PUBLIC PERCEPTIONS AND ATTITUDES ABOUT DIFFERENT ASPECTS OF SUSTAINABLE DEVELOPMENT FOCUSING ON THE ENVIRONMENT - THE CASE STUDY OF CHIOS CITY

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ABSTRACT

The management of environmental issues in modern cities has preoccupied local and national authorities worldwide. Sustainable development is the vision that can drive cities to deal with their environmental and social problems. Under this perception environmental education plays a key role in shaping perceptions, encouraging environmentally friendly behaviors, raising public awareness about environmental issues and mobilizing citizens by active participation.

The attitude of the citizens of Chios island towards sustainable development is the subject of this survey.

The results of the research show that the majority of citizens, are aware of the environmental problems of their city, interpret the concept of sustainable development, underline the need for energy saving and mention the water scarcity. It is argued that actions like recycling and composting need to be supported. The deficient water balance and the poor water quality emerge as a crucial theme that drives citizens to consume bottled water. This behavior contributes to increased use of plastics. For achieving sustainable management in a city presupposes the cooperation of citizens on individual an collective level.

KEYWORDS

Energy saving; Recycling; Refugee issue; Sustainable Development; Urban Green Spaces; Water management ;

1. INTRODUCTION

Greek islands are mainly characterized by their small size. This suggests lack of raw materials, a sense of isolation for the local inhabitants, in particular during winter, and subsequently higher costs of production, transport infrastructure and unstable demographic developments [1].

The most significant environmental managements issues that are identified on the islands include the protection of coastal areas (coastal erosion is a major problem), solid and water management and the limited availability of water resources.

The purpose of this study is to capture citizens views on issues related to the Sustainable Development (SD) of the island of Chios emphasizing on environmental issues of the capital of the island.

Chios is the fifth largest of the Greek Islands. Geographically it is located in the northeastern Aegean and the total area of the island is 842.54 square Kilometers. The population of

Chios according to the latest census (2011), is 53.408 persons. In the capital city live over 26.850 persons (50,22% are men and 49,78% are women) according to the data from Hellenic Statistical Authority and the Strategy of Sustainable Development of Chios Municipality [2].

The island's climate follows the characteristics of Mediterranean climate: hot and dry summers and cool winters. The economy of the island is mainly based on shipping, even though a significant proportion of the population is employed in tourism[3].

Table 1: Sociodemographic information of the Sample (N=336)

Variables				**Percentages (%)**	
Gender		**Male**		**Female**	
		54,20		45,80	
Age	**18-30**	**31-40**	**41-50**	**51-60**	**>61**
	11,60	31,00	28,30	20,80	8,30
Education		**Primary /Secondary /High School**	**Higher Education**		**Master /Phd**
		39,30	36,90		23,80
Job		**Private Employee**	**Public Servant**	**Freelancer**	**Other**
		17,30	26,80	37,50	18,60

2. METHODOLOGY

An online survey was conducted using a structured questionnaire that was sent to e-mail addresses of Chios city residents in order to study their attitudes towards the environment, recycling, the water saving, the immigration phenomenon etc. Data collection commenced in February 2020 and completed in May 2020.

The survey included a participant information sheet to detail the nature of the study, and confidentiality and anonymity in handling individual responses would be assured.

The minimum sample size needed based on an acceptable margin of error of 5%, and a confidence level of p=.05 was 384 individuals. The current study was able to obtain responses from 336 participants.

Analysis of the descriptive statistics

The statistical analysis of the surveys was performed using SPSS 26.0. Data were analyzed using descriptive statistics (frequencies, means, standard deviation).

The questionnaire was divided into 8 sections, each of which include questions related to different aspects of Sustainable development for the Environment.

A summary of the main characteristics of the sample is presented in Table 1.

3. RESULTS AND DISCUSSION

The main results of the study are presented below in section.

3.1 Environment

The first set of questions was aimed to explore the environmental awareness of the participants. The absence of parking spaces in the city of Chios was considered as a major environmental issue by 21,9% of participants, while 17,9% indicated the reduction of water supplies, 16,7% the traffic problem, 11,9% the lack of green spaces within the city, 11,8% the production of solid waste, 11,2% the water pollution,5,9% the soil pollution and 2,8% the air pollution. The percentage of citizens who state that they are a little informed about environmental problems is 58.6%, while 36.6% stated that they are very informed. The percentage of those who stated that they are not informed at all is 4.8%. Participants also consider as the most crucial parameter for the improvement of the environment the social and not individual responsibility as the Table 2 shows.

Table 2: Environmental responsibility for a more sustainable environment (in a scale from 1 to 5, 1=minimum degree,5=maximum degree)

3.2 Urban Green Spaces.

The questions in this section investigated public perception about the amount of the urban green spaces, the evaluation of maintenance of these spaces and citizens opinion about the importance of different functions of urban green spaces.

Degree of Responsibility	Mean	Standard deviation	Min	Max
Personal Responsibility	3,71	1,003	1	5
Other's responsibility	4,14	0,908	1	5

73,8% of the respondents consider that there are not enough urban green spaces in the city, followed by 26,2% who believe the opposite. Most of the participants (77,4%) believe that Municipality of Chios has not implemented important projects in order to improve the quality of life in the city. The urban Green spaces are characterized by the respondents neutral clean as it can be seen on Table 3.

Table 1: Evaluation of Green Space's Cleanliness (in a scale from 1 to 5, 1=slightly clean,2=low clean, 3=neutral clean,4=medium clean, 5=very clean)

Participants were also asked to rate some functions of the green spaces in their city. The results show that in all cases the functions of Green spaces tend to be assessed as of quite importance. The children's play area, the mitigation of climate change effects and the landscape's aesthetics enhancement are considered very important (Table 4).

Evaluation of Cleanliness	**Mean**	**Standard deviation**	**Min**	**Max**
Urban green space's maintenance	2,90	0,895	1	5

Table 2: Evaluation of different functions of Urban Green Spaces (in a scale from 1 to 5, 1=not at all important, 2=slightly important, 3=neutral, 4=quite important, 5=very important)

3.3 Water management

The next questions focused on the water management in Chios city, investigating the frequency of water strikes in residences, the public perception about the water quality, the origin of the drinking water and personal attitudes and choices toward water saving and additional charge.

35,7% of respondents declared that water strikes occur rare in their residences, while

Evaluation of different functions of Urban green Spaces	**Mean**	**St. deviation**	**Min**	**Max**
Meeting and refreshment spaces	3,28	1,171	1	5
Children's play area	3,40	1,289	1	5
Climate improvement	3,19	1,287	1	5
Pollution reduction	3,14	1,331	1	5
Mitigation of climate change effects	3,25	1,351	1	5
Enhancement of Biodiversity	3,11	1,382	1	5
Landscape's aesthetics enhancement	3,34	1,345	1	5

32,7% stated that occur during the summer 22,6% reported frequent water strikes and a small percentage (8,9%) said that there are no water breaks.

The vast majority of the participants (63,10%) consume bottled water, while 31,25% providing drinking water from municipal fountains.

Drinking water is characterized as of poor quality by 47,3%, followed by 33,0% who consider it as moderate quality. Also 82,70% apply water conservation measures while the rest (17,3%) do not apply.

Regarding water conservation measures 22,1% of the participants use shower instead of a bath for personal hygiene, 18,9% apply leakage control to plumbing, 11,6% use double flow toilet flush, 11,2% wash the dishes at the dishwasher, 7,90% wash verandas/courtyards/balconies with a bucket and not with a hose, 7,70% install a low-flow showerhead,7,40% wash the fruits in a bowl, 7,30% wash the car with a bucket and not with a hose and finally 5,90% use automatic watering for the plants/flowers.

Findings also show that 27,6% of the participants ignore the origin of the recycled water, followed by 20,8% who believe that the recycled water comes from the tertiary treatment of sewage, 19,7% of the respondents stated from the sea water treatment ,19,1% declared from the treatment and cleaning of the water reservoirs,12,5% from the rainwater and a very small percentage 0,2% stated directly from the sewage.

52,4 of the participants are positive in an additional charge of the water bill in order to Municipal Authority for Water Supply in Chios (ΔΕΥΑΧ) being able to implement projects for the renovation of water supply network among others. Though, 47,6% of the participants were negative to this.

According to the respondents (34,4%) the biggest consumer of water in Chios city is the Household sector, followed by a total of 28,4% declared the agricultural activities, 22,3% stated the touristic activities and finally a total of 14,9% stated the Public sector (including activities, buildings etc).

3.4 Recycling

In this section, questions investigated the citizens attitudes towards recycling, including the frequency they recycle, their knowledge about recyclable materials, their perception about the significance of recycling and the satisfaction level from recycling programs on their Municipality.

Results show that 42,0% of the surveyed, always recycle, followed by 33,6% who often recycle,16,7% rarely recycle and those who never recycle are 7,7% of the sample.

The majority of the participants (50,6%) answered that the most important reason for recycling is the environmental protection. Another important reason is for saving resources and materials, which was answered by 28,8% of the respondents. Other responses that received lower percentages include money savings, job creation in the recycling industry, recycling imposed by EU and it is a fashion of the era. The percentages were 9,9%, 8,9%, 1,4% and 0,3% respectively.

Another important finding is that for the vast majority (60,4%) the most important practice is recycling rather than the solid waste reduction (39,6%).

Residents at a rate more than half (52,1%) declare a little satisfied from Municipality's recycling programs, followed by those who are not at all satisfied 24,1%, those who are very satisfied at a rate of 12,2% and finally those that they don't know at a rate of 11,6%.

About the recyclable materials the results show that the sample has chosen to a large extent the well-known materials such as plastic packaging (15,6%), glass packaging (14,8%), metal (13,3%), followed by batteries (12,8%), old vehicles (8,2%), organic materials (7,9%), vehicle tires(6,8%) and demolition materials (4,3%). As it is obvious the organic materials which consist the larger volume of household waste corresponds to a low percentage of known recyclable materials.

3.5 Energy saving

The questions in this section explored the public attitudes and actions towards energy saving measures in buildings, the transportation means they use, the heating and cooling methods for their homes and their opinion about the reasons of the necessity of energy saving.

Energy saving techniques	Mean	Standard deviation
Interventions in Buildings (insulation, double glazing etc).	1,76	0,973
Installation of solar heater panels	1,63	0,912
Installation of other energy saving system (photovoltaics, geothermal system etc)	2,97	0,856
Bulbs replacement with low-e energy	1,22	0,593
Electrical appliances replacement with lower consumption	1,67	0,947

Table 3:Energy techniques which citizens apply on their residences (in a scale from 1 to 4, 1=already apply, 2= i am going to apply, 3=I want to apply but I can't afford it, 4= I don't care about all these

The results show that the majority of the respondents (75,9%) live in single-family dwellings, while the 24,10% live in apartments.

Regarding the heating/cooling methods that the participants apply at their residences, the largest percentages (32,6% and 27,8% respectively) use domestic central heating oil and air-conditions followed by wood stove/fireplaces/wood boiler (14,3%), electric heaters (11,7%), energy fireplaces (7,9%), other methods (4,6%) and pellet (1,1%). Heating pumps, gas stove and floor heating systems were reported as alternative methods. The participants have applied different energy saving techniques such as interventions in buildings envelope (57,4%), solar heater panels 63,1%, other energy saving systems 8,3%, bulbs replacement with low-e 84,8% and electrical appliances replacement 62,8 %. Results also show that the financial factor plays deterrent role in the decision of applying energy saving techniques for the participant as it can be seen from the Table 5.

A total of 66,10% of the participants use their car every day, 23,2% use it 2-3 times per week and 10,7% use their car rare.

As alternative transportation means 47,2% choose motorcycle, 20,7% move with a bike,20,4% use exclusively their car, 10,4% choose the Public means of Transportation and a very low percentage of 1,3% use other means.

The public's perception of the reasons to save energy is the reduction of environmental pollution (31,2%), the non-depletion of natural resources (23,5%), the prevention of greenhouse effect (18,7%), the economy (15,8%) and the avoidance of energy crisis (10,8%).

3.6 Immigrant/Refugee issue

Questions in this section explored citizens' opinions about the refugee issue that is very important in the island

The vast majority of the participants (76,5%) consider that refugees have an effect on sustainable development of the island, 13,4% stated no to this question and 9,5% answered that they don't know.

The same percentage as above (76,5%) believe that the existence of immigrants/refugees has negative impact on Chios environment, 4,2% believe that is positive impact and 19,3% answered that they don't know.

The majority of those surveyed (63,4%) also believe that immigrants/refugees cannot integrate in the island ensuring housing, care and education. The opposite believes a total of 21,7%, while 14,9% answered that they don't know.

These findings are in line with a similar survey carried out in the North Aegean Perfecture by the Kaparesearch Company [4]. 78% of respondents come from Chios believe that immigration issue is the major problem for the Country at this time and 90% of respondents said that the increased flows have negatively affected their island while 56% believe that no compensatory measures can improve the situation.

It is obvious, from the majority of the citizens the negative attitude towards the refugee phenomenon.

3.7 Sustainable development

The last questions have tackled the concept of Sustainable Development.

The vast majority (86,9%) has heard the term of Sustainable development while the remaining participants are not. The participants gave different answers about the concept of Sustainable development with 23,3% stating that is the development that meet the needs of today's generation, 22% stating that is maintaining natural capital at constant levels over time, 22,2% saying that is the financial, social and environmental development, 26,7% saying all the above and finally 5,7% nothing from the above.

4. CONCLUSIONS

The purpose of this study is to investigate the attitudes and perceptions of citizens regarding Sustainable Development issues with an emphasis on the Environment of the City of Chios.

The most important environmental problems for the city are the traffic, the lack of parking spaces and the reduction of water supplies. The majority of surveyed citizens say they are not enough informed about the environmental status of their city. Compared to the European Union survey [5], at a national level Greeks indicates, in a rate of 52% that they are well informed about their country's environmental problems and the remaining state poorly informed. It is obvious that citizens recognize the necessity for energy saving, recycling and water management for their city. According to the people interviewed municipal, Chios presents lack of green and free spaces within the city.

The majority develops water saving habits, while consumes bottled water in their routine. Water saving measures mainly concern practices (shower instead of bath) and less application of water saving technologies (eg. pressure regulators etc). The results are related to a corresponding study conducted in Greece too [6].

There was also an absence of knowledge about important recyclable materials such as organic waste. The significance of composting arises from the fact that 40% of the total generated (Municipal Solid Waste) in Greece are organics and in the North Aegean Prefecture that Chios island belongs, this percentage is 44,3% [7,8].

Most of the citizens apply energy saving technologies on their residences but the financial factor is deterrent in order to apply expensive technologies such as photovoltaics, geothermal systems or replace electric appliances with others. They also use their car every day or alternatively motorcycle in order to move. The Public means have low attractiveness [9].

A negative attitude and perception towards the refugee/immigrant issue was also represented by the majority of the surveyed.

Achieving sustainable city management is a multidimensional process that requires the cooperation between citizens and agencies such as Local Authorities.

As a result, informing citizens about the environmental problems of their city and "activating" them to ensure the achievement of the objectives of sustainable management should be a top priority.

Municipality of Chios has to deal with many issues so that the city becomes more sustainable including the water management, the solution of the traffic congestion and the increase in the attractiveness of the parking areas available to the city. It has also to increase green spaces or improving the quality of existing ones through renovation projects.

The promotion of recycling and home composting are very important as the Municipality records very low levels of attractiveness of these actions.

It is also very significant for citizens to understand that in order for their city to become more sustainable their individual

responsibility is as important as the collective one.

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