

CLIMATE CHANGE AND THE FUTURE OF PAMPOROVO SKI RESORT BULGARIA. THE VIEW OF THE LOCAL POPULATION

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Abstract

The paper is focused on climate change and the future of a major ski resort in Bulgaria as seen by the inhabitants of three adjacent settlements that have been traditionally related to the out-of-the-settlement resort complex. The study aims to identify the respondents' perceptions about the global climate change phenomenon, the specific manifestations of local climate change, and their implications for the current and future development of the Pamporovo resort. The views and opinions of local residents are analyzed on the basis of a questionnaire survey conducted in 2018. Identified perceptions are discussed in the broader context of previous studies conducted worldwide and the decision-making process regarding climate change, mountain tourism and ski resort adaptation. Conclusions are drawn concerning the respondents' general views and specific suggestions as well as the need for further research and methodology refinement.

Keywords: *perceptions, local residents, climate change, ski tourism, adaptation*

1. INTRODUCTION

Climate change has become an important theme in the public realm and even though the physical reasons behind it are still questionable among scientists, the effects can be generally observed even today. One of the economic spheres that is most threatened by current and potential climate change is tourism, with the ski industry defined as the most vulnerable tourism sector, as well as being the most studied example (Scott et al, 2012; Bürki et al., 2003; Yang & Wan, 2010). As this is usually the core economic activity in many mountain communities, its effects may have a huge impact over the general economic situation of these regions, as well as on the individual livelihood strategies of their residents (Trawöger, 2014) The views and opinions of the local population are necessary to study for two reasons - first, it is the locals who have the deepest knowledge about the typical climate and its abnormalities in their own region and should be those first able to sense any change in it; and second, they are among the key stakeholder groups to be considered when it comes to adaptation strategies for sustainable tourism development.

This paper is focused on climate change and the future of the Pamporovo Ski Resort in Bulgaria as seen by the inhabitants of three adjacent settlements that have been traditionally related to the out-of-the-settlement resort complex. The study aims to identify the respondents' perceptions on the global climate change phenomenon, the specific manifestations of local climate change, and their implications for the current and future development of the Pamporovo resort. Local dwellers and their views are researched based on their two roles – as general lay public and as one of the key stakeholder groups in a tourist destination context. Results do not only describe the general climate change opinions within the studied mountain region in Bulgaria, but also help connect these views with the problems of ski tourism development in the area.

2. LITERATURE REVIEW

2.1 General climate change perceptions

Personal experience of potential changes in weather, translated into perceptions of climate variability and change, are an important component for the adaptation at an individual or community level (Howe & Leiserowitz, 2013). The general public are influenced not only by scientific and technical descriptions of possible climate change risks, but also by a whole set of psychological and social factors such as personal experience, emotions, imagery, trust, values and worldviews (Leiserowitz, 2005). The mass media are the main representor and propagator of the climate change phenomenon to the majority of population (Gomez-Martin et al., 2014). On a personal level, identifying the abnormalities in climate requires comparison between current experience and memories of past experience or descriptive information from external sources with the potential biases to outweigh recent experience in memory and disregard the prior events (Howe & Leiserowitz, 2013). When it comes to perceptions of climate change risks, people traditionally believe that climate changes and impacts occur to other people and nations, those born in the future, and that they will be more serious for distant locations (Spence et al., 2011; Scannel & Gifford, 2013). Spence et al. (2011) call this phenomenon 'psychological distance' and determine its four dimensions: 1) spatial (geographical); 2) temporal; 3) distance between the perceiver and the target (individual or group), and 4) uncertainty. In general, the higher the personal concern about climate change, the lower the psychological distance observed.

Previous research in the United Kingdom and the United States clearly indicate high public awareness with increasing signs of scepticism over the issue during the past years, with approximately 40% of the British public under the opinion that climate system is too complex for scientists to make useful forecasts (Spence et al., 2011). Americans as a whole perceive global climate change as a moderate risk and are less concerned about unlikely local impacts, seeing the danger to geographically and temporally distant people, places and non-human nature (Leiserowitz, 2005). British and US surveys confirm other national issues like health care, education, safety, economy and terrorism or even environmental issues like clean air, to be of greater concern than climate change, being more easily understood and having direct local and personal relevance (Scannel & Gifford, 2013; Leiserowitz, 2005). Similar statistics for Bulgaria can be acquired from a survey in all EU member states which had as one of the main objectives the identification of perceptions about climate change and its seriousness, as well as a comparison to other global challenges. The Eurobarometer survey carried out in March 2017 reveals that more than seven in ten respondents in Bulgaria believe climate change is a 'very serious' problem

(72% vs. EU average 74%). However, less than one in ten see it as the most serious problem the world is facing (7% vs. EU average 12%), with a decrease of 6 percentage points compared to a previous survey conducted in 2015 (European Commission, 2017).

Leiserowitz (2005) identifies several distinct groups in accordance with their climate change views, based on risk perceptions, affective imagery, cultural worldviews, and religion, as well as socio-demographic characteristics – namely naysayers, alarmists, and those, confusing climate change with ozone-hole depletion. Among the population perceptions about climate change, women and participants with higher education are found to be more climate change aware and environmentally concerned (Scannel & Gifford, 2013; Crona et al., 2013).

Personal risk in developed countries is perceived as lower than societal risk, while local environmental issues are of bigger concerns to respondents from less industrialised developing nations (Spence et al., 2011). The changes that people notice are closely related to those aspects directly connected to the livelihoods they are engaged in, so many of the residents from one and the same community may identify different changes depending on occupation, while perceptions of people whose lives are not dependent on weather, like the majority of the population in industrialised countries, become unclear (Howe & Leiserowitz, 2013).

In the reviewed literature, special attention is paid to the traditional environmental knowledge of the local population and the comparison of the typical weather with current abnormalities and increased inability to forecast the weather with the same certainty as in the past (Duerden, 2004). The growing understanding that people are good natural observers of their local environment leads to an appreciation of their knowledge in both the cultural and ecological context and it is recognized that local perceptions reflect real-world and tangible concerns (Crona et al., 2013).

The concept for place attachment in connection to climate change is also discussed in the literature as it can either provoke place protective intensions, or on the contrary, underlie actions that are harmful to one's place, especially connected to tourism overuse (Scannel & Gifford, 2013). Place attachment and sense of pride are emerging as important factors for climate adaptation in regions where existing livelihoods are unlikely to be maintained as a result of increasing climate change manifestations (Adger et al., 2012).

Howe & Leiserowitz (2013) question the extent to which perceptions of local weather changes could be biased by pre-existing beliefs about climate change at a global scale. Their research reveals that global warming beliefs bias perceptions of seasonal temperature, but the effect is strongest among those who do not believe in climate changes or in other words, excluding this group, individuals as a whole are likely to accurately recall their experiences with seasonal climate conditions whether or not consistent with long-term climate change. This conclusion is proved by a study in 89 countries that found that perceptions of local temperature change correspond to quantifiable observations of recent temperature change so as global climate change continues to cause increases in local average temperatures, individuals will increasingly notice these changes through their own direct experience (Howe et al., 2012).

Duerden (2004) stresses on the big uncertainty caused by difficulty in transforming the large scale climatic scenarios and the impact on human activity in different local geographies and communities with a different mix of local conditions, population attitudes, cultural history and economic relationships. The demography and economy of the community and the local people's perceptions of the current or expected changes in the physical environment will determine the extent to which climate change will be experienced at a local level (Duerden, 2004). The impacts of climate change are also expected to change community culture in the form of beliefs, rituals, art, stories, shaping their own collective outlooks and behaviours - for instance, retreat and loss of

snow cover would lead to loss of winter culture and recreation, and the place of snow in ritual and the sense of place (Adger et al., 2012).

2.2 Climate change and ski industry stakeholders' perceptions

A specific case within climate change research on perceptions is that of the perceptions of the stakeholder groups in the ski industry – considered as one of the most vulnerable tourism sectors (Bicknell & McManus, 2006). An impressive number of studies have been published regarding the perception of climate change effects on ski tourism over the past decade, with the more recent being published for Australia, New Zealand, Austria and Switzerland (Wyss et al., 2014), though they have been significantly less addressed compared to the technical capacity, economic feasibility and environmental limitations (Hopkins, 2014). Individual climate change perceptions must be taken into account, together with the structural aspects of destination governance, in order to assess the vulnerabilities of tourism destinations and strengthen the resilience of local tourism systems. It is important to understand how climate change impacts are perceived by tourism stakeholders in a specific geographical context and what influence these perceived impacts will have on cooperation patterns between the various actors along the supply chain (Wyss et al., 2014). Wolfsegger (2005) stresses that perceptions are important because they can either lead to misconceptions and mal-adaptations, thus increasing the costs of climate change, or result in exaggerated measures, with both extremes having negative consequences. However, limitations should be outlined regarding stakeholders' perceptions and their consideration in terms of differences between the mental picture of climate change and real physical change (Burki, 2000), as well as between opinions of scientists, lay people and decision makers (Wolfsegger, 2005).

Although the vulnerability of local mountain communities relying on snow-related and seasonal tourism towards climate change is acknowledged in the observed literature (Hill et al., 2010), research on their perceptions is extremely limited. On a local level it is the stakeholders' opinion rather than general views and particular perceptions of local population that have been studied. Authors undertake a qualitative approach by conducting interviews with representatives of different local stakeholders (tourist businesses, small operators, NGOs and local tourism and administrative authorities) or selected community representatives (Hill et al., 2010; Bonzanigo et al., 2016; Morrison & Pickering, 2013) rather than conducting studies focussed purely on the local population.

Research on host communities is challenging as they are not homogenous but rather consist of different groups with different preferences and perspectives on tourism and climate change, and the related adaptation needs (Kajan & Saarinen, 2013). Hill et al. (2010) see the local communities as mostly focussed on maintaining the current state of tourism and not showing an interest in capitalizing from new climate-change related opportunities. Despite this, destination communities can play a vital role as they have the potential to detect even detailed changes in their surrounding environments because they are the experts in their own communities and, through participation, can contribute to more general sustainable development (Kajan & Saarinen, 2013).

Adaptation research frequently uses local knowledge, history and current experiences but not in tourism research (Kajan & Saarinen, 2013). Therefore, attention to the local population in studies of climate change impacts should be increased as in the end they are the ones who need to live with the decisions made by the tourism industry, developers and policy makers and to bear

the costs of these decisions. For example, artificial snowmaking and diversification of services have been considered main adaptation strategies for the ski industry, but they require flexibility, hence, acceptance from the host community (Kajan & Saarinen, 2013). The lack of community engagement seems strange as local residents are considered ‘a vital component of tourism planning and development’ and ‘an essential part of creating the local atmosphere in a destination’ (Kajan & Saarinen, 2013, p. 184), which is especially true for communities in rural and remote locations. The current study as a part of a broader research among all stakeholders in a destination, aims to identify the specific views and opinions of the sub group of local residents, that are widely researched in general climate change literature, but not in climate change impact and tourism context.

3. METHODOLOGY

The resort of Pamporovo has been selected as an illustrative case study because it is one of the three major ski resorts in Bulgaria - in 2017 its accommodation capacity accounted for 5,331 bed-places in 52 establishments; the resort was visited by 130,395 tourists, and the revenue from accommodation only was EUR 7.9 million (NSI, 2018). Furthermore, it is located at an average altitude of just 1,650 m on the territory of two municipalities (Smolyan and Chepelare) in the Rhodope Mountain which is the most densely populated mountain area in the country. Therefore, the three settlements adjacent to the out-of-the-settlement resort complex have been considered the most appropriate polygon for studying the perceptions and opinions of the local population regarding climate change and the future of ski tourism in the region. These settlements are quite different in their demographic and economic profile but still similar in their strong traditional connection to the development of Pamporovo as a ski resort. According to the latest official data the population size there is as follows: the town of Smolyan - 27,255 inhabitants; the town of Chepelare - 4,666 inhabitants; the village of Stoykite - 164 inhabitants (MRDPW, 2018).

The questionnaire survey of the local population was conducted in September and October 2018. It was performed during three four-day trips to the studied settlements, and was coupled with a wider qualitative research of local stakeholders that goes beyond the scope of the current paper. Considering the restricted budget and time limitations of the survey, as well as the problematic access to a potential random selection of local residents, non-probability sampling was preferred. Specifically, a combination of quota and convenience sampling techniques was implemented to ensure higher reliability of results.

The number of distributed questionnaires was 250 and a total of 170 valid surveys were collected, thus indicating a response rate of 68%. The sample covered reasonable proportions of male and female respondents of various age groups, education and occupation, including those directly or indirectly involved in the tourism industry of Pamporovo (26.22%) as well as people not involved with the resort development (73.78%). The proportion of survey participants by place of residence reflected the different number of population in the studied settlements (Table 1).

The questionnaire contained 19 questions most of which were close-ended with one or more answers possible, some of them giving an option for additional free comments. It was designed to collect both qualitative and quantitative information about the respondents’ perceptions regarding the following aspects: 1) global climate change and its manifestation at a local level; 2) relevance of artificial snow production; 3) the extent to which the Pamporovo Resort is threatened by climate change compared to other major ski resorts in Bulgaria; 4) the resort’s current

significance for the local economy and the level of involvement of the locals in its economic activities; 5) appropriate adaptation strategies for the ski resort of Pamporovo and overall vision for its future development; 6) respondents' demographic and social characteristics.

Table 1. The sample structure by demographic and social characteristics (n=170)

Variables	Categories	Number of valid cases	Share of valid cases
Gender	Male	91	53.53%
	Female	79	46.47%
Age group	< 30 years	39	23.21%
	31-50 years	92	54.76%
	>50 years	37	22.02%
Education	Primary	7	4.29%
	Secondary	81	49.69%
	Higher	75	46.01%
Sphere of activity	Tourism business	32	19.88%
	Trade & Services	58	36.02%
	Production	35	21.74%
	Public sector	26	16.15%
	Retired / Unemployed	10	6.21%
Job position	Owner	21	13.64%
	Manager	15	9.74%
	Employee	118	76.62%
Directly or indirectly involved with the tourism industry of Pamporovo	Yes	43	26.22%
	No	121	73.78%
Place of residence	Smolyan	127	74.71%
	Chepelare	27	15.88%
	Stoykite	16	9.41%

All close-ended questions were coded and subjected to descriptive data analysis using SPSS software, thus forming the core of the research findings. Additionally, free comments were grouped and integrated in the text. Most of the data was put through bivariate analysis comprising cross tabulations and measures of association (Cramer's V). In particular cases, inferential statistics was applied to test the quality of the survey results and the extent to which generalizations and conclusions could be made on their basis.

Limitations of the survey refer to the relatively small number of valid respondents (170) and the non-probability sampling implemented. Therefore, the research findings should be considered with caution. Although not fully representative, they reveal interesting insights, enable tentative conclusions, and lay the ground for future research and methodology refinement.

4. RESULTS

4.1 Perceptions of global climate change and its manifestation at local level

Given a 5-grade Likert scale, participants were asked to assess the climate change threat at a global, regional and local level. Results in Table 2 show a very high degree of acceptance of the issue at a global level (4.22) and statistically significant association with the respondents' sphere of activity, education and place of residence. Such threats are higher scored by those involved in the tourism industry, higher educated, and by the inhabitants of the small town of Chepelare.

Table 2. Perceptions of climate change manifestation at different levels - respondents' agreement on a 5-grade scale

		Climate change is a serious global problem			Climate change affects South-Eastern Europe, including Bulgaria			Climate change represents a serious threat to ski tourism in Pamporovo		
		Mean	SD	Sig.	Mean	SD	Sig.	Mean	SD	Sig.
Total		4.22	1.25		3.92	1.25		3.62	1.25	
Involved with Pamporovo	Yes	4.19	1.21	0.320	3.93	1.31	0.921	3.63	1.30	0.852
	No	4.27	1.26		3.94	1.23		3.64	1.24	
Sphere of activity	Tourism business	4.50	1.11	0.019*	3.97	1.40	0.318	3.93	1.36	0.123
	Trade & Services	4.30	1.13		3.84	1.27		3.70	1.22	
	Production sector	3.81	1.19		3.87	0.94		3.39	1.02	
	Public sector	4.15	1.59		4.20	1.32		3.36	1.50	
	Retired / Unemployed	4.30	1.34		3.67	1.41		3.40	0.84	
Job position	Owner	4.00	1.49	0.629	3.84	1.42	0.832	3.42	1.50	0.837
	Manager	4.33	1.40		4.14	1.17		3.71	1.38	
	Employee	4.22	1.21		3.93	1.23		3.64	1.25	
Education	Primary	3.67	1.63	0.007*	3.67	1.63	0.003*	3.67	1.63	0.119
	Secondary	3.96	1.40		3.59	1.30		3.38	1.34	
	Higher	4.53	1.01		4.25	1.10		3.85	1.15	
Age group	< 30 years	4.14	1.42	0.807	3.92	1.42	0.661	3.68	1.45	0.443
	31-50 years	4.34	1.04		3.92	1.10		3.70	1.13	
	> 50 years	3.97	1.55		3.90	1.47		3.38	1.34	
Gender	Male	4.05	1.39	0.113	3.88	1.27	0.714	3.46	1.30	0.071
	Female	4.42	1.05		3.97	1.22		3.83	1.18	
Settlement	Smolyan	4.27	1.15	0.025*	4.02	1.19	0.107	3.69	1.14	0.591
	Chepelare	4.44	1.33		3.91	1.27		3.55	1.60	
	Stoykite	3.50	1.63		3.20	1.52		3.25	1.53	

Note: * means significantly different ($p < 0.05$) as measured by the tests of Kruskal-Wallis and Mann-Whitney

Changing the scale from global to regional (i.e. Southeastern Europe and Bulgaria) the results for 'completely agree' start to decrease, with an increase for those who just agree and those who are neutral to climate change threats, with an average acceptance of 3.92. No considerable differences regarding the manifestation of climate change threats at this level are observed between separate subgroups of respondents. Significant connection is found only with the education level – the higher it is, the bigger the acknowledgement of climate change on a regional scale.

The trend of denial continues with a similar declining step when the question is asked about climate change threats particularly for Pamporovo Resort and the development of ski tourism there – the average score is reduced to 3.62. Although not statistically significant, it can be seen that the statement is least accepted by the participants working in the public and production sectors as well as the retired or unemployed; by those with secondary education, above 50 years of age, and those living in the smallest of the three settlements – Stoykite. On the other hand, tourism business representatives give the highest support to the statement (3.93) compared to all other subgroups of respondents.

Somewhat surprisingly, a broad consensus was found among the survey participants that climate in their area is changing. A positive answer to the question was given by 86% of the respondents, with only 8% disagreeing and 7% undecided (Figure 1). Lowest agreement was demonstrated by those respondents with primary education level, followed by the subgroup of business owners and the inhabitants of the village most reliant to ski tourism in Pamporovo – Stoykite.

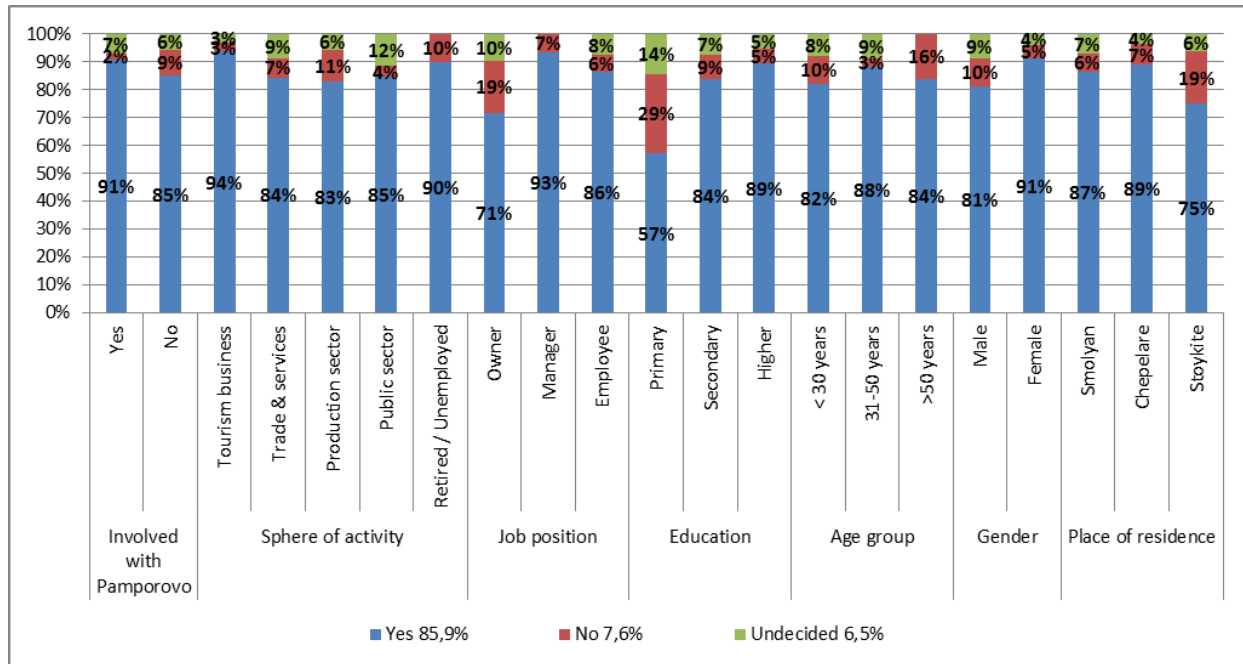


Figure 1. 'In your opinion, is climate changing in the Rhodope Mountain?' – Share of respondents

Considering the unanimity of perceptions on this question, it is not surprising that Cramer's V measures of association reveal a weak connection of the answers with the respondents' social and demographic profile. A slightly stronger relationship is observed in terms of age only but no statistically significant results have been found (Table 3).

Table 3. Cramer's V measure of association between the respondents' perceptions of climate change in the Rhodope Mountain and their social and demographic profile

	Cramer's V	Approx. Sig.	N of Valid Cases
Involvement with Pamporovo Resort	.115	.338	164
Sphere of activity	.125	.756	161
Job position	.138	.211	154
Education	.137	.192	163
Age group	.167	.051	168
Gender	.141	.183	170
Settlement	.102	.473	170

When asked to identify the main problems Pamporovo is facing from a climate change perspective, the majority of respondents pointed to a shorter winter season (66%), lack of real snow (48%) and unseasonal weather (43%) as well as higher temperatures (39%), as being the most important ones (Table 4).

Table 4. Perceptions of climate-induced problems applying to Pamporovo Resort – share of valid cases by selected subgroups of respondents (column %)

	Total	Local climate is changing*			Gender*		Involved in Pamporovo		Job position			Education		
		Yes	No	Undecided	Male	Female	Yes	No	Owner	Manager	Employee	Primary	Secondary	Higher
A shorter winter season	66%	70%	31%	60%	56%	77%	75%	64%	68%	79%	63%	29%	65%	70%
Lack of real snow	48%	48%	54%	40%	44%	52%	50%	46%	53%	50%	48%	71%	44%	49%
Unseasonal weather	43%	47%	8%	30%	51%	34%	43%	43%	47%	57%	38%	29%	44%	39%
Higher temperatures	39%	43%	15%	20%	39%	39%	40%	39%	42%	57%	36%	14%	32%	47%
Bad condition of snow	15%	13%	31%	10%	15%	14%	8%	17%	26%	7%	14%	29%	15%	14%
None of the mentioned	4%	3%	15%	10%	6%	3%	8%	3%	11%	0%	3%	0%	4%	6%
No of valid respondents	164	141	13	10	87	77	40	119	19	14	115	7	81	70
Chi-square		30.471			14.330		5.180		11.677			14.899		
df		12			6		6		12			12		
Sig.		.002 ^{*,b,c}			.026 [*]		.521		.472 ^{b,c}			.247 ^{b,c}		

Notes: A multiple response question - the sum of column percentages exceeds 100%

*. The Chi-square statistic is significant at the 0.05 level.

b. More than 20% of cells in this sub-table have expected cell counts less than 5. Chi-square results may be invalid.

c. The minimum expected cell count in this sub-table is less than one. Chi-square results may be invalid.

The breakdown of results indicates statistically significant differences with the reference to the expressed agreement on climate change already observed in the Rhodope Mountain and the respondents' gender. Looking at the first connection, those convinced in local climate change clearly support all of the four major identified issues, giving even higher priority to the shortened season (70%). Those who are neutral if local climate is changing also give very high acceptance on the issue of shortened ski season (60%) and the problem with the lack of real snow (40%), while for the deniers of climate change the lack of real snow is the most frequent issue (54%) as well as its poor quality (31%).

The analysis by gender reveals that women are much more concerned with the tourist season duration (77%) and the lack of real snow (52%) while men are less worried about most of the enumerated issues, checking more frequently only unseasonal weather (51% vs. 34%).

Even not statistically significant, other results are also interesting. Respondents who are involved with the tourism industry in the Pamporovo Resort are much more disturbed by the shorter winter season (75%) and the lack of real snow (50%) than those who are not involved. The shorter season is most often pointed to by higher educated people (70%) while those with primary education focus on the lack of real snow (71%). Finally, it is worth noting that the highest concern regarding the winter season duration is observed among respondents performing managerial functions (79%).

4.2 Pamporovo resort's relative vulnerability

Even confessing that their local climate is changing, the majority of respondents share the opinion that the nearby resort is not threatened by climate change more than other major Bulgarian ski resorts (57%). There are though two major equally split groups who are either undecided (20%), or consider Pamporovo is more in risk than the others (21%).

Table 5. Perceptions how much Pamporovo is threatened by climate change compared to other major ski resorts in Bulgaria – share of respondents (row %) and Cramer's V measures of association

		More than others	Less than others	As much as others	Undecided	Number of valid cases = 100%	Cramer's V	Approx. Sig.
Total		21%	2%	57%	20%	170		
Involved with Pamporovo	Yes	23%	5%	51%	21%	43	.113	.550
	No	20%	2%	61%	17%	121		
Sphere of activity	Tourism business	16%	9%	59%	16%	32	.188	.144
	Trade & Services	22%	0%	59%	19%	58		
	Production sector	31%	0%	51%	17%	35		
	Public sector	15%	4%	50%	31%	26		
	Retired / Unemployed	0%	0%	80%	20%	10		
Job position	Owner	24%	5%	62%	10%	21	.181	.119
	Manager	47%	7%	33%	13%	15		
	Employee	19%	2%	56%	24%	118		
Education	Primary	43%	0%	14%	43%	7	.168	.162
	Secondary	22%	2%	52%	23%	81		
	Higher	17%	3%	65%	15%	75		
Age group	< 30 years	13%	0%	54%	33%	39	.175	.115
	31-50 years	24%	2%	55%	18%	92		
	> 50 years	16%	5%	68%	11%	37		
Gender	Male	15%	4%	60%	20%	91	.195	.092
	Female	27%	0%	53%	20%	79		
Settlement	Smolyan	21%	2%	56%	20%	127	.077	.917
	Chepelare	19%	0%	63%	19%	27		
	Stoykite	19%	6%	56%	19%	16		

Practically no differences in opinions were found in regards to the respondents' personal involvement with the resort of Pamporovo as well as to their place of residence. Relatively higher association was identified with the reference to gender, sphere of professional activity, and job position (Table 5). Women are more concerned than men, with almost twice higher percentage of those considering Pamporovo Resort more in danger (27% vs. 15%). Survey participants working in the tourism industry are less concerned compared to those occupied in other sectors, with the highest share considering Pamporovo even less threatened than other major ski resorts (9%). On the other hand, managers appear as the most worried subgroup, with 47% considering the resort being more in danger.

The local population is rather split in terms of optimistic or pessimistic expectations regarding the future of Pamporovo resort – 42% of the respondents are optimistic, while 34% are undecided and 24% are pessimistic (Figure 2).

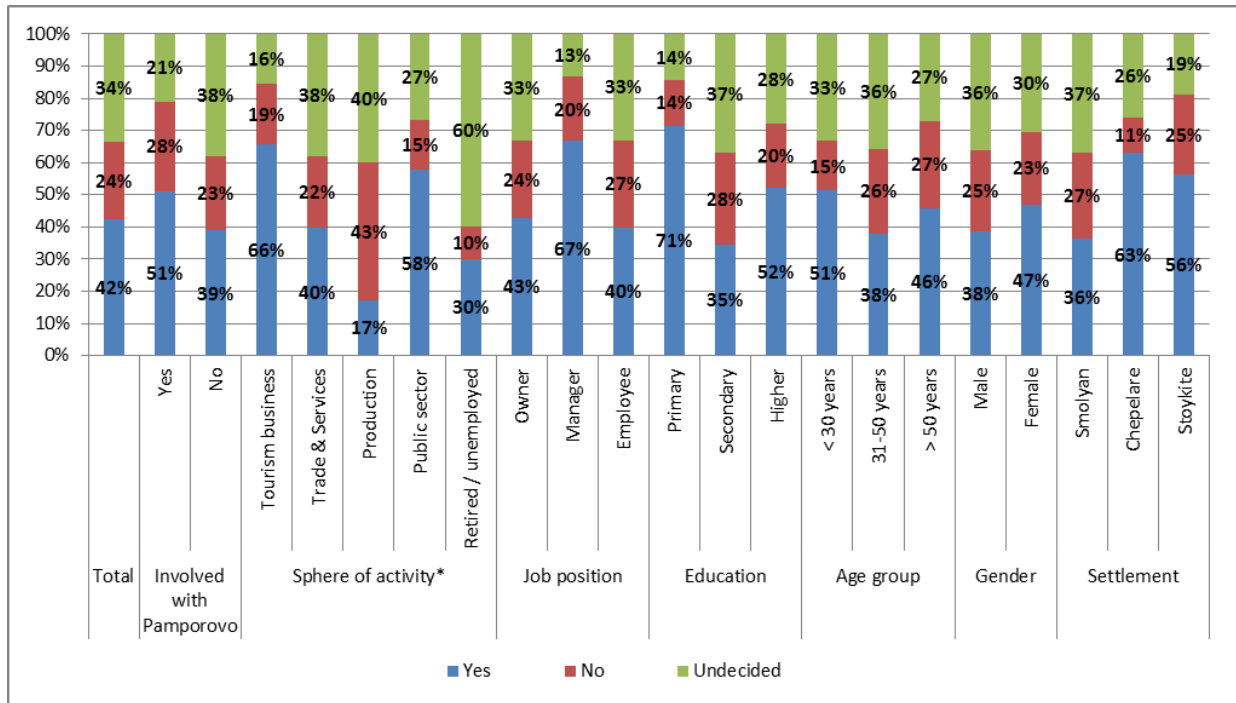


Figure 2. ‘Are you optimistic about the future of Pamporovo Resort?’ – Share of respondents
Note: * indicates a significant relationship between the variables ($p < 0.05$) as measured by Cramer’s V

The highest share of optimists is observed within those who are involved in the tourism industry (66%) and the public sector (58%) while the pessimists and undecided predominate among those working in the production sector, and such a connection appeared statistically significant (Table 6). Weaker association is found with the reference to respondents’ direct or indirect involvement in the resort development, with those involved being more optimistic than the others (51% vs. 39%). It is worth mentioning though that pessimists among them are also relatively high (25%). The share of optimists is higher in the smaller settlements of Chepelare and Stoykite, while pessimists predominate in the bigger town of Smolyan. Although the Cramer’s V coefficient shows a very weak connection of answers with job position, it can still be observed that managers are to a larger extent optimistic, compared to owners and employees.

Table 6. ‘Are you optimistic about the future of Pamporovo Resort?’ - Cramer’s V measures of association

	Cramer's V	Approx. Sig.	N of Valid Cases
Involved with Pamporovo Resort	0.160	0.122	164
Sphere of activity	0.277	0.002*	161
Job position	0.117	0.375	154
Education	0.147	0.133	163
Age group	0.100	0.498	168
Gender	0.086	0.536	170
Settlement	0.161	0.066	170

Note: * indicates a significant relationship between the variables ($p < 0.05$)

4.3 Perceptions and recommendations regarding necessary adaptation strategies

Without any doubt, the most popular current adaptation method applied in ski resorts is the production of artificial snow but the survey results found the local population opinions to be controversial – 45% of the respondents agree with such an adaptation strategy, while 37% are undecided and 18% are definitely against it (Figure 3).

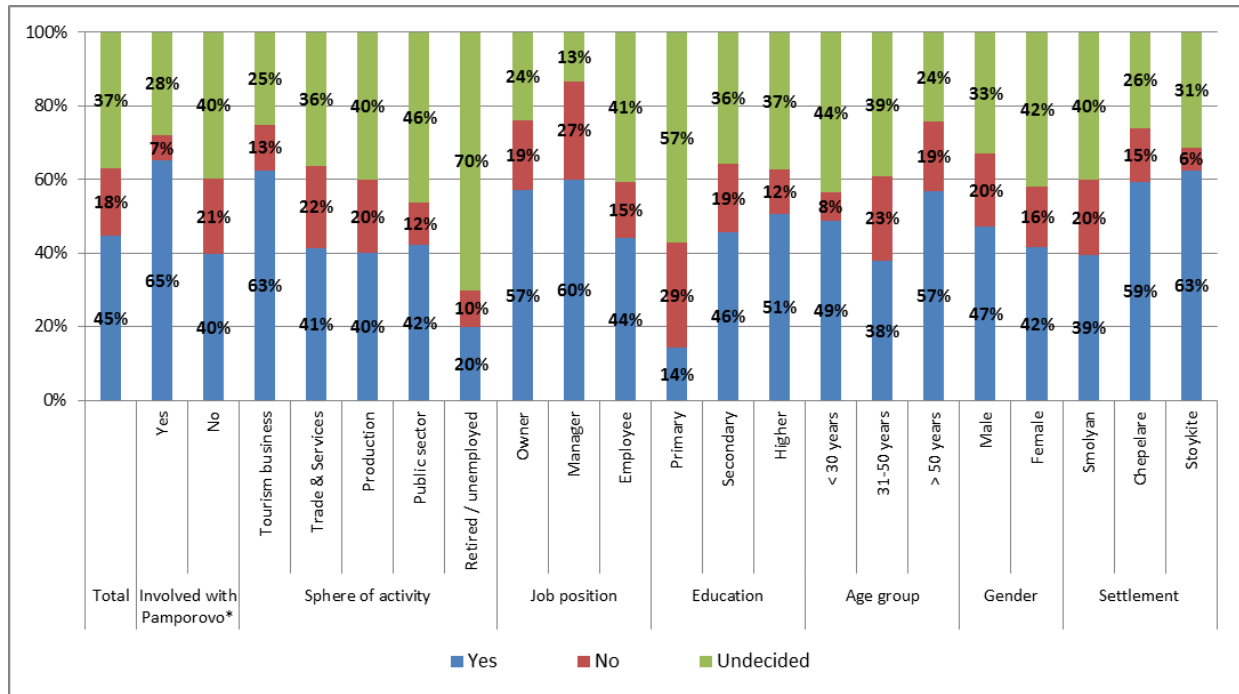


Figure 3. ‘Are you in favour of artificial snow production?’ – Share of respondents

Note: * indicates a significant relationship between the variables ($p < 0.05$) as measured by Cramer’s V

Logically, those involved with the Pamporovo Resort and those occupied in travel and tourism businesses in general demonstrate highest acceptance of artificial snow production. The inhabitants of Chepelare and Stoykite are also much more in favour of this adaptation strategy, compared to those who live in Smolyan. Higher educated participants have stronger positive opinion of its benefits (51%), while much larger than the average proportion of undecided is seen among the retired and jobless respondents (70%) as well as those with primary education (57%). It should be noted though that the only significant association revealed by the Cramer’s V coefficient refers to the respondents’ involvement with the resort (Table 7).

Table 7. ‘Are you in favour of artificial snow production?’ – Cramer’s V measures of association

	Cramer’s V	Approx. Sig.	N of Valid Cases
Involvement with Pamporovo Resort	0.236	0.011*	164
Sphere of activity	0.184	0.210	161
Job position	0.140	0.196	154
Education	0.116	0.355	163
Age group	0.153	0.097	168
Gender	0.092	0.490	170
Settlement	0.137	0.172	170

Note: * indicates a significant relationship between the variables ($p < 0.05$) as measured by Cramer’s V

On whether artificial snow production should be the main adaptation strategy against climate change impacts in ski tourism, the majority of respondents are either neutral (30%) or even totally disagree (24%). When asked if this strategy would successfully compensate for climate fluctuations specifically in the resort of Pamporovo, the neutral opinion is still the highest (34%), while those who totally disagree are less in share (14%). Such a distribution of answers directly influences the means on a 5-grade scale (Figure 4). With no consi

derable differences, all subgroups of respondents expressed a neutral opinion about both questions, demonstrating a slightly lower level of agreement with artificial snow production as an adaptation strategy in general than if particularly applied in the case of Pamporovo Resort (2.79 vs. 2.93).

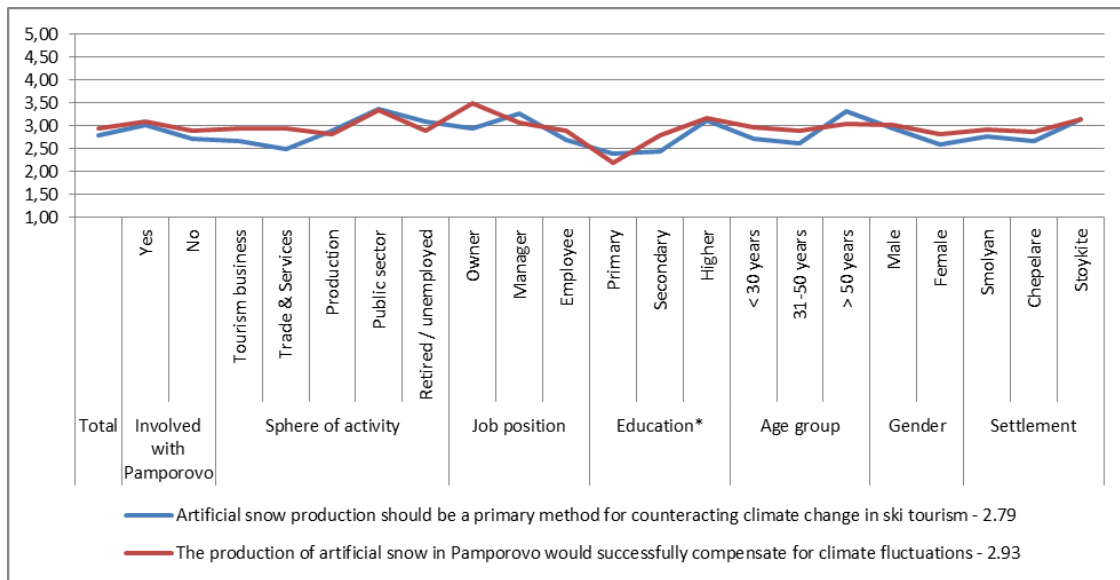


Figure 4. Perceptions regarding artificial snow production - level of respondents' agreement on a 5-grade scale (means)

Note: * means significantly different ($p < 0,05$) as measured by the tests of Kruskal-Wallis and Mann-Whitney

Respondents' opinions on both statements are strongly associated with the above discussed controversial attitudes to the production of artificial snow in general, and such a connection is confirmed statistically significant (Table 8).

Table 8. Levels of agreement with the statements associated with general attitudes to artificial snow production

		Artificial snow production should be a primary method for counteracting climate change in ski tourism.			The production of artificial snow in Pamporovo would successfully compensate for climate fluctuations.		
		Mean	SD	Sig.	Mean	SD	Sig.
Are you in favour of artificial snow	Yes (45%)	3.21	1.26	0.000*	3.26	1.16	0.000*
	No (18%)	2.00	1.12		2.04	.93	
	Undecided	2.68	1.32		2.95	1.18	

Note: * means significantly different ($p < 0,05$) as measured by the Kruskal-Wallis test

An attempt was made to identify the most popular measures as to overcome effects of climate change on the local ski tourism industry, and out of the proposed options in the questionnaire, the most frequently chosen by the respondents was 'creating more opportunities for tourists for traditional local cultural and natural experiences' (69%) as well as 'inclusion in

the winter offers of new products and attractions such as snowshoeing, ski touring, cross-country skiing, etc.’ (57%). The traditional extensive methods like increase of pistes and lifts, and production of artificial snow were supported by only 20% and 16% respectfully (Table 9).

Table 9. Recommended changes to improve the Pamporovo offering during the winter season – share of valid cases by selected subgroups of respondents (column %)

	Total	Education			Age group			Gender		Settlement		
		Primary	Secondary	Higher	< 30 years	31-50 years	> 50 years	Male	Female	Smolyan	Chepelare	Stoykite
Create opportunities for traditional local cultural and natural experiences	69%	60%	65%	73%	74%	74%	53%	64%	74%	67%	81%	67%
Add new winter products and attractions	57%	40%	53%	67%	69%	56%	50%	56%	58%	56%	62%	60%
Make more pistes and lifts	20%	0%	18%	26%	29%	16%	22%	21%	19%	19%	23%	27%
Increase the production of artificial snow	16%	20%	23%	10%	20%	13%	19%	21%	12%	16%	12%	27%
Other	16%	20%	15%	18%	17%	16%	14%	18%	13%	15%	12%	27%
There is nothing to change	2%	0%	0%	4%	0%	1%	6%	1%	3%	2%	4%	0%
N of valid cases	164	5	80	73	35	91	36	87	77	123	26	15
Chi-square		16.861			15.942			5.668		7.222		
df		12			12			6		12		
Sig.		.155 ^{a,b}			.194 ^a			.461		.843 ^{a,b}		

Notes: A multiple response question - the sum of column percentages exceeds 100%

The Chi-square Results are based on nonempty rows and columns in each innermost sub-table.

a. The minimum expected cell count in this sub-table is less than one. Chi-square results may be invalid.

b. More than 20% of cells in this sub-table have expected cell counts less than 5. Chi-square results may be invalid.

Even though not statistically significant, the breakdown of results reveals that higher educated, younger and female survey participants more strongly support the diversification of supply and introduction of new services. It is also worth noting that the inhabitants of Chepelare are more in favour of tourist offering diversification compared to those of Smolyan and Stoykite. Free answers have provided extra information on the question – that for the locals it is very important that they have a cheaper access to the ski zone, that better infrastructure is needed in the resort, as well as higher quality of the services provided and more appropriate marketing.

Considering the overall vision for the future of Pamporovo Resort, respondents clearly declare that it should develop as an all-season destination (75%), while only 6% see it purely as a ski resort. Significant association as measured by Cramer’s V is revealed with reference to education level, gender and place of residence while the respondents’ age as well as their sphere of activity and involvement with the resort’s tourism industry do not appear as important differentiating factors in regards to this question (Table 10). The four-season destination is the preferred choice for better educated survey participants while those with primary education are equally split between all-year destination and mainly ski resort. Females are much stronger supporters of the year-round resort compared to males. Finally, the Chepelare inhabitants are almost unanimous regarding the all-season development (93%) while this option is supported by a considerably lower share of respondents from Stoykite and Smolyan.

Table 10. Supported overall vision for the future development of Pamporovo Resort - share of respondents (row %) and Cramer's V measures of association

		An year-round resort orientated to nature & traditions	A ski resort with high occupancy also during the summer	Mainly a winter resort focused on ski tourism	Other	Number of valid cases = 100%	Cramer's V	Approx. Sig.
Total		75%	18%	6%	1%	168		
Involved with Pamporovo	Yes	74%	26%	0%	0%	42	0.188	0.124
	No	77%	15%	7%	1%	121		
Sphere of activity	Tourism business	77%	19%	0%	3%	31	0.161	0.420
	Trade & Services	76%	16%	9%	0%	58		
	Production sector	62%	26%	12%	0%	34		
	Public sector	81%	15%	4%	0%	26		
	Retired / Unemployed	90%	10%	0%	0%	10		
Job position	Owner	81%	19%	0%	0%	21	0.200	0.059
	Manager	67%	13%	13%	7%	15		
	Employee	73%	20%	7%	0%	116		
Education	Primary	43%	14%	43%	0%	7	0.238	0.005*
	Secondary	75%	20%	5%	0%	80		
	Higher	77%	17%	4%	1%	75		
Age group	< 30 years	68%	24%	8%	0%	38	0.106	0.713
	31-50 years	79%	14%	5%	1%	91		
	> 50 years	70%	24%	5%	0%	37		
Gender	Male	67%	23%	9%	1%	90	0.218	0.047*
	Female	85%	13%	3%	0%	78		
Settlement	Smolyan	72%	22%	6%	1%	125	0.219	0.006*
	Chepelare	93%	0%	7%	0%	27		
	Stoykite	69%	25%	6%	0%	16		

Note: * indicates a significant relationship between the variables ($p < 0.05$) as measured by Cramer's V

The resort is considered of high or even very high economic importance by nearly 2/3 of the survey participants while 21% rate it as important as all other sectors of the local economy (Table 11). Logically, those personally involved with the resorts' development as well as occupied in travel and tourism business and in the public sector give it higher significance. In terms of place of residence, inhabitants of the smaller settlements of Stoykite and Chepelare assess the resort's significance higher than those living in the larger city of Smolyan.

From a sustainable development perspective, 55% of the respondents do not consider the local population involved enough in the economic activities of the resort. Only 18% consider it is benefiting enough from tourism in Pamporovo Resort while nearly 1/3 is undecided. The breakdowns of results show considerable unanimity on this question, with very slight differences among most of the subgroups (Table 12). A better pronounced and statistically significant association of answers is found only in regards to the respondents' place of residence – somewhat paradoxically, the smaller the size of the settlement, the higher percentage of those considering that local population is not enough involved.

The locals seem rather distant from finding solutions to climate change adaptation problems –tourism businesses and local administration are those who should primarily deal with these issues. Yet, local community involvement is important for 36% of the respondents. It should be stressed however that a minimal role is assigned to non-government organizations – they were pointed to by just 18% of the survey participants (Figure 5).

Table 11. Perceptions of the Pamporovo Resort economic importance - share of valid cases by selected subgroups of respondents (column %) and Cramer's V measures of association

	Total	Involved with Pamporovo		Sphere of activity					Education			Settlement		
		Yes	No	Tourism business	Trade & Services	Production	Public sector	Retired / unemployed	Primary	Secondary	Higher	Smolyan	Chepelare	Stoykite
Very high importance	16%	21%	16%	19%	19%	9%	15%	10%	0%	14%	21%	15%	19%	25%
High importance	47%	56%	44%	56%	41%	43%	58%	60%	86%	41%	52%	42%	63%	63%
As much important as all	21%	21%	20%	9%	26%	23%	15%	30%	0%	23%	17%	24%	7%	13%
Limited importance	8%	2%	10%	13%	5%	17%	0%	0%	14%	11%	4%	10%	4%	0%
Undecided	8%	0%	11%	3%	9%	9%	12%	0%	0%	11%	5%	9%	7%	0%
N of valid cases = 100%	170	43	121	32	58	35	26	10	7	81	75	127	27	16
Cramer's V		.227		.166					.200			.191		
Approx. Sig.		.077		.344					.109			.123		

Table 12. 'Is local population involved enough in Pamporovo resort's economic activities?' – Share of cases by subgroups of respondents (row %) and Cramer's V measures of association

		Yes	No	Undecided	N of valid cases = 100%	Cramer's V	Approx. Sig.
Total		18%	55%	28%	170		
Involved with Pamporovo	Yes	23%	51%	26%	43	.078	.609
	No	17%	57%	26%	121		
Sphere of activity	Tourism business	22%	56%	22%	32	.161	.403
	Trade & Services	17%	57%	26%	58		
	Production sector	6%	66%	29%	35		
	Public sector	31%	50%	19%	26		
	Retired / Unemployed	20%	40%	40%	10		
Job position	Owner	14%	62%	24%	21	.096	.586
	Manager	33%	47%	20%	15		
	Employee	17%	56%	27%	118		
Education	Primary	0%	43%	57%	7	.163	.071
	Secondary	14%	63%	23%	81		
	Higher	25%	49%	25%	75		
Age group	< 30 years	18%	49%	33%	39	.067	.828
	31-50 years	17%	57%	26%	92		
	> 50 years	19%	59%	22%	37		
Gender	Male	15%	56%	29%	91	.064	.707
	Female	20%	53%	27%	79		
Settlement	Smolyan	18%	51%	31%	127	.221*	.014
	Chepelare	19%	59%	22%	27		
	Stoykite	13%	75%	13%	16		

Note: * indicates a significant relationship between the variables ($p < 0.05$) as measured by Cramer's V

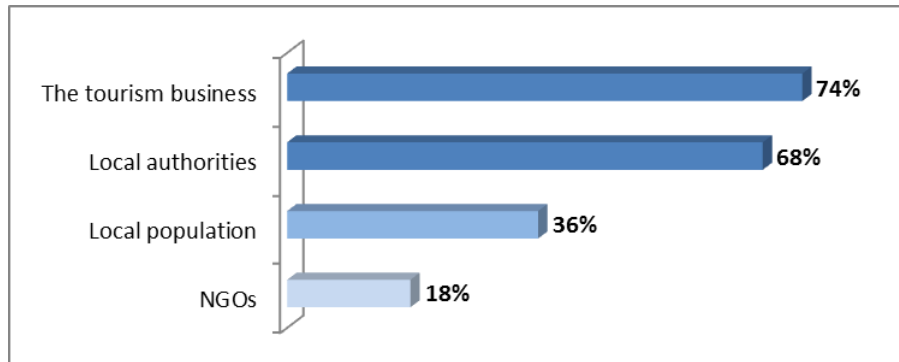


Figure 5. ‘Who should be the main participants in the local tourism adaptation to climate change?’ – share of valid respondents

Note: A multiple response question - the sum of percentages exceeds 100%

A large proportion of survey participants did not even answer who should take the leading role in the climate change adaptation process (45%). The limited number of valid respondents to this question are split between the local tourism industry (the lift operator, hoteliers, etc.) – 27% and the local authorities (24%). Only 4% of those who responded saw the local community as the driving factor in any changes.

5. DISCUSSION

5.1 General climate change perceptions

The high level of acknowledgement about the climate change issue at a global level by the local population in the studied settlements is in complete unison with the situation identified worldwide (Spence et al., 2011) and with previous research for Bulgaria and the EU (Eurobarometer, 2017). The high acknowledgment of the global threat of climate change also corresponds to the expectations based on the literature review and can be related to the media coverage and the broad public discussions of the issue that have been going on in society for a significant period of time.

The concept of psychological distance in terms of climate related impacts (Spence et al., 2011) is confirmed in the current survey as the results substantially change when discussing global, regional and purely local threats. It seems that climate changes are mentally connected to global-related threats like melting glaciers, sinking islands, loss of distant and exotic wildlife such as polar bears, and not with local events. Associations, impacts and effects generally related to climate change are still not clearly understood and related to climate change observed in the studied region. Results also confirm the higher sensitivity to and acknowledgement of the potential risks by female survey participants and those with higher education (Scannel & Gifford, 2013; Crona et al., 2013). Travel and tourism employees also demonstrate a high level of acknowledgement of local threats, possibly associated with their professional involvement in the tourism industry and the different perspective they have compared to lay people.

The psychological distance concept in relation to climate changes, although confirmed by the results, is on the other hand drastically confronted as the participants, even though not acknowledging local threats and risks, do consider that the weather in their region is changing (86%). Such a contradictory (at first glance) result could be explained by the ‘traditional environmental knowledge’ concept (Duerden, 2004). Previous surveys clearly demonstrate that

people in general and local communities respectively are perfectly capable to sense and detect with a good degree of certainty changes in seasonal and typical climate (Howe et al., 2012). This presumption is especially valid for local people as they are supposed to have the deepest understanding of local geography and climate, based on long-term observation, experience and even culture (Duerden, 2004; Crona et al., 2013).

5.2 Perceptions of climate change and the future of Pamporovo Resort

Results presented in the relevant sections should be discussed taking in consideration that as far as the current authors' are aware, no similar study has been previously undertaken for Bulgarian ski resorts, and findings can only be compared with the limited amount of similar research identified in the English-language literature.

The weather issue perceptions of the local population are mainly connected with the winter season length, which strongly influences the ski industry's benefits. Lack of snow, higher temperatures and unseasonal weather could also be associated with worries about tourism industry incomes. Given the availability of artificial snow production, the length of the season is a key indicator for any ski resort's viability and sustainability (Steiger & Abegg, 2013) and hence, significantly affects the regional economy. Taking into account the stated economic importance of the resort in the survey, this becomes the main climate change threat identified by the locals. Even the deniers of the changes in the Rhodope are worried about the lack of real snow and its bad quality.

The climate related vulnerability of the resort is not of significant concern to the local population and in unison with this, the levels of optimism for the future development of Pamporovo are higher than pessimistic ones. It can be concluded that both optimism and pessimism include a lot of other considerations, mainly related to the general economic and tourism development of each of the settlements in the study. As there has been a stronger tourism development in Chepelare during recent years, especially after the joining of the Chepelare ski zone to the main ski zone of Pamporovo in 2017 (Pamporovo.me, 2018), optimism prevails there.

A general trend to be commented on is the large share of respondents who are undecided on questions related to artificial snow production. Obviously, this adaptation strategy is still not clear enough in terms of technical, economic and environmental advantages and disadvantages, as the greatest acceptance is demonstrated by those who either work in the resort or in tourism in general, as well as those with higher education, while on the other hand, those with lower education, jobless and retired are mainly undecided. The passiveness on the subject can also be explained by two other facts – the already identified feeling of distance between the livelihoods of the majority of locals and the ski industry in the region and a lack of clarity regarding snow production and its potential effects.

The aspirations for simply preserving the current tourism status quo is observed in the reviewed literature (Hill et al., 2010) connected with a lack of interest in climate change issues. Geographically, the inhabitants of Smolyan are less concerned with climate change impacts while for the smaller and less developed settlements of Chepelare and Stoykite, there is a higher level of interest in the subject as a result of the limited alternative livelihood sources. Although there is a strong consensus about possible climate change adaptation strategies, it is the Chepelare inhabitants who are much stronger supporters of service diversification and the development of the resort into a four-season destination as being the way to further develop tourism in the area.

These strategies can also be associated with pure business logic and not solely connected with climate change adaptation.

Lack of interest is also observed in terms of the role of the local population in climate change adaptation – the tourism industry and local authorities are mainly assigned to deal with potential impacts. This is a logical choice as non-homogenous groups in communities (Kajan & Saarinen, 2013) can hardly take the leading role in an adaptation process, but the total absence of non-governmental organizations is a worrying tendency. Moreover, as the locals do not feel economically involved in the tourism development of the ski resort, i.e. not benefitting enough from its activities, this also makes them distant to the importance of climate change impacts and threats to the resort. All these findings reveal a serious problem regarding the future sustainable climate change adaptation at a local level where the local population is considered a key stakeholder and should play a role in the creation of any adaptation policies and strategies.

6. CONCLUSION

The research examined perceptions of climate change and the future of the Pamprovo ski resort for the local population living in three adjacent settlements that are traditionally related to the out-of-the-settlement resort complex. Results were discussed in two aspects – general climate change perceptions, as well as views and opinions regarding the resorts' vulnerability and adaptation. Interesting findings were revealed – the locals show the same tendency regarding general climate change views at global, regional and local level in unison with the human tendency to make potential unclear threats distant, whilst on the other hand there seems to be a consensus about the fact that the climate in the Rhodope is changing. With some geographical differences observed, locals are neutral on the snowmaking adaptation strategy, but strongly agree with the diversification of tourist services and conversion of the resort to an all-season destination. Although worried about the climate and its effect, the local population feels rather economically excluded from the resort, hence, distant from the issue of tourism adaptation to climate change. This is a worrying situation from a sustainable development perspective as the local community should be a key participant in any adaptation process.

As the current research has limitations in terms of the sample size and representativeness, future research in the area should include a larger number of respondents to confirm the results obtained in this exploratory study. In order to add qualitative insights into the perspectives of the locals and to stimulate further involvement of members of the local community, focus groups should be used to boost the process of local climate change adaptation. The analysis should then be included in a broader tourism adaptation research of the perceptions of the other stakeholder groups, resulting in a local tourism adaptation strategy.

REFERENCES

- Adger, W. N., Barnett, J., Brown, K., Marshall, N., & O'Brien, K. (2012). Cultural dimensions of climate change impacts and adaptation. *Nature Climate Change*: published online: 11 November 2012, DOI: 10.1038/NCLIMATE1666
- Bicknell, S. & McManus, P. (2006). The Canary in the Coalmine: Australian Ski Resorts and their Response to Climate Change. *Geographical Research*: 44(4): 386-400.

- Bonzanigo, L., Giupponi, C., & Balbi, B. (2016). Sustainable tourism planning and climate change adaptation in the Alps: a case study of winter tourism in mountain communities in the Dolomites. *Journal of Sustainable Tourism*: DOI: 10.1080/06669582.2015.1122013
- Bürki, R. (2000). Climate Change and Adaptation Processes in Winter Tourism. *East Swiss Geographical Society*: Issue 6. (in German), quoted in Wolfsegger, C. 2005. Perception and Adaptation to Climate Change in Low Altitude Ski Resorts in Austria. [Master's Research Project]. Lund University.
- Bürki, R., Elsasser, H., & Abegg, B. (2003). Climate Change and Winter Sports: Environmental and Economic Threats, *5th World Conference on Sport and Environment*, Turin 2-3 December 2003, (IOC/UNEP): available online at www.researchgate.net/publications
- Crona, B., Witich, A., Brewis, A., & Coartin, M. (2013). Perception of climate change: Linking local and global perceptions through a cultural knowledge approach. *Climatic Change*: 119:519-531.
- Duerden, F. (2004). Translating Climate Change impacts at the Community level. *ARCTIC*:57 (2) June 2004: 204-212.
- European Commission (2017). *Special Eurobarometer 459*. Report. Climate Change: available from https://ec.europa.eu/clima/sites/files/support/docs/report_2017_en.pdf, (accessed on 5 January 2018)
- Gomez-Martin, M.B., Armesto-Lopez, X.A., Cors-Iglesias, M. & Munoz-Negrete, J. (2014). Communicating the effects of climate change on tourism. The Spanish written press as a case study. *European Journal of Geography*, 5 (3): 73-87.
- Hill, M., Wallner, A., & Furtado, J. (2010). Reducing vulnerability to climate change in the Swiss Alps: a study of adaptive planning. *Climate Policy*, 10 (1)
- Hopkins, D. (2014). The sustainability of climate change adaptation strategies in New Zealand's ski industry: a range of stakeholders' perceptions. *Journal of Sustainable Tourism*: 22(1), 107-126.
- Howe, P. & Leiserowitz, A. (2013). Who remembers a hot summer or a cold winter? The asymmetric effect of beliefs about global warming on perceptions of local climate conditions in the U.S. *Global Environmental Change*: 23 (2013): 1488-1500.
- Howe, P., Markowitz, E., Lee, T.M., Ko, C. & Leiserowitz, A. (2012). Global perceptions of local temperature change. *Nature Climate Change*: published online: 16 December 2012, DOI: 10.1038/NCLIMATE1768
- Kajan, E. and Saarinen, J. (2013). Tourism, climate change and adaptation: a review. *Current Issues of Tourism*: 16 (2), 167-195.
- Leiserowitz, A. (2005). American Risk perception: Is climate change dangerous? *Risk Analysis*:, 25 (6)
- Ministry of Regional Development & Public Works of Bulgaria - Directorate General Civil Registration and Administrative Services (2018). Population number by settlements available at: https://www.grao.bg/tna/t41nm-15-12-2018_2-4.txt
- Morrison, C., & Pickering, C. M. (2013). Perceptions of climate change impacts, adaptation and limits to adaptation in the Australian Alps: the ski-tourism industry and key stakeholders. *Journal of Sustainable Tourism*: 21(2): 173-191.

- National Statistical Institute of Bulgaria (2018). Statistical data on the activity of the resorts, available from www.nsi.bg (accessed on 2 November 2018)
- Pamporovo Ltd. (2018). Available from <http://pamporovo.me> (accessed on 15.10.2018)
- Scannel, L., & Gifford, R. (2013). Personally relevant Climate Change: The Role of Place Attachment and Local Versus Global Message Framing in Engagement. *Environment and Behavior*: 45(1): 60-85
- Scott, D., Gössling, S., & Hall, C. (2012). International tourism and climate change. *Wiley Interdisciplinary reviews – Climate Change*: 3 (3): 213-232.
- Spence, A., Poortinga, W., & Pidgeon, N. (2011). The psychological Distance of Climate Change. *Risk Analysis*: 32(6): 957-972.
- Steiger, R., & Abegg, B. (2013). The sensitivity of Austrian Aki Areas to Climate Change. *Tourism Planning & Development*: 10 (4): 480 – 493.
- Trawöger, L. (2014). Convinced, ambivalent or annoyed: Tyrolean ski tourism stakeholders and their perceptions of climate change. *Tourism Management*: 40 (2014): 338-351.
- Wolfsegger, C. (2005). *Perception and Adaptation to Climate Change in Low Altitude Ski Resorts in Austria*. [Master's Research project], Lund University. URL: https://www.lumes.lu.se/sites/lumes.lu.se/files/christoph_wolfsegger.pdf (last accessed on 05.05.2018)
- Wyss, R., Abegg, B., & Luthe, T. (2014). Perceptions of climate change in a tourism governance context. *Tourism Management Perspectives*: 11 (2014): 69-76.
- Yang, J. & Wan, C. (2010). Progress in research on the impacts of global climate change on winter ski tourism. *Advances in Climate Change Research*: 1(2): 55-62.
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