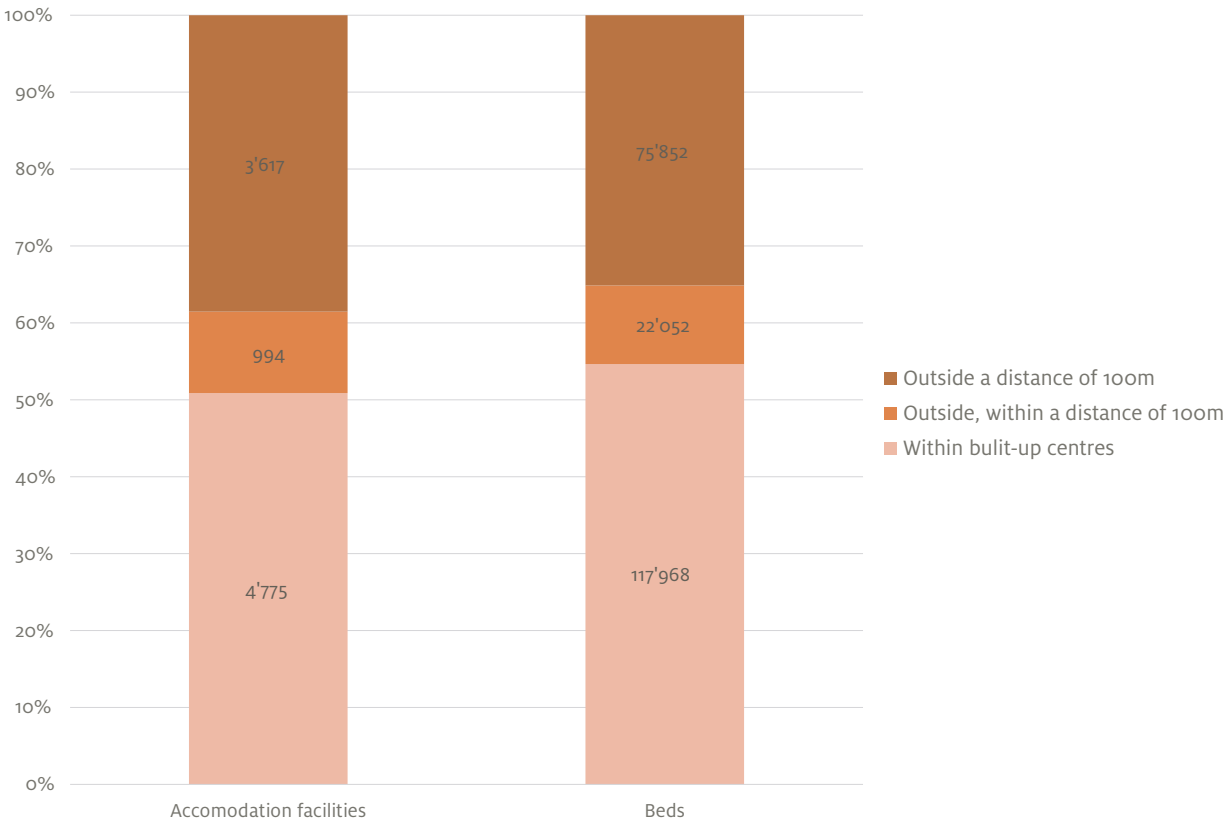


Figure 19: Location of accommodation facilities and beds in hotels and similar establishments with regard to the built-up centres of South Tyrol. Sources: LTS & GeoKatalog Südtirol, own elaboration.

The result shows how much and which type of accommodation facilities and beds are located outside built-up urban centres, which are contributing to urban sprawl. Accordingly, the following results are the most important ones:

- 49.1% of all accommodation facilities are located outside built-up centres.
- 35.0% of all beds are located outside 100m from the built-up centre.
- 53.7% of all beds in tourism zones are located at more than 100m from built-up centres.

Relevance for spatial planning

Municipalities should generally make more efforts to build accommodation facilities within village centres. This applies especially to hotel establishments, as they have the highest number of beds in the countryside. It can be assumed, that tourism zones contribute to building outside built-up centres.

Surprisingly, about one third of the farm holiday beds are located within built-up centres. However, since they have the highest proportion of beds in the countryside, it should be ensured that in future they will be realised close to built-up centres.

Municipalities with more than 33% of the beds located outside the built-up centres are above the average for South Tyrol and are thus particularly required to promote building in the built-up centre.

11.2 DEVELOPMENT OF THE AREAS FOR TOURIST FACILITIES

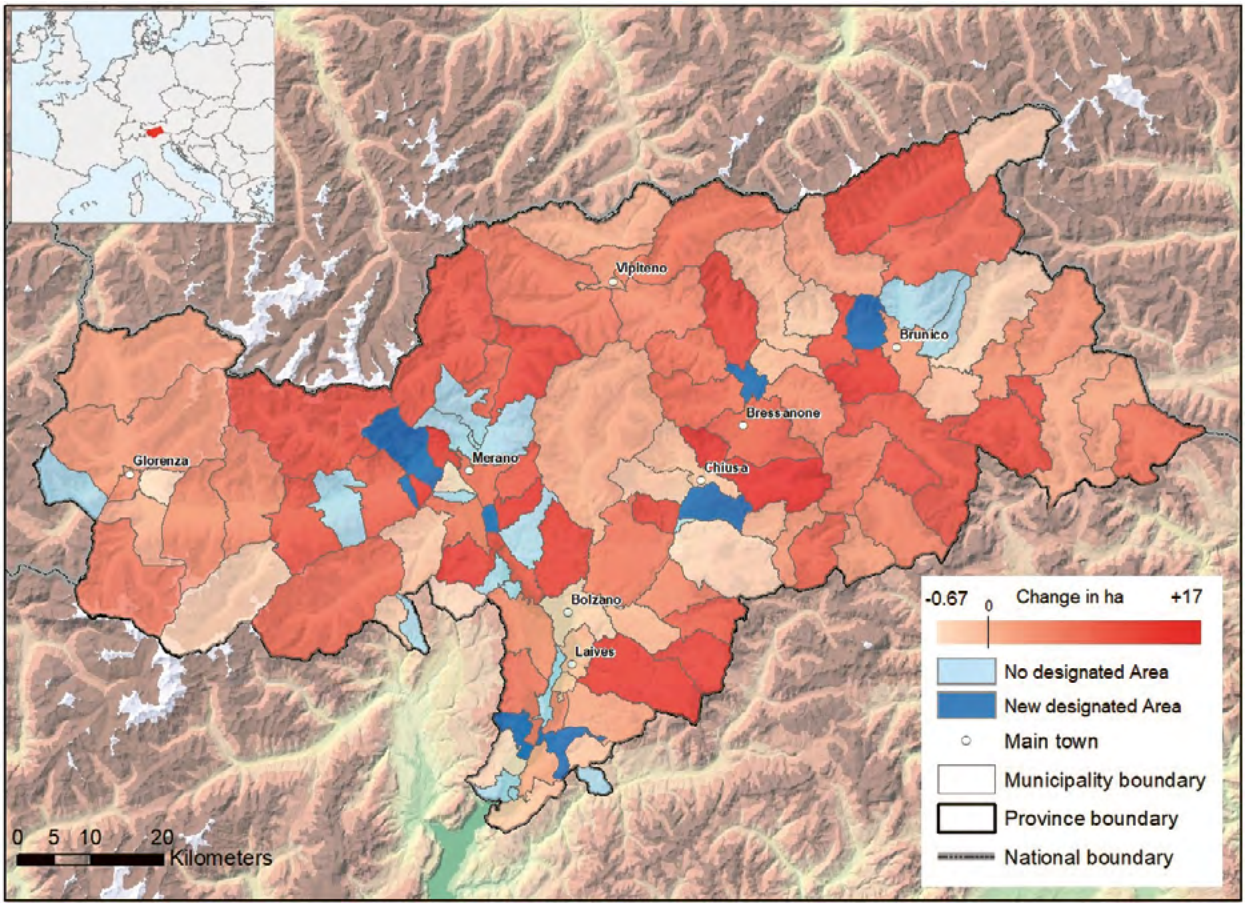


Figure 20.: Development of the areas for tourist facilities at municipality level, South Tyrol (2015-2020). Yearly data on municipality level. Source: Office of Regional Planning and Cartography, Province Bolzano-South Tyrol, own elaboration.

Since 2007/2008 municipalities have the possibility to designate areas specifically for tourist facilities. In the period between 2015 and 2020, these areas have increased in most municipalities of South Tyrol, namely in 74 out of 116. In 16 municipalities, the areas for tourist facilities have decreased[8]. 18 municipalities have not designated any areas for tourist facilities yet. Generally, such areas can be found in every category of tourism exposure: 8 out of these 18 municipalities fall into the category "low tourism exposure", 4 into the category "medium tourism exposure" and 6 into the category "high tourism exposure"[9]. In 8 municipalities, areas for tourist facilities have been designated only after 2015[10]. It should be noted that the increases and decreases are minimal in some cases.

8 Schluderns/Sluderno, Unsere Liebe Frau im Walde – St. Felix /Senale-San Felice, Marling/Marlengo, Kurtatsch an der Weinstrasse/Cortaccia sulla strada del vino, Kastelruth/Castelrotto, Rasen-Antholz/Rasun Anterselva, Martell/Martello, Prettau/Predoi, Proveis/Proves, Bozen/Bolzano, Terenten/Terento, Villanders/Villandro, Truden/Trodena, St. Pankraz/San Pancrazio, Salurn/Salorno and Olang/Valdaora.

9 Pfatten/Vadena (low), Margreid an der Weinstrasse/Magrè sulla strada del vino (low), Altrei/Anterivo (medium), Kurtinig an der Weinstrasse/Cortina sulla strada del vino (high), Gais/Gais (medium), Percha/Perca (low), Riffian/Rifiano (medium), Schenna/Scena (high), Tirol/Tirolo (high), Kuens/Caines (high), Taufers/Tubre (low), Tscherms/Cermes (high), Kastelbell-Tschars/Castelbello-Ciardes (low), Mölten/Meltina (low), Waidbruck/Ponte Gardena (low), Nals/Nalles (medium), Andrian/Andriano (high), Laurein/Lauregno (low).

10 Tramin/Termeno, Montan/Montagna, Pfalzen/Falzes, Natz-Schabs/Naz-Sciaves, Partschins/Parcines, Burgstall/Postal, Plaus/Plaus and Lajen/Laion

11.3 BED DENSITY OF HOTELS AND SIMILAR ESTABLISHMENTS IN RESIDENTIAL ZONES

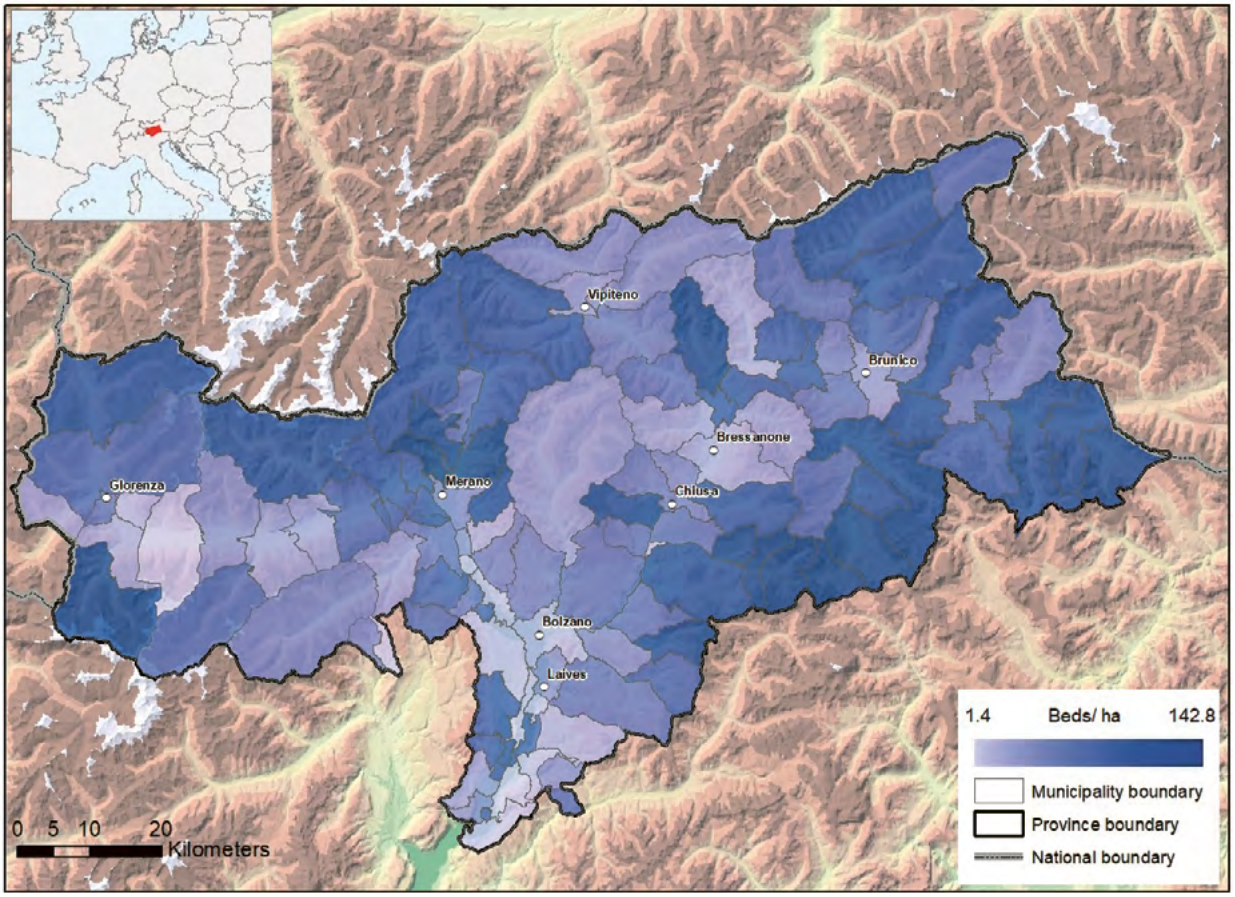


Figure 21.: Bed density of hotels and similar establishments in residential zones at municipality level, South Tyrol (2020). Source: LTS & Office of Regional Planning and Cartography, Province Bolzano-South Tyrol, own elaboration.

The darker the blue, the higher is the bed density of hotels and similar establishments in residential zones (for information on how the bed density is calculated see **Annex 2**). In **Figure 21** we can see that the density of beds in the residential zones of South Tyrol's east, especially in the Dolomite area, is higher than for example in most municipalities of Vinschgau/Val Venosta and Überetsch-Unterland/Oltradige-Bassa Atesina. The average density in South Tyrol is 22.1 beds per hectare. The three municipalities with the lowest bed density in residential zones are Neumarkt/Egna, Laas/Lasa and Gargazon/Gargazzone. The highest density is to be found in Corvara, Wolkenstein /Selva di Val Gardena and Tirol /Tirolo. Two municipalities, Pfatten/Vadena and Laurein/Lauregno, do not have any beds in residential zones. In general, dense regions might be better from an ecological point of view but might have a negative impact on the local population's attitude towards tourism, especially if areas suffer from overload.

12

12 Nature conservation

Nature-based tourism in destinations such as South Tyrol relies heavily on recreational opportunities provided by the environment and, in turn, also contributes to the attractiveness and quality of destinations (see also Scuttari, Isetti, Habicher, 2019). In this context, tourism, depending on the intensity, concentration and behavior of visitors on site, can either endanger the environment or constitute an impulse for positive change. In fact, as it is based on the enjoyment of the natural and cultural surroundings, tourism can be a driving force for nature protection, play a positive role in raising awareness and consumer education through its vast channels of communication and provide an economic incentive to protect habitat that might otherwise be converted to less environmentally friendly purposes (UNWTO, 2004). On the other hand, it might also become a source of stress for certain fragile environments. In order to link tourism and nature conservation and identify those areas where a balance between conservation and development is pursued, through a survey among tourism organizations we have tried to find out what measures are currently being taken for nature conservation. Since the effects of human activities on nature are multifold and it is not always easy to define which role tourism plays in this context, future research could focus on the topic of biodiversity and tourism, and on the concept of beauty of the landscape, as it is perceived by visitors, but also by the local population.

12.1 NATURE CONSERVATION SURVEY

This survey was conducted in July 2021 among the 72 tourism boards in South Tyrol. Answers were received from 46 tourism boards, which corresponds to a response rate of 64%. Some results of the survey are presented below.
The majority of organizations, 83%, already take into account the issues of nature conservation and environmental protection in their strategic plans. From the total area for which the tourism boards are responsible in their territory, according to their own estimation, an average of 45.9% is already considered by these strategic plans.

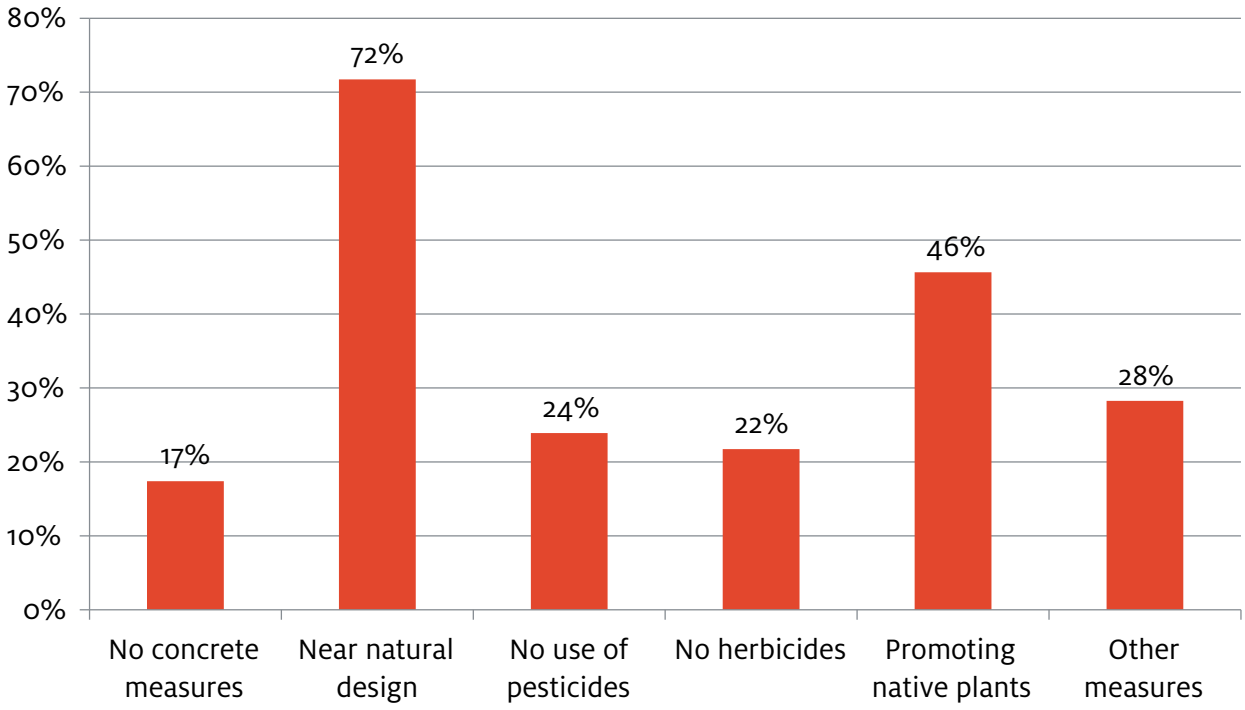


Figure 22: Measures to promote biodiversity in the respective tourism destination. Source: CAS, n= 46.

The most common measure tourism boards use to promote the biodiversity of the organization's area of responsibility is near-natural design and the cultivation of native plants (see **Figure 22**). Some of the other measures that were listed were planting trees with the guests, mobility solutions for guests, environmental days, herbal labs and preservation of the ancient irrigation channels. Furthermore 82.2% of tourism boards communicate the biodiversity of their local destination to guests and make it tangible through tourism products. Among these products were mentioned guided herbicultural walks, the serving of spring water, slow food products, apple and wine trails and numerous more. However, 64.0% of the respondents do not have a guidance system or visitor guidance concept to optimize visitor flows in sensitive natural areas in their destination. Those guidance systems can consist of information signs and signposting to identify natural attractions and optimize visitor flows. This can also be done with the help of digital technologies. Some tourist destinations explicitly point out mountain bike trails, snowshoe trails and winter hiking trails. Another positive aspect concerns the issue of raising awareness of the issues of environmental protection and nature conservation. 68.2% of tourism boards offer their guests information material on nature and environmental protection and nature-friendly behavior.

BOX 4 :

THE IMPACT OF SOME OUTDOOR RECREATIONAL ACTIVITIES ON ALPINE BIODIVERSITY: FOOD FOR THOUGHT

A recent study carried out in the French Alps (Lavorel et al., 2020) highlights the spatial overlap between areas of higher biodiversity in the Alps and tourism activities. The study reports evidence on how the main habitats of vertebrate species are at risk due to the impact of tourism, since most of the outdoor offers are concentrated in those areas, especially during the summer.

Eurac Research, in the Alpine Space project ALPBIONET2030 - concluded in December 2019 - dealt with the protection of ecological connectivity in the Alpine area, highlighting the physical, economic and social barriers that prevent its development. A project focus addressed the impact of some tourism activities on Alpine biodiversity, considering in particular outdoor recreational activities. The analysis of these potential impacts on wildlife was carried out in the pilot areas of the project, involving local stakeholders, in particular tour operators, protected areas managers, farmers and hunters.

In the Berchtesgaden National Park in Germany, the interaction between e-Mountain-bikes (e-MBTs) and wildlife was discussed, particularly the Tetrao Urogallos (also known as Western Capercaillie), an animal particularly sensitive to anthropogenic disturbance. The development of e-MTBs has allowed more tourists to arrive in places hitherto reachable only by a few, negatively disrupting the balance between the various activities and wildlife species present. A 2017 study in the Black Forest in Germany (Coppes et al., 2017) confirms this, reporting, among several examples of consequences due to disturbance by e-MTBs, a clear reduction of habitat (between 8 and 40%) for this bird.

In another case, in the area between the Rieserferner-Ahrn Provincial Nature Park (South Tyrol, Italy) and the Hohe Tauern National Park in Austria, the potential effects of paragliding on wildlife were investigated. Paragliders usually start their flights from the South Tyrolean side and land in the Austrian Defereggen Valley. The hypothesis followed is that a continuous presence of paragliders can frighten the local fauna (in particular - but not only - deer) away and push them into less favorable areas, where they can, among other things, damage the natural regeneration of the forest and forestry activities, as well as end up victims of road accidents. This effect was already highlighted in a previous study of 2001 in the Swiss Alps, where it was observed that, after the appearance of paragliders, female chamois (Rupicapra rupicapra) fled to great distances, seeking refuge within the forest cover. In an area without paragliders, chamois had remained in the pastures and rocks above the tree line throughout the day (Schnidrig-Petrig, 2001).

These findings clearly highlight the negative impacts of some tourism activities on alpine biodiversity, a problem that affects all areas of the Alps including South Tyrol. At the same time, they underline the lack of in-depth studies on the interaction between tourism and biodiversity and therefore the need for research on this topic. A need that can be defined as urgent in light of both the ever-increasing consumption of natural resources and an ever-increasing tourist presence in some mountainous areas such as South Tyrol and the introduction of new technologies such as e-MTBs. These studies could promote the initiation of local and cross-border reflection on the management of certain outdoor activities, in order to reduce the negative effects they can have on Alpine biodiversity. As also highlighted by the ALPBIONET2030 project, this issue is difficult to manage and can be addressed only by involving the various categories of stakeholders in direct dialogue-based confrontations leading to mutual understanding and the development of a participatory approach to adapt the tourism offer to the needs of nature.

13

13 Culture

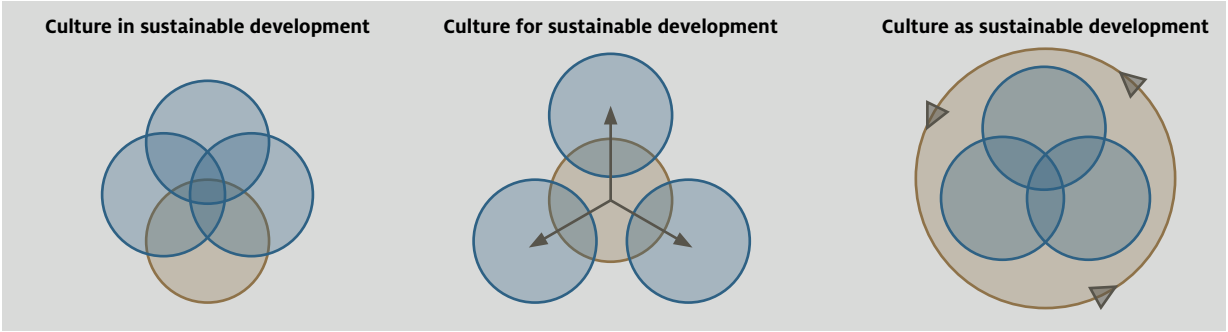
South Tyrol is a popular holiday destination for culturally interested tourists due to its many cultural treasures and its rich history. Over the last 150 years tourism has had a great impact on the most diverse forms of culture worldwide. In material terms, this influence on culture has existed and continues to exist directly in the form of hotel facilities, infrastructure etc., but also indirectly through the prosperity fostered by tourism in the region. The influence of tourism on immaterial cultural assets is more difficult to assess, but it clearly exists.

In order to close this knowledge gap, qualitative interviews and surveys can lead to a better understanding of this relationship. In addition, some quantitative numbers on museum visitors were collected and numerous individual discussions and workshops with experts from the cultural sector were held, while the relation between culture and tourism was investigated thanks to the case study on transhumance.

BOX 5 :

CULTURAL SUSTAINABILITY AND CULTURAL HERITAGE

In the last decades the role of culture as a model of sustainable development has been reassessed and a four-pillar model is often proposed in which culture represents the fourth pillar of sustainability (Voss 1997). In this regard, culture may play different roles, as Dessein et al. (2015) argue: culture *in* sustainable development promotes culture as an additional pillar of sustainability. Culture *for* sustainable development foresees an instrumental role of culture for the enhancement of the social, economic and ecological goals and culture *as* sustainable development is framed in terms of a world view, thus providing a cognitive and behavioural basis for the achievement of sustainable goals. In the very broad sense of the term, culture may constitute the groundwork for all forms of sustainability as it represents a whole philosophical and intellectual constitution of a people that informs and shapes the relations between humans, humans and other species as well as humans and the natural environment (Eagleton, 2000).



Different roles of culture for sustainable development: culture as the fourth pillar, as a mediator between the three pillars and as a foundation for sustainability (adapted from Dessein et al., 2015)

Regarding cultural heritage more specifically, the safeguarding of material and immaterial heritage is essential because it is considered a form of "cultural capital that has been inherited from previous generations and can be handed onto future generations" (Soini and Birkeland, 2013, p.216). Since cultural heritage is often intertwined with landscapes and collective identities and may embody traditional values and particular types of social organization, it can create cohesion between people and foster social integration. The centrality of history and the endeavour to preserve traits of the past, may however stand in contrast with modern, new or different ways of living. Several global trends such as tourism are therefore not seldom seen as phenomena endangering the preservation of cultural heritage (Soini & Birkeland, 2013).

13.1 TRANSHUMANCE CASE STUDY

The case study focused on transhumance, the seasonal movement of livestock from one region to another due to climate reasons and to ensure year-around grazing. In South Tyrol vertical transhumance is practiced, meaning that livestock remains on mountain pastures during the summer and is transferred to lower pastures during the winter. This allows for animals to feed on the nutrient-rich grasslands in the mountains and makes room for other cultivating activities in the valleys, mainly to produce hey for winter stable feeding. Every year in spring the animals are transferred from the valleys to the mountain pastures and then back in the fall, often on challenging routes which have been used by shepherds for centuries. A successful flock migration is celebrated upon return in autumn by the whole village. In the past decades tourists have started to take interest in this custom and to participate in the subsequent festivities. The case study therefore wanted to analyse the impact of tourism on transhumance, specifically on the celebrations in the fall. Two South Tyrolean municipalities were chosen for the qualitative and exploratory research: Wolkenstein in Gröden/Selva di Val Gardena and Schnals/Senales. The semi-structured interviews were conducted with people involved locally in the areas of culture, tourism and agriculture.

According to the respondents, transhumance is for the most part considered a very important custom. With the increased importance of tourism, the role of this custom is no longer limited to the field of agriculture. The fall celebration is now a major tourist attraction in both municipalities, turning it into a touristic event which is partially disconnected from the custom itself which has led to a loss of the perceived authenticity. The income from the festivities and the heightened awareness of such cultural heritage among the local community can be seen as positive effects deriving from a greater presence of tourism. Since farmers are among the most important carriers of local traditions but are themselves involved in tourist activities, they increasingly lack the time to cultivate such customs. Festivities are an occasion for the farmers to celebrate their achievements. Some interviewees from the agricultural and cultural sector underline how important it is that future generations will continue to take interest in this custom. As a result of the case study, a code of conduct for guests and tourists is being developed together with local stakeholders to prevent a commercialization of this event.

Cross-border transhumance below the Hochjochferner in the Schnalstal valley. Source: Katerina Fiser, 2016, TV Schnalstal

Folkloristic transhumance in Wolkenstein, Gardena Valley. Source: Tourismusverein Wolkenstein (valgardena.it)

13.2 SURVEY ON CULTURE AND TOURISM

The relationship between local culture and tourism was also investigated empirically through a non-representative survey with agents from the tourism and the cultural domain: municipal annalists and tourism organizations were contacted via email, letter and telephone while the survey was performed online. Out of the registered 426 municipal annalists, 82 responded to the questions, while 57 out of 72 tourism organizations took part in the survey. The results show a clear predominance of positive attitudes towards the relation of culture and tourism, pointing to what could be read as an indicator of cultural sustainability: tourism intensity is not perceived by the respondents as a threat for local culture. However, tourism organizations seem to be less sensitive towards eventual dangers of overtourism for culture than municipal annalists. A further expansion of the survey involving other stakeholders such as local associations involved in the preservation of customs, traditions and folklore, is planned for the next year.

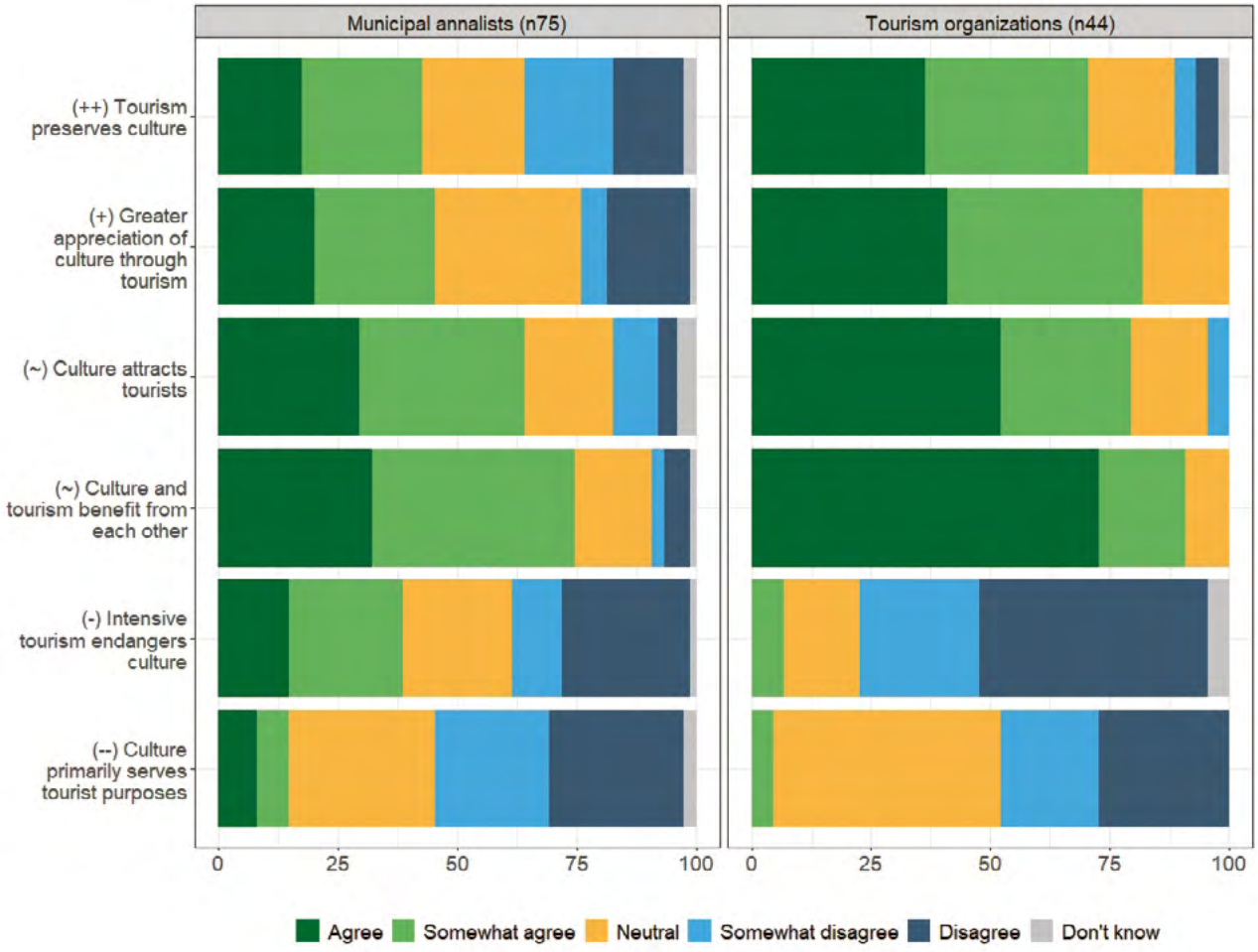


Figure 23.: Perception on the relationship between local culture and tourism, survey performed in May 2021 with municipal annalists and tourism organizations, own elaboration, n=119.

13.3 ENTRIES IN MUSEUMS BY TOURISTS USING MOBILITY CARDS

To gain further insights into cultural tourism in South Tyrol, quantitative data on museum visits was collected and analyzed. Overall, tourists constitute a large part of museum visitors in South Tyrol. In fact, estimates calculate that tourists made up 79.4% of the total museum visits in 2017, 66.4% in 2018 and 66% in 2019[11] (Source: ASTAT, 2020, data available on demand).
Moreover, several types of mobility cards offered to tourists in South Tyrol allow free access to museums and cultural venues (See also 10.1). In **Figure 24** the aggregate museum entries per day with tourist mobility cards are shown for the period of 2017-2020. The seasonality in the figure is remarkable, if compared to the distribution of summer and winter waves represented earlier in **Figure 9**: Despite some winter visits, the access to museums is definitely a summer activity for South Tyrolean tourists. Besides the effects of the Covid-19 pandemic that forced museums to shut down from March until late June 2020, museum entries with mobility cards have increased until 2019, pointing out an increase in cultural tourism in South Tyrol.

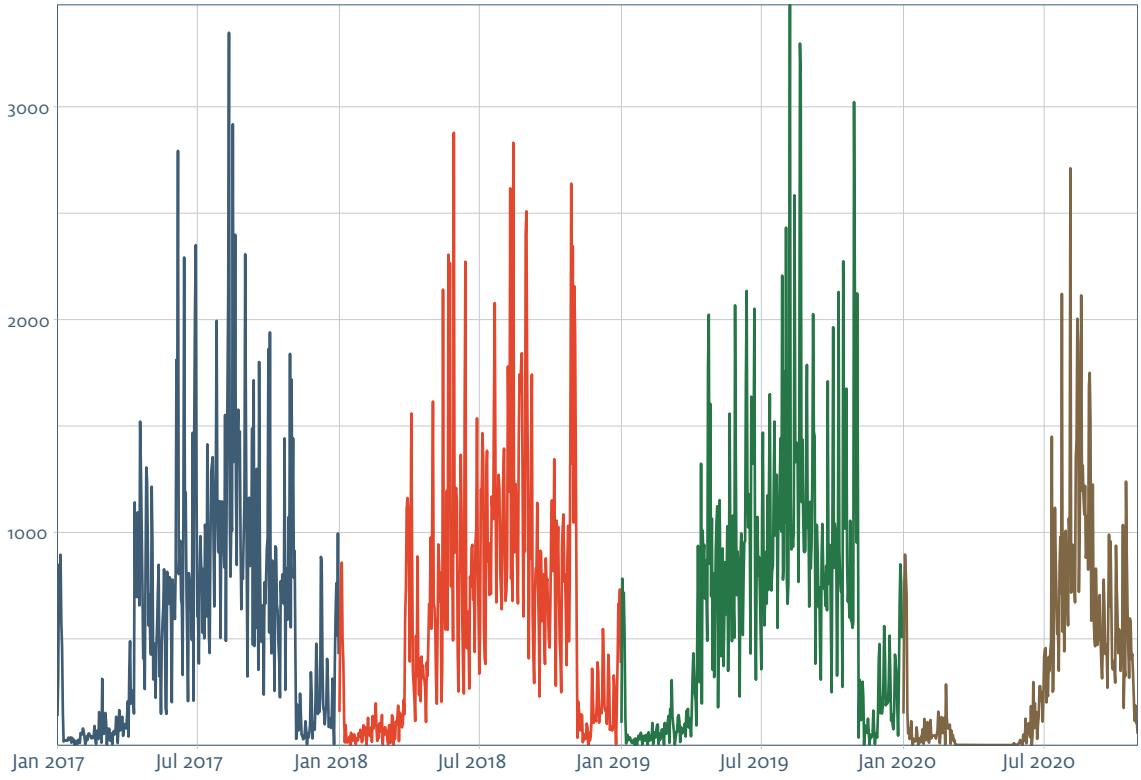


Figure 24: Number of total museum entries per day effectuated with tourist mobility cards, 2017-2020.
Data available on demand, source: Lorima GmbH, own elaboration.

As for what concerns the preferences and interests of museum visitors with tourist mobilty cards, the most visited museums over the years 2017-2019 were the Südtiroler Archäologiemuseum (archeology), the Südtiroler Landesmuseum für Kultur- und Landesgeschichte Schloss Tirol (local history and culture), and the Messner Mountain Museum Firmian (mountains and nature). Interestingly, while the Südtiroler Archäologiemuseum remained the most visited in 2020, the other two most visited museums were the Festung Franzensfeste (fortress) and the Augustiner Chorherrenstift Neustift (monastery). In this context, it is hard to determine if these changes are due to pandemic-induced seasonality dynamics in tourism (e.g. spring tourism diminished dramatically in 2020), museum policies or other factors.

11 Data on 2020 is still being collected.

Conclusions and outlook

The third STOST report highlights the specific development patterns of tourism in South Tyrol before and during the Covid-19 pandemic. It reveals both the business and the behavioural effects of Covid-19 at local level, as well as the chances and opportunities for a future recovery. On the one hand, the Covid-19 crisis has reduced the tourism intensity and therefore the resource use, on the other hand it has encouraged unsustainable behaviour in transport. International tourist markets were losing importance during the crisis, although the fewer international tourists overnighting in South Tyrol during 2020 revealed to be more risk-tolerant than the domestic tourists during their visit; conversely, the proximity markets gained importance, but they were more risk-averse and isolated. Outdoor activities were practiced more, especially because they guarantee a safe holiday environment, whereas cultural activities, and some cultural hotspots in particular, were suffering from the effects of the pandemic and were forced to temporarily close. Events – and therefore also sustainable events - were limited to a few, due to Covid-19-restrictions.
Overall, the STOST report was prepared for its third edition with the aim to transform monitored data into valuable information for policy makers, and to compare and interpret Covid-19-related effects. After three years of activity, each issue area is studied with a higher precision, and survey data support secondary data where necessary. The presence of the STOST website further allows to expand the report digitally, while keeping the volume to an acceptable dimension.
The future of STOST is bright: after the first pilot phase of three years, the observatory will continue its work and will expand its horizons, including accessibility and climate action policy as new issue areas for the next years. Further, the regular assessment of the tourist motivations and satisfaction, as well as the locals' attitudes towards tourism will be surveyed, and non conventional data on the sharing economy platforms for accommodation will be gathered.

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Annex 1: Data management workflow and participatory design

Workflow and technical aspects

This report contains a wide range of indicators on different subjects related to tourism. The indicators themselves are based on an even wider set of data that have been collected from different sources, i.e. we collected data from different statistical offices (ASTAT, ISTAT), the chamber of commerce (WIFO), the labor market office of South Tyrol (AMB), various sector associations as well as from private firms. Thereby, the collected data surpass the amount that one can handle efficiently without a data managing plan.
In order to handle the amount to data efficiently, we laid out the following workflow: First, we collect data from various data providers. Second, as incoming data are transmitted to us in different data forms (xlsx, csv, RData, json, pdf) with varying data structures, we use the statistical software R to pre-process the data. As most data can be represented in a timeseries format, we chose to transform the available data into R time series objects. Third, after transforming the data into R time series objects, we store the timeseries in PostgreSQL database. Particularly, we set up a time series database according to the R package timeseriesdb (Bannert, 2015). The basic idea behind the timeseriesdb package is a storage concept that uses the PostgreSQL extension hstore to store time series in a key-value-pair. Thereby, timeseriesdb maps R time series objects into their PostgreSQL counterparts for permanent storage. The package timeseriesdb also allows us to store meta information in several languages and associate it with the same series. Finally, we use the stored timeseries to compute the indicators used in this report. In order to ensure reproducibility of all results, all scripts used to transform the data and compute the indicators are managed within a GitLab environment.
In cases of seasonal adjusted data, we use the X-13Arima-SEATS library provided by the US Census Bureau. Specifically, we use the R package *seasonal* that provides a powerful interface between R and X-13ARIMA-SEATS (see Sax and Eddelbuettel, 2008). We use TRAMO-SEATS as the default procedure.

Organizations participating in the Working Group Workshops

During the development of STOST, many organizations have participated in the Observatory's Working Group Workshops or joined bilateral exchanges to share their knowledge and provide their data. Among them are: IDM, Eurac Research institutes other than the Center for Advanced Studies, ASTAT (Provincial Institute of Statistics), Agency for Energy South Tyrol – KlimaHaus (Agentur für Energie Südtirol – KlimaHaus), Provincial Mobility Department, Provincial Department of Nature, Landscape and Spatial Planning, WIFO (Chamber of Commerce), HGV (South Tyrolean Hotels and Restaurants Association), VPS (South Tyrolean Non-commercial Accommodation Providers Association), SBB (South Tyrolean Farmers' Association), Free University of Bolzano, LTS (South Tyrolean Tourism Organizations Association), VCS (South Tyrolean Campsite Operators Association), AVS and CAI (associations of mountain huts/shelters), HDS (South Tyrolean Trades and Services Association), LVH (South Tyrolean Crafts and Services Association), Hogast (local buying syndicate), Provincial Forestry Department, Provincial Nature Parks Office, Provincial Landscape Ecology Office, BikeHotels Consortium, South Tyrolean Umbrella Organization for Nature and Environment Protection (Dachverband für Natur- und Umweltschutz), Terra Institute, Provincial Environment Agency, Labor Market Moni-

toring Office, Alpine Convention, Technical School for Hospitality and Food Industry (Brixen-Bressanone). Tourismusverein Wolkenstein, Tourismusverein Schnals, Verein der Fremdenführer und Reiseleiter Südtirols, Heimatpflegeverband Südtirol, Platform Cultural Heritage Cultural Production - Free University of Bozen-Bolzano, Landeschronistin, Südtiroler Landesarchiv, Museumsverband Südtirol.

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Annex 2: Technical notes on indicators

TOURISM EXPOSURE

For each municipality in South Tyrol, we compute its tourism exposure. First, we calculate the tourism intensity for each municipality. We then standardize this variable to mean zero and unit variance. Second, we calculate the number of beds per surface for each municipality. We then standardize this variable to mean zero and unit variance. Finally, we define tourism exposure of a municipality as the average between the variables.

We divide municipalities into three different groups, i.e. low tourism exposure (bottom 25%), average tourism exposure (25%-75%) and high tourism exposure (upper 25%) according to their tourism exposure measure.

1 Tourism seasonality

1.1 Tourist arrivals by market

"Tourist arrivals by market" stands for the absolute number of tourists arrived in South Tyrol, distinguished by market of origin. Data, provided by ASTAT, are available on a monthly basis. In order to summarize this vast amount of information, we decided to calculate monthly average absolute values for each available market of origin over the time span 2011-2020 in the following way:

$$Arrivals_m = \frac{1}{T - t + 1} \sum_{y=t}^{T} Arrivals_{m,y}$$

Equation 1: Monthly average arrivals

Where T = last available year (2020), t = first available year (2011), m = month, y = year. Values can range from 0 to infinity.

1.2 Percentage of tourist arrivals occurring in peak months by municipality

"Percentage of tourist arrivals occurring in peak months by municipality" stands for the shares of tourists arriving in South Tyrolean municipalities within specific months. For the analysis, municipalities were divided according to their tourism exposure. The focus is then placed on those municipalities with the highest percentages of tourist arrivals in one specific month of the year. Values can range from a minimum of 0% (no tourists arriving in a month) to 100% (all yearly tourists arriving in one month). Data in absolute numbers of tourist arrivals, provided by ASTAT, are available on a daily basis.

1.3 Percentage of tourist arrivals occurring in peak weeks by municipality

"Percentage of tourist arrivals occurring in peak weeks by municipality" stands for the shares of tourists arriving in South Tyrolean municipalities within specific weeks. For the analysis, municipalities were divided according to their tourism exposure. The focus is then placed on those municipalities with the highest percentages of tourist arrivals in one specific week of the year. Values can range from a minimum of 0% (no tourists arriving in a week) to 100% (all yearly tourists arriving in one week). Data in absolute numbers of tourist arrivals, provided by ASTAT, are available on a daily basis.

2 Employment

2.1 % of employees in the accommodation and food service sector

"Percentage of employees in the accommodation and food service sector" stands for the number of employees working in the accommodation and food service sector in South Tyrol, expressed as a percentage of total employment. Data, provided by AMB, were available on a monthly basis and were distinguished by ATECO sector (classification of economic activity provided by the Italian National Institute of Statistics – ISTAT). For the sector "Accommodation and Food Service Activities", which was the focus of our analysis, data have been further distinguished between the two sublevels, namely "Accommodation" and "Food service activities". The indicator was determined in the following way:

$$Tourism\ employees\ compared\ to\ tot\ employment_m\ (\%) = \frac{Accommodation\ sector\ employees_m + Food\ service\ sector\ employees_m}{All\ sectors\ employees_m} * 100$$

Equation 2: Tourism employees proportion calculation

Where m = month.

It should be noted that these data report only employees, i.e. they exclude the self-employed. Moreover, we decided to calculate this indicator using data regarding employees working in South Tyrol, i.e. they may not necessarily live in South Tyrol. Values can range from a minimum of 0% (no employees working in the accommodation or food service sector) to a maximum of 100% (all the employees working in the accommodation or food service sector).

2.2 % of female enterprises in the accommodation and food service sector

"Percentage of female enterprises in the accommodation and food service sector" stands for the number of female enterprises active in the tourism sector in South Tyrol, expressed as a percentage of total tourism enterprises. Data, provided by WIFO, were available on a yearly basis and were extracted by Infocamere, the database of Unioncamere. The indicator reports only the number of active enterprises. For the sake of coherence with the other indicators, the tourism sector refers to the ATECO sector "Accommodation and Food Service Activities". The indicator was determined in the following way:

$$female\ enterprises\ in\ the\ tourism\ sector_t\ (\%) = \frac{Female\ enterprises\ in\ the\ tourism\ sector_t}{Total\ tourism\ enterprises_t} * 100$$

Equation 3: Female enterprises proportion calculation

Where t = year.

Unioncamere (the public entity representing the system of the Italian Chambers of Commerce), defines an enterprise as owned by a woman if different conditions are met, depending on the types of enterprises[12]. More specifically:

- For the Italian "società di capitali" (which could be classified as limited liability companies): more than 50% of the shareholders should be female;

12 http://www.imprenditoriafemminile.camcom.it/P42A0C0S806/Osservatorio-imprend%20%20itoria-femminile.htm

- For “società di persone” (partnerships): more than 50% of the partners should be female;
- For “ditte individuali” (sole practitioners): the entrepreneur should be a woman;
- For other types of enterprises: more than 50% of the administrators should be women.

It should be noted that the remaining enterprises not necessarily classified as owned by men, as they could be controlled by an equal share of men and women or by legal persons. Values can range from a minimum of 0% (no female enterprises in the tourism sector) to 100% (all the enterprises in the tourism sector are female enterprises).

2.3 Employees in the accommodation and food service sector by citizenship

“Employees in the accommodation and food service sector by citizenship” stands for the number of employees working in the accommodation and food service sector in South Tyrol, distinguished by citizenship. The graph presented in the report shows this number expressed in percentage values over total employment within the tourism sector only. Data, provided by AMB, were available on a monthly basis and were distinguished by ATECO sector (classification of economic activity provided by the National Institute of Statistics – ISTAT). For the sake of coherence with the other indicators, the tourism sector refers to the ATECO sector “Accommodation and Food Service Activities”.

It should be noted that these data report only employees, i.e. they exclude the self-employed. Moreover, we decided to calculate this indicator using data regarding employees working in South Tyrol, i.e. they may not necessarily live in South Tyrol. Values can range from a minimum of 0% (no employees with a specific citizenship working in the accommodation or food service sector) to a maximum of 100% (all the employees working in the accommodation or food service sector have a specific citizenship).

3 Economic benefits at the destination level

3.1 Value added by industries

“Value added by industries” stands for the value of output minus the value of intermediate costs. When expressed by economic sector, it allows the growth of the economic system to be measured in terms of new goods and services available for final use. Data, provided by ISTAT, were available on a yearly basis and were distinguished by NACE Rev.2 sector (statistical classification of economic activities provided by Eurostat). Data are expressed in current prices and refer to South Tyrol. For the sake of coherence with the other indicators, the tourism sector refers to the NACE Rev.2 sector “Accommodation and Food Service Activities”. The graph presented in the report shows the value added of all industries expressed in percentage values over the total. Values can range from a minimum of 0% (the sector does not add any value to the economic system), to 100% (the sector alone adds all the value to the economic system).

3.2 Profit situation for the accommodation and food service sector

“Profit situation for the accommodation and food service sector” displays the perceived profit situation of South Tyrolean firms working in the accommodation and food service sector. The underlying data is collected and provided by WIFO on a yearly basis.
At the beginning of each year, WIFO conducts business tendency surveys among a large panel of private firms. These qualitative surveys are designed to receive timely data on economic development. Among other questions, the questionnaire asks firms to assess their profit situation of the previous year. Thereby, firms can assess their profit situation as good, satisfactory, or bad. In addition, firms are asked to express their expectations about the current year’s profit situation. Thereby, firms can state that the profit situation will increase, remain unchanged or decrease. WIFO provided us with the timeseries on each item for both questions. That is, we received the share of firms that ticked one specific item, i.e. the share of firms that stated that their profit situation will decrease, the

share of firms that stated that their profit situation will remain unchanged as well as the share of firms that reported that their profit situation will increase. Using this information, we calculated the balance statistic between the possible answers (good, satisfactory, and bad) for each year. In this way, we get an estimate of the average assessment of the past profit situation as well as an estimate of the average expected business situation.

3.3 Gross occupancy rates of bed places by municipality and tourism exposure

"Gross occupancy rates of bed places by municipality and tourism exposure" indicates the extent to which available beds within accommodation facilities are occupied by tourists within a specific period in South Tyrol, distinguishing between municipalities with low, average and high tourism exposure. The indicator can be interpreted as a capacity utilization indicator. Data, provided by ASTAT, were available on a yearly basis and were distinguished by tourism intensity.
According to ISTAT (2008), the gross occupancy rate of bed places is calculated as follows:

$$Gross\ occupancy\ rate\ of\ bed\ places_t\ (\%) = \frac{overnight\ stays_t}{365 * bed\ places} * 100$$

Equation 4: Gross occupancy rates of bed places calculation

Where t = year.

The number of days (365) does not take into account the days in which accommodation facilities are inactive, i.e. seasonal or temporary closures are not considered here. As data are expressed in percentage, values can range from a minimum of 0% (empty accommodation facilities) to a maximum of 100% (fully booked accommodation facilities).

4 Governance

4.1 Number of municipalities, accommodation facilities and events involved in voluntary certification schemes for sustainability

The figures regarding the "number of municipalities, accommodation facilities and events involved in voluntary certification schemes for sustainability" aim at measuring the number of voluntary schemes adopted throughout South Tyrol to increase tourism sustainability. Data were provided by Agency for Energy South Tyrol – KlimaHaus (Agentur für Energie Südtirol – KlimaHaus), Provincial Agency for Environment (Landesagentur für Umwelt und Klimaschutz), ISPRA, Bio Hotel and Alpine Pearls. Values can range from 0 to infinity.

4.2 Number of "Red Rooster" branded agritourism ventures producing and selling regional products

"Number of Red Rooster branded agritourism ventures producing and selling regional products" aims at measuring the number of agritourism ventures offering certified regional products. Data, provided by Red Rooster, were available on a yearly basis. It should be noted that an agritourism venture can produce more than one type of products. Values can range from 0 to infinity.

4.3 Organic milk sold to members of the main local buying syndicate

"Organic milk sold to members of the main local buying syndicate" aims at measuring the number of organic milk sales in South Tyrol, expressed as a percentage of total sold milk. Data, provided by Hogast, the major purchasing organization of the accommodation and food service sector in South Tyrol, were available on a yearly basis. The indicator has been calculated as follows:

$$organic\ milk\ sales_t\ (\%) = \frac{Organic\ milk\ sold_t}{Total\ milk\ sold_t} * 100$$

Equation 5: Organic milk sales calculation

Where t = year.

It should be noted that organic milk sold by an organization different from Hogast is not recorded here. Values can range from a minimum of 0% (only non-organic milk is sold) to a maximum of 100% (only organic milk is sold).

5 Local and visitor satisfaction

5.1 Tourism intensity index

Tourism intensity aims at measuring the ratio between tourists and resident population. As such, it can be measured in different ways, e.g. with arrivals or overnight stays. Following ASTAT (2015a), we decided to adopt the following definition: "tourism intensity index" stands for the ratio between overnight stays in accommodation establishments within a specific area and the product between the population residing in the same area and the days of the period analyzed. Given that data on the resident population, provided by ASTAT, were available only on a yearly basis (and it can reasonably be assumed that the number of inhabitants remains stable throughout one year), we chose to use the year as reference period.

$$Tourism\ intensity\ index_t = \frac{Overnight\ stays_t / 365}{Total\ resident\ population_t} * 100$$

Equation 6: Tourism intensity index calculation

Where t = year.

Values can range from a minimum of 0% (every 100 inhabitants, 0 tourist overnight stays within a year) to a maximum of 100% (every 100 inhabitants, 100 tourist overnight stays within a year), but the index can potentially take on values higher than 100%, given that there is no limit to the number of overnight stays with respect to the number of inhabitants.

5.2 Difference in rent prices between touristic and non-touristic municipalities

"Difference in rent prices between touristic and non-touristic municipalities" is an indicator for price differences of rents in more and less touristic municipalities. Data, elaborated by ASTAT, are available on a yearly basis and were distinguished by central and peripheral areas of each municipality. To summarize this vast amount of information, we decided to compare the evolution of minimum rent prices between municipalities with high and low tourism exposure. We calculated average values of prices for both municipality groups and all available year. Values are expressed in Euros and can range from 0 to infinity.

5.3 Percentage of guests satisfied with prices

"Percentage of guests satisfied with prices" shows tourists' evaluations of prices in South Tyrol. Data, collected by ASTAT and Eurac Research during the summer season 2013, as well as by Eurac Research during the summer season 2020, consist of survey data. This specific question was aimed at measuring the extent to which tourists were satisfied with prices of accommodation facilities and food services, irrespective of the price level.

From all possible answers (very satisfied/satisfied/neutral/dissatisfied/very dissatisfied), the percentage values of respondents who answered with "satisfied" or "very satisfied" were grouped and reported. The values can range from a minimum of 0% to a maximum of 100%.

5.4 Percentage of guests satisfied with their holiday in the destination

"Percentage of guests satisfied with their holiday in the destination" refers to tourists' evaluations of their stay in South Tyrol overall. Data, collected by ASTAT and Eurac Research during the summer season 2013, as well as by Eurac Research during the summer season 2020, consist of survey data. This specific question was aimed at measuring the level of satisfaction of guests with their holiday. From all possible answers (very satisfied/satisfied/neutral/dissatisfied/very dissatisfied), the percentage values of respondents who answered with "satisfied" or "very satisfied" were grouped and reported. The values can range from a minimum of 0% to a maximum of 100%.

5.5 Percentage of residents for whom the advantages of tourism in the destination outweigh its disadvantages

"Percentage of residents for whom the advantages of tourism in the destination outweigh its disadvantages" refers to the perception of the local population of the effects of tourism on South Tyrol. Data, collected by HGV in 2018, as well as by Eurac Research in 2020, consist of survey data. This specific question was aimed at measuring the local population's attitude towards tourism. Participants could either answer with "the disadvantages of tourism in South Tyrol outweigh the advantages" or "the advantages of tourism in South Tyrol outweigh the disadvantages". The percentage value of those who chose the latter answer is reported. The value can range from a minimum of 0% to a maximum of 100%.

6 Energy management

6.1 Estimated minimum electricity consumption in accommodation facilities

"Estimated minimum electricity consumption in accommodation facilities" stands for an estimation of the minimum energy consumption in accommodation facilities using coefficients from existing literature (Bundesministerium für Wirtschaft, Familie und Jugend Wirtschaftskammer Österreich, Fachverband Hotellerie, Fachverband Gastronomie, Österreichische Hoteliervereinigung, 2011). Coefficients for electric energy are different according to accommodation category and performance conditions of the facilities. We chose to use those expressed in units per overnight stay. Given that data provided by ASTAT on overnight stays were available on a monthly basis, the resulting indicator is on a monthly basis as well. Therefore, we estimated the minimum energy consumption in accommodation facilities based on the following formula:

$$minimum\ electric\ energy\ consumption_t = \sum_{i=1}^{n} o_i * \alpha_i$$

Equation 7: Minimum electric energy consumption calculation

Where i = type of accommodation categories, o = overnight stays, α = electric energy consumption coefficient under optimal performance conditions and t = month.

We obtain data on monthly overnight stays by accommodation category (n=3) from ASTAT. The categories provided by ASTAT are comparable to the categories found in the guidelines provided by the Bundesministerium für Wirtschaft, Familie und Jugend Wirtschaftskammer Österreich et al. (2011). In this way, we can estimate the minimum energy consumption. That is, the energy consumption in the case that all accommoda-

tion facilities are energy efficient. Values are expressed in millions kWh and can range from 0 to infinity.

6.2 Electricity consumption by ski-lifts and snow cannons
"Electricity consumption by ski-lifts and snow cannons" stands for the amount of electric energy consumed by these two infrastructures. Data are provided by ASTAT on a yearly basis and are available only aggregated (consumption by ski-lifts cannot be distinguished by that of snow cannons). Values are expressed in kW/h and can range from 0 to infinity.

6.3 -Number of charging stations offered for e-mobility in accommodation facilities and public spaces
"Charging stations offered for e-mobility in accommodation facilities and public spaces" aims at showing how many charging stations for e-mobility are available throughout South Tyrol and of which type. Stations can in fact be public or located in accommodation facilities. We obtained data from the Neogy and Tesla websites. Data refer to the month of April in the year 2021.

7 and 8 Water & Waste water management

7.1 Estimated minimum water consumption in accommodation facilities
"Estimated minimum water consumption in accommodation facilities" stands for an estimation of the minimum water consumption in accommodation facilities using coefficients from existing literature. The same calculation used for energy consumption was done using the water coefficients available in literature (Bundesministerium für Wirtschaft, Familie und Jugend Wirtschaftskammer Österreich, Fachverband Hotellerie, Fachverband Gastronomie, Österreichische Hoteliervereinigung, 2011). For the calculation formula, please refer to Equation . Values are expressed in million liters and can range from 0 to infinity.

7.2 Water use by snow guns
"Water use by snow guns" stands for the quantity of water used by snow guns throughout South Tyrol. Data, provided by APAC, were available on a yearly basis, referring to the winter season only. Values are expressed in million cubic meters and range from 0 to infinity.

8.1 Discharge of sewage water due to tourism
"Discharge of sewage water due to tourism" stands for the proportion of sewage water attributable to tourism when compared to other users. Data are provided by APAC on a yearly basis. The calculation done by APAC is based on the population equivalents for tourism, which is calculated according to hydraulic engineering standards, in conformity with local legislation (Decreto del Presidente della Provincia 21 gennaio 2008, n. 6, Disciplina degli scarichi di acque reflue, Allegato A[13]). For accommodation facilities the population equivalent is based on the number of beds (1 or 2 population equivalent per bed, depending on the accommodation category). This calculation is used to estimate the maximum capacity of waste water treatment plants, rather than their actual use. That is, APAC uses the calculation estimate the maximum capacity a plant must be able to handle. Values can range from a minimum of 0% (the discharge of sewage water is not attributable to tourists at all), to a maximum of 100% (the discharge of sewage water is entirely attributable to tourists).

13 Available here: http://lexbrowser.provinz.bz.it/doc/it/dpgp-2008-6/decreto_del_presidente_della_provincia_21_gennaio_2008_n_6.aspx?view=1

9 Solid waste management

9.1 Estimated waste production in accommodation facilities

"Estimated waste production in accommodation facilities" stands for an estimation of the average waste production in accommodation facilities using coefficients from existing literature (Hamele & Eckardt, 2006). The average weight of waste per overnight stay according to Hamele & Eckardt (2006) amounts to 1.98 kg per overnight stay. This coefficient was retrieved by an analysis of 36 hotels in the 2 to 4-star categories in Germany and Austria. We decided to use this coefficient because of the similarities between South Tyrol, Germany, and Austria in terms of geographical characteristics, governance, target markets and seasonality. Given that data provided by ASTAT on overnight stays were available on a monthly basis, the resulting indicator is on a monthly basis as well. Therefore, we estimated the average waste production in accommodation facilities based on the following formula:

$$Average\ waste\ production_t = o_t * 1{,}98\text{kg}$$

Equation 8: Average waste production calculation

Where o represents overnight stays and t indicates time.

The output is therefore an estimate of the waste production in South Tyrol under the assumption that accommodation facilities are comparable with the sample used by Hamele & Eckardt (2006). Values are expressed in tons and can range from 0 to infinity.

10 Mobility

10.1 Mobilcards, bikemobil cards, museumobil cards and guest tickets

"Mobilcards, bikemobil cards, museumobil cards and guest tickets" stands for the number of tickets giving access to public transport that have been activated throughout South Tyrol and their use. Data, provided by the South Tyrolean agency responsible for public transport are available on a yearly basis and are distinguished by card type. Values can range from 0 to infinity.

10.2 Number of ski-lift and cable car users by season

"Number of ski-lift and cable car users by season" stands for the number of users of either ski-lifts or cable car throughout South Tyrol, distinguished by season (winter and summer). Data, provided by ASTAT, were thus provided twice a year. Values are expressed in million users and can range from 0 to infinity.

10.3 Kilometers travelled using car sharing services by non-local users

"Kilometers travelled using car sharing services by non-local users" stands for the number of kilometers travelled using Car Sharing South Tyrol by non-local users. That is, by persons who have their residence outside South Tyrol. Data are then distinguished by user type (Italian, German, Austrian, Swiss, Flinkster or other users). Car Sharing South Tyrol provides data on a daily level. We aggregate the daily data to annual data using summation. Values are expressed in kilometers and can range from 0 to infinity.

11 Land use and landscape diversity

11.1 Beds in hotels and similar establishments per land use zone and category

"Beds in hotels and similar establishments per land use zone and category" indicates the number of beds in hotels and similar establishments per land use zone and category

on municipality level. The surface area of South Tyrol is divided into different land use zones, defined by the law "Landesgesetz Nr. 9" from 10.07.2018. Each land use zone has specific characteristics and is linked to specific requirements and regulations.

11.2 Development of the areas for tourist facilities

The indicator “development of the areas for tourist facilities ” shows the change in hectares of areas for tourist facilities 2015 and 2020. According to the decree "Dekret des Landeshauptmanns" from 18.10.07 nr. 55 this type of land use zone is dedicated specifically for the realization of tourism infrastructure.

11.3 Bed density of hotels and similar establishments in residential zones

This indicator reflects the density of beds of hotels and similar establishments in residential zones at municipality level. Residential zones can be divided in three categories: A - Historic centre, B - Filling zones, C - Expansion Zones. For the indicator, the sum of all residential zones (in hectare) was calculated and then divided by the total number of beds in hotels and similar establishments in residential zones for each municipality.

12 Nature conservation

12. 1 Nature conservation survey

In July 2021, 72 tourism organizations from South Tyrol were invited by email or telephone to participate in a survey. The nine questions included both quantitative and qualitative aspects concerning the nature conservation of the respective tourism zone. 46 tourism organizations accepted the invitation and the survey was completed via a website by the directors or their deputies of the tourism organization in question.

13 Culture

13.1 Case study transhumance

For the case study on transhumance, a qualitative, exploratory approach was adopted. Two municipalities in South Tyrol, in which transhumance is still maintained and celebrated were chosen. By limiting the study to one highly developed touristic community, Wolkenstein - Selva di Val Gardena with 246,470 arrivals and 1,294,036 overnight stays in 2019, and one less developed touristic community, Schnals-Senales with 74,412 arrivals and 326,406 overnight stays in 2019 (ASTAT 2021), it was possible to make more precise distinctions as to the influence of tourism on the local culture. Primary questions used as guidelines were formulated for conducting semi-structured interviews with various individuals from both localities in the fields of culture, tourism, and farming. The interviews were conducted via Microsoft Teams and Skype. They were recorded, transcribed, and in the following analyzed using the software GABEK (Zelger, 1994). GABEK stands for “Holistic Management of Complexity” and is particularly suitable as an analysis method when open, unstructured data material is available (Zelger, 1994). Using GABEK, the interviews could be coded and the results visualized.

13.2 Survey on culture and tourism

A survey with agents from the tourism and the cultural domain was carried out. Municipal annalists and tourism organizations were contacted via email, letter and telephone while the survey was carried out online. Out of the registered 426 municipal annalists, 75 responded to the following question, while 46 out of 72 tourism organizations took part in the survey. The five questions asked included subjective perceptions on the relation between local culture and tourism (presented for this report), but also questions on the most active stakeholders and organizations engaged in the preservation of local culture, as well as a listing of local cultural events and traditions and their scope: for the identity of the municipality, for touristic purposes. Specifically, a question also addressed the

introduction of new traditions or customs or the revival of old, forgotten customs for the scope of tourist attention.

13.3 Entries in museums by tourists using mobility cards
Aggregate museum entries per day were calculated for all museum entries that were effectuated with a tourist mobility card between 2017 and 2020. Data sources stem from Lorima GmbH and ASTAT Südtirol.

LIST OF ABBREVIATIONS

AMB: Amt für Arbeitsmarktbeobachtung [Department of Labour Market Observation]
APAC: Agency of the Autonomous Province of Bolzano/Bozen of the Environment and Climate
ASTAT: Statistic Institute of the Autonomous Province of Bolzano/Bozen
CAS: Center for Advanced Studies at Eurac Research
HGV: South Tyrolean Hotels and Restaurants Association
ISTAT: Istituto nazionale di statistica [National Institute of Statistics]
WIFO: Institut für Wirtschaftsforschung [Institute of Economic Research], Chamber of Commerce of Bolzano/Bozen

Notes

Notes

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research

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