

The importance of knowledge of social perception on climate change for sustainable development

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Abstract

Knowledge of the social perception regarding the potential risks arising from climate change can be a valuable tool for planning strategies, land-use planning and policies on environmental education, at a time when the future climate projections point out to the need to implement sustainable conditions to improve the quality of life of the population.

This research was based on the results obtained by applying a questionnaire survey to a Portuguese population sample, questionnaire whose objectives were to assess knowledge and level of perception of the population surveyed about climate change and the climate and weather elements that recorded the largest changes in recent years. The sampling was based on data from the population census of 2012, provided by the National Institute of Statistics, on the resident population in 2011, according education level. Six hundred people were surveyed. The sample included people from different Portuguese geographical areas to represent accurately the Portuguese Continental population, people from Bragança, Porto, Coimbra, Lisbon, Beja and Faro was inquired.

Fieldwork took place between March and December 2012. The questionnaire addressed the social perception of climate change from the point of view of the signals that show the possible changes, the causes, consequences, possible mitigation measures of its effects.

The statistical analysis included a univariate analysis based on the absolute and relative frequencies, and a bivariate analysis that involved

the analysis of the variables gender, region, age groups and educational level.

We conclude that the phenomenon of climate change is recognized by most of the respondents that showed an extreme sensitivity to the subject, being interpreted by them as something related to the climate and/or pollution due to the human influence, namely with regard to the increase in average temperature and in annual mean sea rise. They consider themselves informed about the causes and consequences of climate change and also documented in how to combat them.

However, we found that there are many gaps to be bridged as regards the clarification of concepts, behavioral attitudes to adopt towards sustainability and the need for clarity in the transmission of information from the sources. Responses also attest that there is little perception of the role of certain institutions with social responsibility, which could act more effectively in the protection of the people if they were well known.

We intend through the involvement of the community gain a better understanding of the opinions, knowledge and risk perceptions of the Portuguese population concerning climate change, which could serve as the basis of effective structural, political and cultural measures in order to promote greater human well-being.

Palavras-chave

Social Perception, Climate Change, Sustainable Development, Environmental Education, Quality of Life

Introduction

The evaluation of the perception and the knowledge of the population against the risks arising from conditions of bioclimatic discomfort associated with extremes of temperature and humidity, and its aggravation by the influence of climate

change, could contribute towards the adoption of strategies at local level. One of the objectives of this study is to ascertain the knowledge and perception of the survey population concerning climate change, and the climatic elements that have undergone major changes in recent years in Portugal. A questionnaire was administered

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to a sample of residents. Based on the results of the analysis of the questionnaire, we discuss the importance of knowing the perception of population in relation to climate change, aimed at an effective implementation of measures and regulations which could minimize the occurrence of risk situations associated with bioclimatic discomfort by heat.

Methods

To carry out this study, a survey was conducted through the administration of a questionnaire applied to a sample of the Portuguese population aged of 18 or more years. We opted for this criterion, since the results of previous interviews showed that the inclusion of children, will force to make substantive changes in the language of the questionnaire. It should be added that in the majority of the studies analyzed, on the perception of risk, this group was also not considered.

In the questionnaire we introduced some questions contained in the work done by Pereira *et al.* (2008) and Falcão *et al.* (2005). These authors after contact them, kindly showed their agreement on using their studies, as a starting point for conducting this research.

The questionnaire was administered to a sample of 600 people residing in the cities of Braga, Porto, Coimbra, Lisbon, Beja and Faro, considering this sample representative of the Portuguese Continental territory. The sample was based on information from the National Statistics Institute on the resident population in 2012, according to the level of education obtained by the 2011 census.

The collection of information was done through a questionnaire. The fieldwork took place between March and December 2011, with the help of interviewers, geographers recruited and trained that have received adequate training to the specificities of this study and the necessary guidelines for drawing up an inventory of information.

The questionnaire deals with the problem of climate change, including issues associated with signs that show this change, the causes, the consequences and possible mitigation of its effects.

Regarding the treatment and statistical analysis of collected data, a univariate analysis of variables, based on the absolute and relative frequencies of each variable and bivariate analysis of survey variables with the variables sex, region, age group and educational level took place.

A better understanding of opinions, knowledge and risk perceptions of the population,

about global climate change, can be the basis for taking action at structural and political levels and for environmental education purposes. The results of this study may provide clues to act more appropriately and effectively in order to change attitudes and behaviors of citizens, so that everyone can contribute to improve this situation.

Results and Discussion

At this point, we present the main findings of the study carried out on the perception of the Portuguese adult population on global climate change. The results of this research were the basis to propose some educational, structural and communicative strategies, in order to facilitate the implementation of measures that contribute to the mitigation of effects of climate change.

Table 1 shows the characteristics of the sample by gender, age, professional occupation and educational qualifications.

Sex	%
Female	50
Male	50
Age group	
18-24	10,1
25-34	14,3
35-44	22,7
45-54	21,9
55-64	14,0
65-74	9,6
+75	7,4
Professional occupation	
Active	70,5
Not Active (unemployed and retired)	29,4
Student	7,1
Education levels	
Can not read or write	0,4
Basic education	7,9
Secondary education or equivalent	62,2
Higher education or attends	29,5

Table 1 – Percentage of respondents by gender, age group, occupation professional and education level

As regards the analysis of the results to the question “Do you know what the term climate change means?” It can be stated that the term is recognized by 90% of the population surveyed, of which 71% give an opinion on the meaning of this phenomenon; while 10% did not know what it means. It should be emphasized the im-

portance of the percentage of respondents with higher education qualifications or attending higher education (50.5%), that has direct effect on the results.

The various answers to the question, "Refer what you mean by climate change", they were categorized and later explored and could be said that 71% of respondents gave an informed opinion about the phenomenon.

Several answers have to do with heating or impacts directly related to this phenomenon (melting, increasing the mean sea level, desertification); secondly, with catastrophic impacts of natural phenomena and lastly, refers to the reduction of the ozone layer and human influence on the climate system.

About 43% of respondents understand climate change as the "polar ice melting" "increase in the mean sea level", abrupt changes of time, "rapid cyclical changes", "weather irregularity". Other responses also refer to the phenomenon related to pollution and/or the ozone layer (20%), the influence of man and/or the scientific and technological development, and global warming and/or temperature variation (8%).

In a similar study conducted by Carvalho *et al.* (2004), presented at the 7th Congress of Water of

the Portuguese Association of Hydric Resources, regarding the social perception of climate change and flood risk, results of a survey questionnaire applied to the population of the region of Águeda, showed that the concept of climate change is also recognized by most population, with a negative perception, because respondents say that its effects are aggravated in recent years.

On our study, the question "Did you feel any change in the climate in recent years?", 80% of the sample says felt changes in climate in recent years, the remaining 20% indicated not felt any change.

The analysis of the answers given to the degree of intensity of climate change indicates that the sample population has felt intensely (level 4-36%) and that these are mostly related to:

- "warmer and drier weather";
- "short but intense rains";
- "warmer summer with extension of longer heat season";
- "minor demarcation of the seasons";
- "irregular rainfall: dry/late torrential rains or outside normal season";
- "occurrence of heat waves outside the summer season."

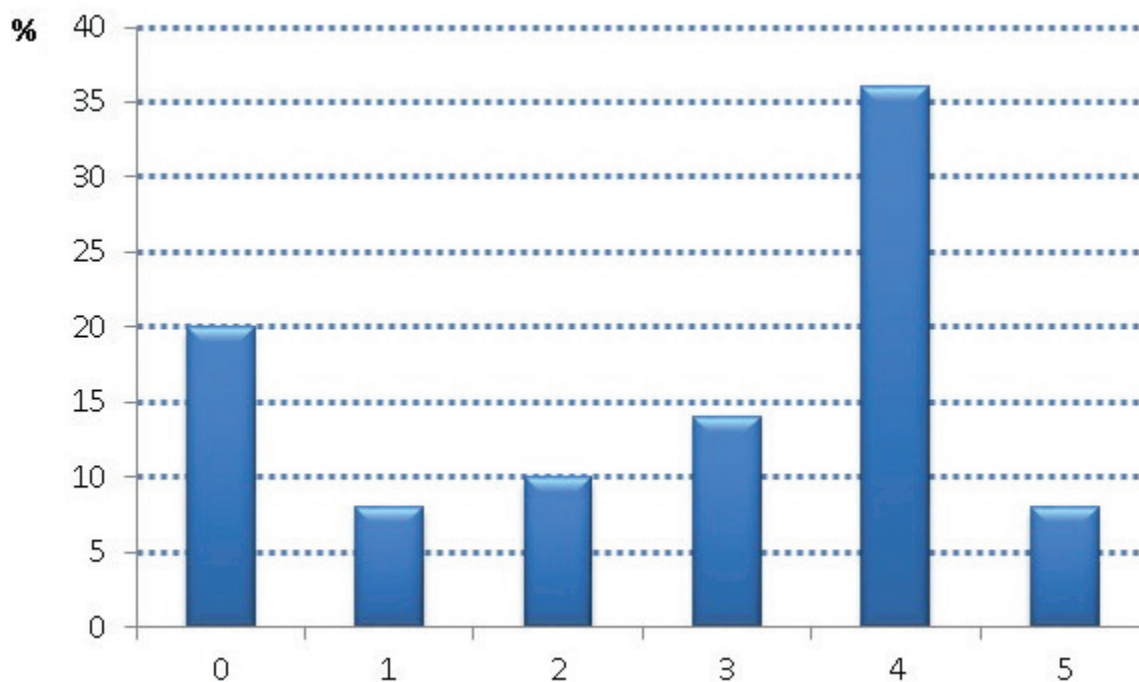


Figure 1 – Perceptions about climate change

Thus, in general, the answers refer to a change that is mainly associated with alterations in temperature and precipitation, similar conclusion to ascertained by Carvalho *et al.* (2004). In their study, the authors indicate that more than 80% of respondents consider, with regard to temperature, that there is an alteration, more than half of them reported an increase and finally, to a lesser extent, indicate the “irregularity and uncertainty of this element” (Carvalho *et al.*, 2004, p. 6). With regard to rainfall, the authors argue that the population is divided between the irregularity, the increase and decrease.

In fact, five of the six warmest years have been recorded in the Portuguese territory are in the 1990s, no wonder therefore that the population more easily record the recent past (Geraldes, 2001).

With regard to comfort or discomfort felt by respondents with regard to the weather during the four seasons, none said that he/she feels very uncomfortable (Figure 2). Most of the sample population stated that feels comfortable in spring and autumn, followed by the summer, with several causes contributing to these feelings in these seasons of the year.

Questionnaire respondents say they feel more comfortable during the spring, underlying the

fact that is the “beginning of the mild weather” or consider the “more pleasant temperatures”; in the case of autumn, much of them associating the season to the festivities related to St. Martin and, consequently, with the occurrence of the “summer of St. Martin,” a popular expression.

Those that say they feel uncomfortable in summer points out, in general, causes such as “more heat for a very prolonged period of time” or “higher than normal temperatures”; while respondents who reported feeling more uncomfortable during winter generally indicate the occurrence of “intense rains and thunderstorms” or “very low temperatures”.

Finally, a small percentage of respondents says that feel very comfortable during winter indicating that in the “last years this season has become milder.”

Concerning the greenhouse phenomenon, 98.1% of the respondents indicate that is aware of it, however, most of them have a wrong idea of the phenomenon, which is associated with a global average temperature without reference to the natural effect of the atmosphere heating. Anyway, it appears that most respondents associate the phenomenon to an increase in global warming.

On climate change, much of the sample believes that the climate is changing (68.6%), 9%

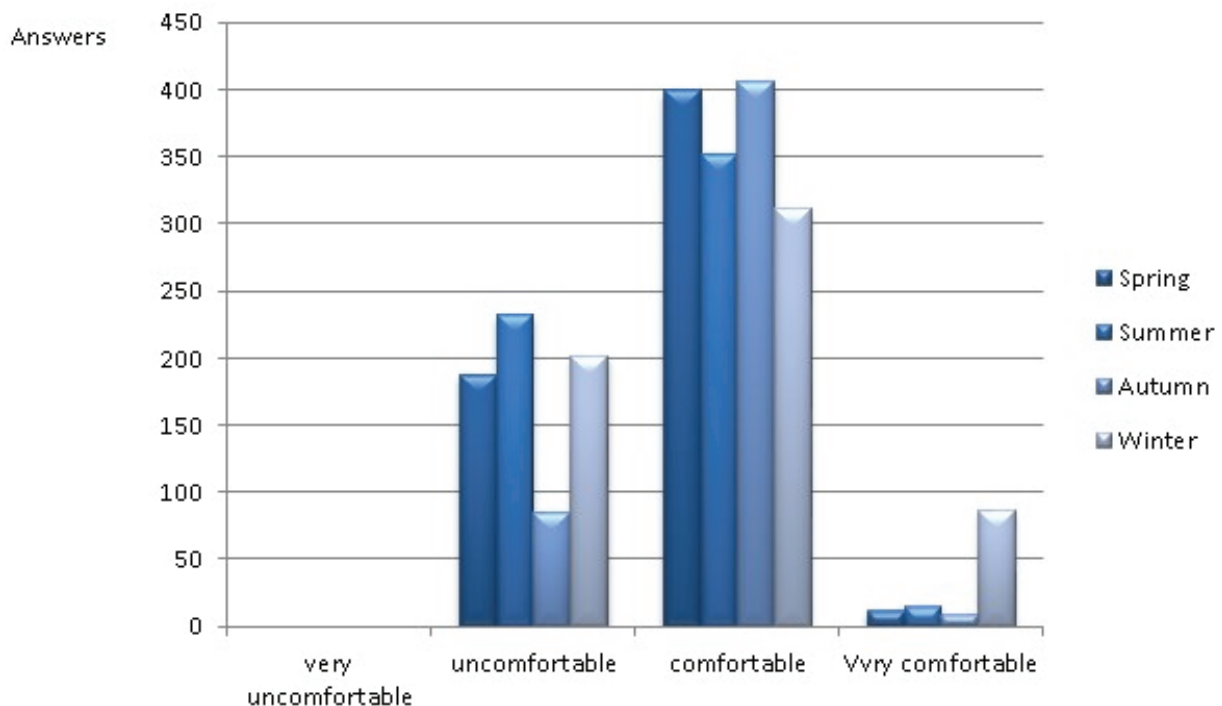


Figure 2 – Comfort levels in relation to the different seasons of the year

consider that no observes climate change, and 22.3% do not know.

Considering only respondents who identified climate change, 68% point to the main changes experienced on the alterations of temperature. Alterations in the mean sea level and precipitation is indicated by a lower percentage of respondents (Figure 3). The fact that the Portuguese territory is in the western end of the Iberian Peninsula, having a vast coastline, it may be the justification for much of the population understand the potential risks associated with coastal erosion, underestimating other elements that may have seen more changes in recent years.

Consequently, the rising of sea level is a process that occurs for a long time and that is felt in Portugal. Marine erosion, in some areas of the country, is evident The rising of sea level seems to contribute to increase the intrusion of salt water in drinking water and soil salinization hurting food production and causing flooding in some regions. These situations show that a great importance should be given to the rising of sea level in coastal planning.

In general, respondents consider that the changes tend to be worse (70.5%), and 22.1% says do not know. Only 7.3% have a more optimistic view of the future in climatic terms, in-

dicating that changes are likely to improve. To the question: “In your opinion, what is the development of the situation in the near future?” With this question we tried to analyze the perception about the sustainability, to evaluate the perspective of the population about the future of the Planet, and concluded, therefore, that the perception of the phenomenon of climate change is mostly negative.

Rodrigues *et al.* (2009, p. 3423), studied the perception of global climate change on Terceira Island in the Azores Archipelago, conclude that “people from Terceira Island consider that the effects of global climate change tend to be visible, but known, uncontrollable, involuntary, new, very threatening, catastrophic and unpredictable”.

Respondents that identified climate change; 51.3% said that the main cause of climate change is related to natural and human factors; for 42.5% the man is the main cause of climate change, 5.1% stated that the phenomenon is related to natural causes and 1% do not know.

The work of Carvalho *et al.* (2004) allows us to conclude, with regard to the causes that contribute to climate change that over 50% of respondents indicate human factors as the main cause of climate change. It can be said that the

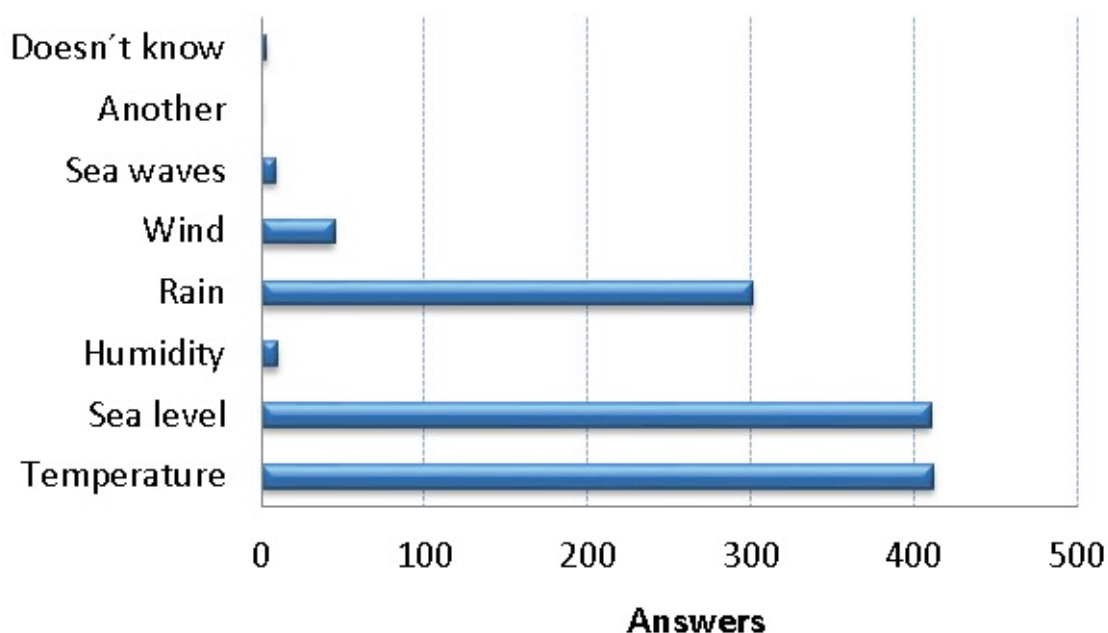


Figure 3 – Elements responsible for the change

Internet and television followed by the newspapers, are the main sources of information of most respondents about the subject.

Among the human factors the main contributors to the worsening of climate change (Figure

5) is pointed out the use of fossil fuels, the greenhouse gas emissions by industries and forest fires. At the same time, Carvalho *et al.* (2004, p. 6) particularly stand out “pollution, changes in the ozone layer, technological and scientific

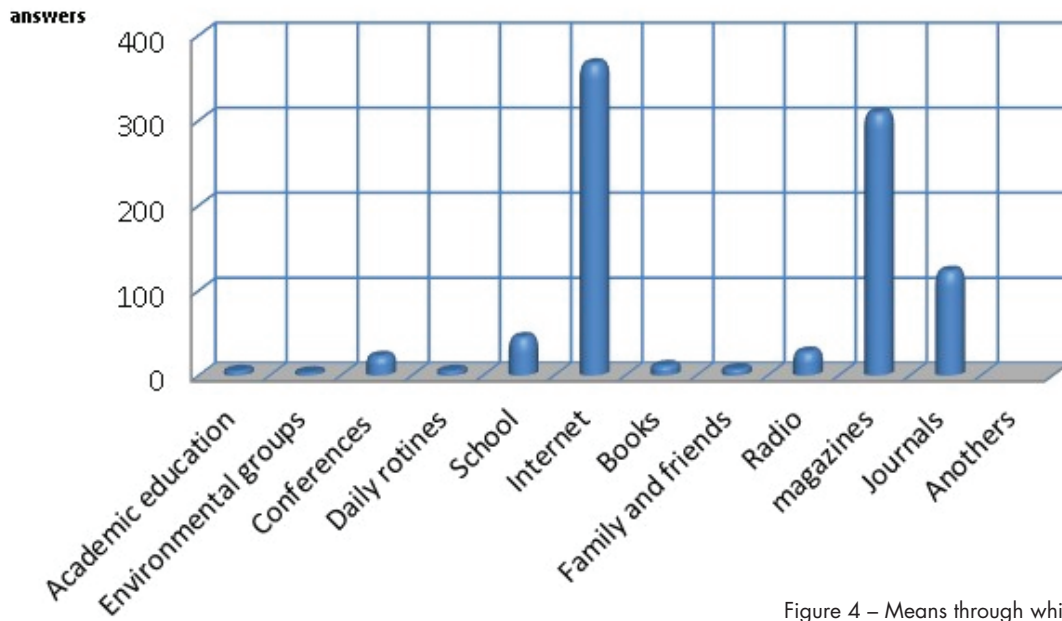


Figure 4 – Means through which people become aware of climate change

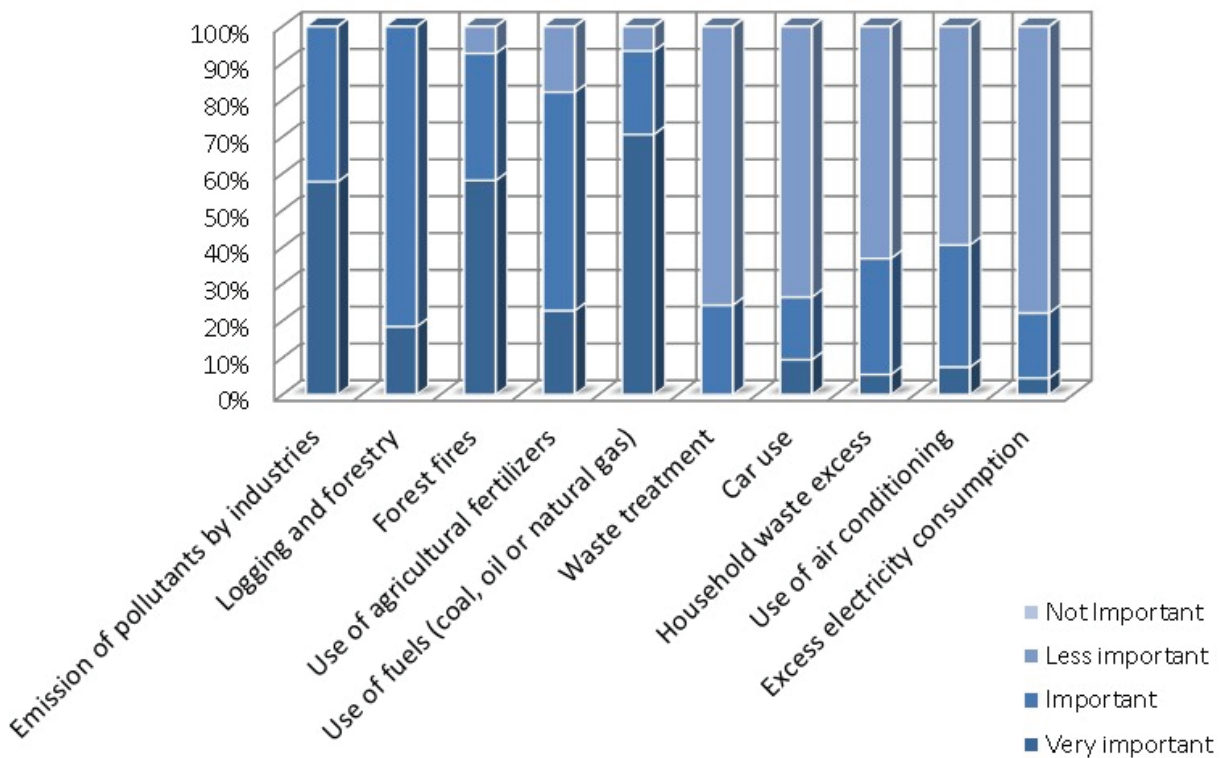


Figure 5 – The importance of each of the following phenomena to the aggravation of climate change

development, and the changes and/or interventions in the stars and space”, as the human factors most mentioned.

With minor importance to climate change is indicated car use, excess of electricity consumption and waste treatment.

In short, the analysis of results obtained in this issue shows that there are different perceptions on the topic. The inquired population does not clearly relate global climate change with their daily individual actions such as: excessive electricity consumption, waste treatment or the use of cars. Consequently, there is a need to develop a more conscious perception of individual environmental aspects in relation to global climate change. This raises the need to promote individual commitment in everyday actions to help reduce global climate change. Highlighting the consequences of climate change, respondents refer the rise of the mean sea level, the decline in agricultural production, the scarcity of water for human consumption and the increase in global average temperature (Figure 6).

Despite the perception of climate change is relatively consensual on the part of the population surveyed, 72% say that know some mitigation measures, dividing the remaining answers in “do not know or no answer”.

With regard to measures to be taken to combat climate change, are indicate the reduction and control of pollution (33%), reducing electricity consumption (24%), raising awareness of the problem (20%) and separation of waste (14%). The remaining (9%) refer to measures such as the creation of laws and supervisory systems in general. They stand out as sources of obtaining knowledge of measures to combat climate change the Internet, magazines, television, schools, newspapers, books and environmental groups.

Consequently, in order to mitigate the effects of climate change, analysis of results obtained in question 10, shows that most of the surveyed population considers that the increase in forest area, investment in renewable energy, the re-

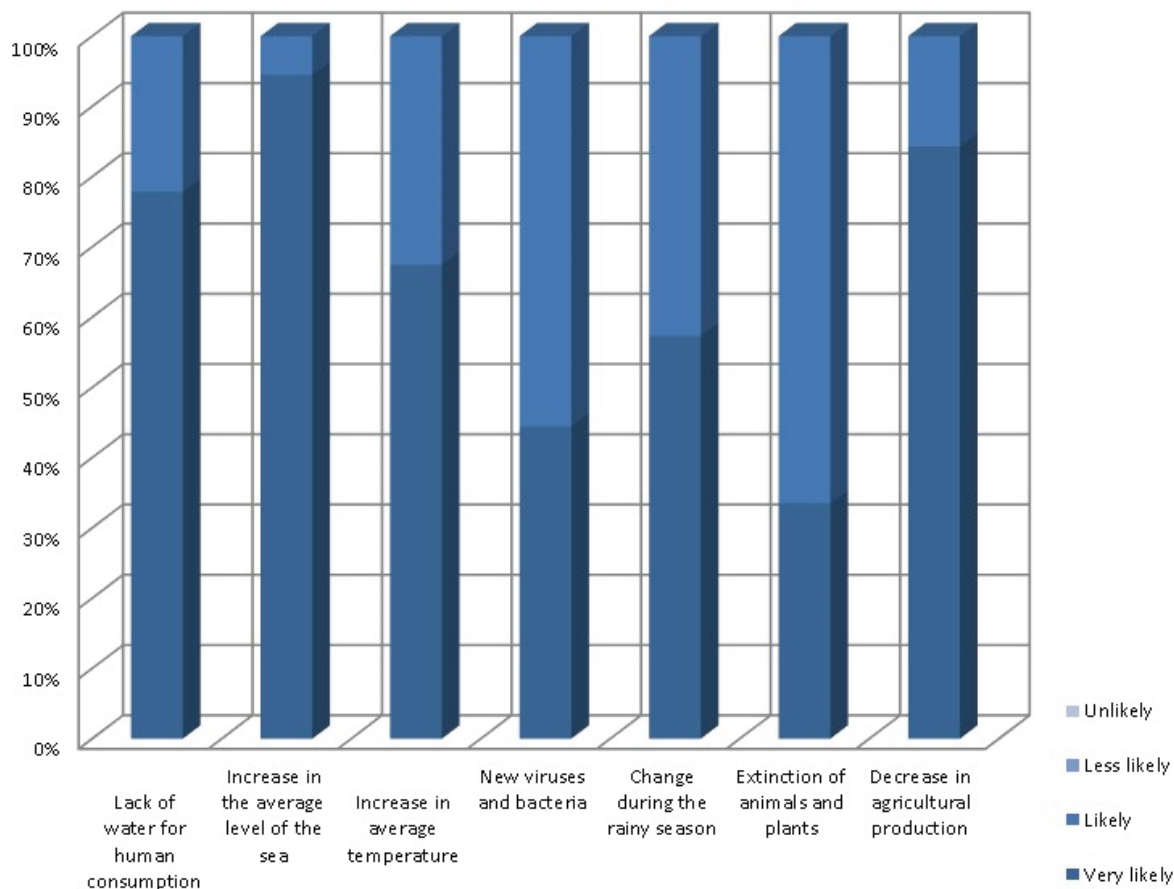


Figure 6 – Probability of occurrence of each of the following phenomena as a result of climate change

duction of emissions air pollution, as well as the application of more environmentally efficient technologies may be some of the most important solutions (Figure 7).

In practice respondents have implemented some measures aimed at improving environmental quality, of which: take short showers instead of immersion bath, follow the policy of 4 r's, caulking doors and windows to prevent heat losses, use of energy saving bulbs, composting,

use of public transport and planting typical trees of the region (Figure 8).

In short respondents consider themselves knowledgeable about the causes and consequences of climate change and at least two-thirds consider themselves documented regarding the means of combating climate change. A bivariate analysis of the results shows that the lowest levels of information (subjective) are reported among citizens whose qualifications are at the

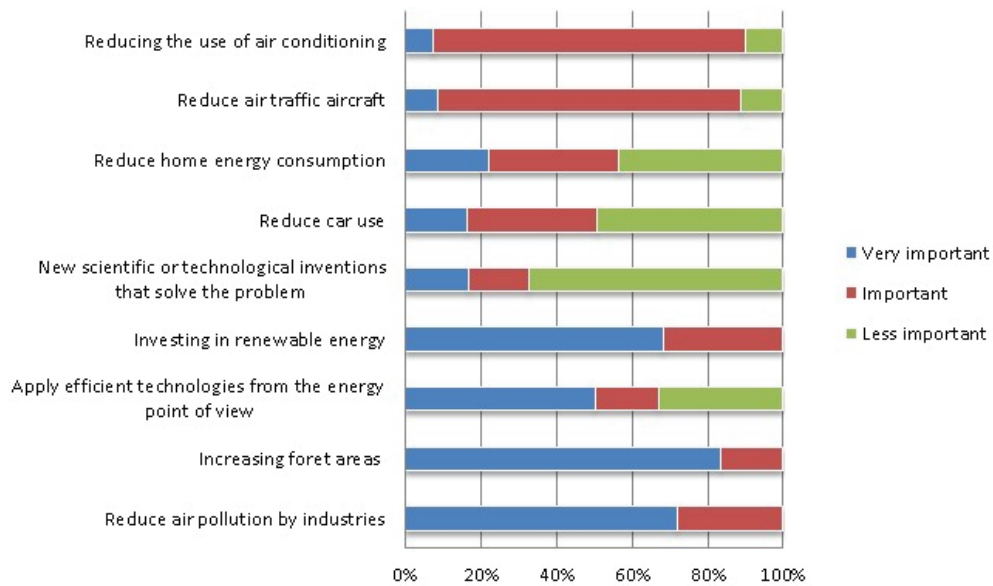


Figure 7 – The importance of each of these actions in addressing climate change

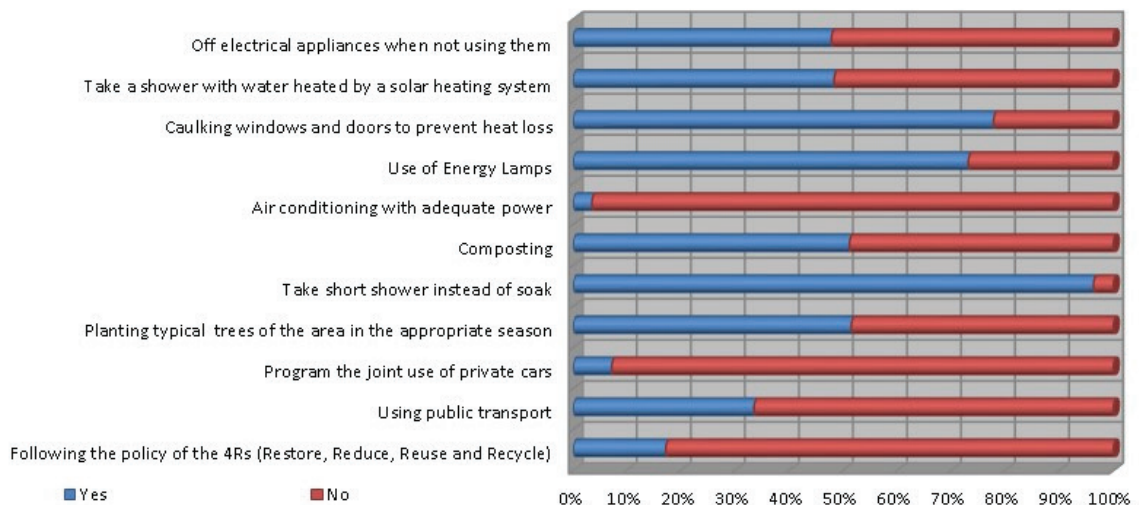


Figure 8 – Predisposition towards changes in order to improve environmental quality

level of basic education (Table 2). A socio-demographic perspective, as indicated in Table 2, it is observed that men declare themselves more informed than women about the causes and consequences of climate change and ways to combat them; the group of respondents over the age of 55 years said to be less informed about these issues than younger respondents, and the level of information declared by respondents increases with their level of education.

In a survey conducted, in 2008, on the social perception on climate change, on the causes, consequences and measures to be taken in relation to climate change (report made by the Directorate-General for Communication Public Opinion Monitoring Unit from the European Parliament) noted that over half of Europeans claim to be relatively well informed about climate change, however, there is still a large number of uninformed citizens. Portugal, the Czech Republic, Lithuania, Bulgaria and Romania are the countries whose respondents say they are very or fairly badly informed to the three variables (causes, consequences and measures to be adopted). With regard to the perception and information, the report notes situations identical to our question-

naire related to socio-demographic level, noting that young people, aged 15 to 24 years, as more knowledgeable about climate change, whether in relation to the causes or the consequences and on ways to combat climate change. The level of education has a particular importance, because there are differences between the Europeans that continued to study after the age of 19, claiming to be well informed and those with lower education levels that claim to have little or no information on the issue. Between men and women the differences in the level of information are not too prominent, concluding, nevertheless, that women are less informed than men.

Society aspires to live well, be healthy, to have certain goods that may be providing more comfort, and employment. Quality of life is acquired by consumption. Consumption generates the use of natural resources, energy, space, which can lead to pollution and scarcity of resources. As a result of human activity there has been an intensification of the greenhouse effect, the instability of the environment and excessive waste production. On the issue of waste, the results obtained by question 11 (Figure 8) show that only 17% of respondents practice the politics of 4 r`s. These

		Do you know what the term climate change means?	Do you know what the term greenhouse effect means?	Are you aware of the measures to be taken to combat climate change.
Sex	%	Total number of positive responses	Total number of positive responses	Total number of positive responses
Female	50	257	290	209
Male	50	283	299	223
Age Group				
18-24	10,1	79	102	54
25-34	14,3	98	122	53
35-44	22,7	105	104	69
45-54	21,9	102	87	78
55-64	14,0	71	76	67
65-74	9,6	56	50	64
+75	7,4	29	48	47
Literary Abilities				
Can not read or write	5,4	41	56	43
Basic education	7,9	88	68	62
High school or equivalente	36,2	202	232	125
University	50,5	209	233	202

Table II – Total number of answers by sex, age group and educational level

results demonstrate the need for raising awareness in changing attitudes in society about the sustainability at all levels. The knowledge of the population perception can influence government agencies through forms of popular participation in planning, management and development of public policies.

Conclusion

The phenomenon of climate change that is a reality around the world, is recognized by most respondents. Among these some have an extreme sensitivity to the topic, and the concept of climate change interpreted as something that is related to climate and/or pollution, demonstrating the human influence on aggravation which according to the questionnaire sample will tend to worsen.

It is considered that if people are sensitized to the issues of climate/global warming changes can contribute to reducing emissions of greenhouse gas effect. On the other hand, citizens may use social pressure, electing and requiring the use of alternative energies. Thus, both will be to participate in the economic and energy sustainability of the country. Collective pressure can lead to changes in terms of environmental practices (Rouquette *et al.*, 2005). Although, climate change includes complex and difficult concepts to convey, it is essential that appropriate ways to reach out to the population, in accessible language, clearly, and include aspects that still are not well known, this information should be conveyed on television, in newspapers and magazines and the Internet. Population should change the behavior, gradually, without sudden changes, especially the adoption of individual measures to combat climate change. Finally, it is important to emphasize the message that everyone has a responsibility in solving the problems and that all are important in mitigation of global issues.

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