Sustainable Urban Resilience: Cities in the face of modern challenges. Case study: The city of Elliniko-Argyroupoli, Greece

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Abstract

The present paper deals with the analysis of the current situation of the Municipality of Elliniko - Argyroupoli, in the region of Attica in Greece, regarding the sustainable urban resilience to impending disasters. The disasters are divided into natural and technological, of which natural disasters have affected the Municipality of Elliniko - Argyroupoli in recent years. Climate change, the increasing trend of urbanization, and the city's complexity are among the main reasons that necessitate urban resilience to prevent, respond to, and recover from a variety of impending disasters. The operational plans for civil protection, combined with the sustainable urban mobility plans and the waste management plans of the Municipality of Elliniko - Argyroupoli, make it a model municipality for achieving urban resilience. Through the results of the questionnaire, conclusions are drawn that could be considered useful both for the further analysis of the current situation and for the design of future policies.

Keywords

Sustainable urban resilience, Municipality of Elliniko – Argyroupoli, fractures, city resilient

Presenter Profile

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Introduction

Human civilizations and societies from ancient times until today, have faced countless and diverse challenges and disasters. The continuous increase in urbanization, climate change and the complexity of the city are some of the various causes, which make the urban resilience of cities necessary to face modern challenges. This paper deals with the assessment of the current situation of the Municipality of Elliniko – Argyroupoli in the context of urban resilience.

This paper aims to analyse and explain the current situation of the Municipality of Elliniko - Argyroupoli regarding the challenges that cities are called to manage so that they can be considered urban resilience for the prevention and confrontation of various challenges.

The first part constitutes a general theoretical framework to better understand conceptual determinations. The definition of urbanization and climate change and the correlation between the two terms are mentioned. In addition, the terms disaster and risk are clarified with a view to a better understanding of natural and technological disasters. The term urban resilience, which is the most important part of the present work, the term sustainable development and the interrelated link between the two terms, are defined.

The second part is the research part of the work which concerns entirely the case study of the Municipality of Elliniko-Argyroupoli. Firstly, examples of natural disasters that have taken place in the municipality that has been studied for the last ten years are cited. In addition, the operational plans for civil protection for the Municipality of Elliniko - Argyroupoli are mentioned in the context of preventing and dealing with impending disasters and the sustainable urban mobility plan of the municipality of study is presented. Finally, the management plan for the waste of the Municipality of Elliniko – Argyroupoli is presented.

The third chapter makes a detailed assessment of the current situation of the study area. In particular, the SWOT analysis is presented to better understand the current situation of the Municipality of Elliniko - Argyroupoli. Following the collection of anonymous questionnaire replies, analysis and statistical processing are carried out with means of statistical analysis to explain the results of the questionnaire "Urban Resilience: Cities against contemporary challenges".

This research aims to draw some conclusions for the assessment of the urban resilience of the Municipality of Elliniko-Argyroupoli.

Cities and contemporary challenges

Urbanization and climate change

Urbanization is a phenomenon that has been observed since ancient times. The reasons vary, such as social, economic as well as environmental (United Nations; Environment programme). Today, half of the world's population lives in urban areas. In 1950 a third of the world's population lived in urban areas and according to the United Nations in 2050 it is estimated that 70% of the world's population will live in large urban areas. However, sustainable development depends to a considerable extent on managing urban development to achieve sustainable cities in both developed and developing countries (World Urbanization Prospects, 2018).

The quality of life in cities is inextricably linked to the rate at which cities are drawing on and managing the natural resources at their disposal. Urbanization is linked to the great pressure on the environment and land, the increased demand for basic services, infrastructure and jobs

(United Nations? Environment programme). Therefore, changes are taking place in the way of life, culture and behaviour of citizens, resulting in the formation of the demographic and social relationship of urban areas. Due to urbanisation, there is a continuous upward trend in the number of inhabitants living in urban areas in relation to rural dwellers (World Urbanization Prospects, 2018). The increased concentration of people in large cities results in increased economic activities, increased demand for infrastructure and housing. Because of the above, cities are more vulnerable to natural disasters such as the effects of climate change. The successful implementation of urban resilience contributes to the reduction of social and economic losses because it requires the adoption and implementation of immediate policies to achieve sustainability and address urbanisation to protect the environment (United Nations? Environment programme).

The definition of climate change is linked to the long term to weather phenomena on Earth, such as temperature, sea level and frost. The earth's climate has changed rapidly several times since the planet was created, 4.5 billion years ago. It has undergone extended periods of hot temperatures as well as periods of glaciers. These cycles have lasted about tens of thousands or even millions of years. Over the last 150 years, known as the "industrial age", temperatures have risen faster than in any other era (the European Union).

Abrupt climate change has obvious effects, which are distinguished from changing temperatures and rising sea levels resulting in the melting of polar glaciers as well as more frequent occurrences of rainfall and flooding. These effects can bring about fundamental changes in economic, social and environmental terms. In particular, they can be able to they alter water resources, the integrity of ecosystems, public health, industry, agricultural production as well as transport (Ministry of Environment & Energy).

The draft of the Intergovernmental Panel on Climate Change (IPCC) points out that climate change, and in particular global warming, is causing far-reaching consequences affecting the oceans, winds and rainfall in many regions of the world (International Panel on Climate Change, 201) 9). The high intensity of extreme weather events combined with the increased frequency results in overheating of the temperature of marine waters. In addition, a 2°C rise in temperature will have a particularly significant impact on both the environment and people. Efforts to eliminate the greenhouse effect by reducing carbon dioxide emissions and greenhouse gas emissions will reduce the effects of climate change (European Council of the European Union).

Global warming as well as the phenomenon of urbanisation contribute to warming in cities and their surroundings, especially during events related to elevated temperatures, such as heatwaves. Temperatures during the night are more affected by this phenomenon than the temperatures of the day (International Panel on Climate Change, 2019).

Natural and technological disasters

A disaster is defined as any rapid or slow development of a natural or technological event in marine, land and airspace which may cause far-reaching adverse effects on both man and the natural or man-made environment. For a disaster to be included in the database of the United Nations International Strategy for Disaster Reduction (EM-DAT) at least one of the following criteria must be met: 10 or more dead, 100 people reported to have been infected, call for international assistance and declaration of a state of emergency (EM-DAT, The International Disaster Database for Research on the Epidemiology of Disasters - CRED).

Often in the literature, the terms destruction and danger are mistakenly confused and therefore it is necessary to differentiate the two terms (Abhaya S. Prasad & Francescutti, 2017). The United Nations International Strategy for Disaster Reduction (2004) defines as a risk any natural events or human behaviour that can have consequences for man, social disturbance, destruction of property or deterioration of the environment. However, a disaster is the possible consequence of a risk in which a community or a population cannot handle the effects of the risk, given the resources at its disposal. Therefore, a risk can be an event that will take place independently of human intervention, but the impact of a feed could be reduced or even avoided (Abhaya S. Prasad & Francescutti, 2017).

Risks can be grouped into three categories: technological, physical and environmental. Technological risks are characterised as industrial, nuclear and even pollution, while environmental risks relate to the degradation of the environment permeating the ecosystem, the environment, or natural resources, such as climate change. Natural hazards are events that are the direct result of natural processes, while technological and environmental hazards have come because of human behaviour (Lekkas, 2000).

The natural disaster is a serious, large-scale, adverse event that originated because of natural processes of the biosphere and the earth (Sapountzaki & Dandoulaki, 2016). A natural disaster can be a rapid, large or momentary collision between the natural environment and the social environment. economic system (Lekkas, 2000). This results in loss of property and life, problems in human health as well as injuries, damage to the natural and man-made environment. At the same time, it can cause extensive economic and social losses, the size and severity of which depend on adaptability, vulnerability, and the ability to recover (Bankoff et al., 2004).

A technological disaster is defined as a major accident that occurs in a high-risk installation. It is defined by the International Labour Organisation as "an incident such as a large emission, fire or explosion resulting from uncontrolled developments during an industrial activity, leading to serious a danger to man, immediate or delayed, inside or outside the installation, and the environment, involving one or more dangerous substances' (International Labor Organization, 1988).

Urban resilience and sustainable development

Urban resilience is defined as the carrying capacity of cities to operate in such a way that people living and working in cities, especially the vulnerable and the poor, survive and thrive regardless of the unexpected crises or even disasters they face (Index, City Resilience, 2014).

With the continuing increasing trend of urbanisation, cities are faced with a variety of acute shocks resulting both from long-term pressures, such as the effects of climate change, and from natural and technological disasters. As a result, they can cause incalculable effects on people's health and safety, the economy, and the natural environment. As a result, they can have incalculable effects on people's health and safety, the economy, and the natural environment. As a result, they can have incalculable effects on people's health and safety, the economy, and the natural environment. As a result, urban resilience becomes necessary, without however being limited only to the traditional approach to the prevention and management of risks, but also focusing on the creation of preventive and adaptive policies to deal with any unexpected threat (Labaka et al., 2019).

The scale of urban risk is increasing, while at the same time it is becoming more unpredictable due to the complexity of the city as well as the uncertainty associated with various risks. Urban resilience helps to bridge the gap between disaster risk reduction, resilience to climate change, and ensuring the well-being of society. One of the main objectives of urban resilience is to improve the performance of a system for prevention and to address multiple risks (Index, City Resilience, 2014).

The concept of sustainable development is defined as the form of development policy that aims to meet the economic, social and environmental needs of society to ensure both short-term and long-term prosperity (European Commission). Sustainable development must be based on and respond to existing needs while at the same time ensuring the well-being of future generations. The aim is not to degrade or alter the environment while contributing to long-term economic growth (European Commission). On the other hand, the environment has been sacrificed and a large number of natural resources have gradually been exhausted, making sustainable development a major issue. It is therefore necessary to achieve it, cooperation between the government of each country, its local government and non-governmental organizations (Council for Sustainable Development).

The immediate aim of the Council of the Federation of Enterprises and Industries (SEV) for sustainable development is that by 2050, 9 billion people will live in satisfactory living conditions on the planet (Council for Sustainable Development). Today, humanity consumes more than the earth can produce, so it is no longer possible to focus only on economic growth and development. The burden on the environment, climate change, the increasing trend of urbanisation, food shortages and social inequalities are some of the factors that threaten humanity. However, businesses committed to sustainable development are a key factor in the delineation of change, pointing to sustainability to other social partners such as governments and local authorities. The axes of extroversion, competitiveness and innovation create jobs as well as a cohesive society by developing a productive economy with respect for the environment (Council for Sustainable Development).

Analysis of the existing situation of the Municipality of Elliniko - Argyroupolis

The union of the Municipality of Hellinikon (Municipal Community of Hellinikon) and the Municipality of Argyroupoli (Municipal Community of Argyroupoli), which resulted from the Kallikratis Programme in 2010, created the Municipality of Elliniko - Argyroupoli (Law 3852/2010 Government Gazette A 87/7-6-2010). The Municipality of Elliniko - Argyroupoli belongs to the Regional Unit of the Southern Sector of Athens, consisting of 51,356 permanent residents, according to the census of the Hellenic Statistical Authority (ELSTAT). that took place in 2011 and occupies an area equal to 15.4 sq.km. (Municipality of Elliniko Argyroupolis). The altitude of the municipality corresponds to 56 meters and the climate is Mediterranean, according to the Köppen scale classification: Csa (DB. City. com). It is located by the sea while at the same time a part of it is located at the foot of mount Hymettus.

Examples of natural disasters in the Municipality of Elliniko - Argyroupoli

Various natural disasters have affected, on a small scale, the Municipality of Elliniko - Argyroupoli in the last ten years, but no disaster related to a technological accident has been recorded. Several fires have taken place in the Municipality of Elliniko - Argyroupoli but they were small scale and were extinguished immediately without causing adverse effects on the property or the environment and without human casualties. In May 2021, a small fire was recorded in a forest area of Argyroupoli but thanks to the rapid response of the fire brigade,

it did not take a large area. Moreover, according to the official website of the municipality another fire had broken out but was quickly noticed by the voluntary forest protection body of the municipality. It is necessary to mention that there have been attempts at arson in forest areas near the Municipality of Elliniko - Argyroupoli and several fires that broke out were investigated and attributed to inflammatory actions (Municipality of Elliniko Argyroupoli).

In addition, the geographical position of Greece, which is located above the tectonic plates, favors earthquakes. Specifically, in the Municipality of Elliniko - Argyroupoli took place an earthquake of 2.6 on the Richter scale in 2020 and another earthquake of 5.1 on the Richter scale in 2019. The consequences of the two earthquakes were not serious and did not cause large-scale disasters. Thanks to the information and awareness of the citizens through the official website of the municipality as well as the social media, there were no victims (Municipality of Elliniko Argyroupoli).

Also, due to climate change, extreme phenomena have been observed, such as severe weather, heat waves, heavy rainfall, and snowfall. The consequences of climate change may affect and cause adverse effects even at a local level, due to the coastal area of the Municipality of Elliniko - Argyroupoli. A possible impact of climate change is the rise of sea levels, which can affect all residents and employees of the municipality and the sector that will be affected at an average level is the building stock and materials (Giaourdimou, 2020).

Although the municipality of Elliniko - Argyroupoli is included with a percentage of 100% within a water district in the catchment area of the Attica basin, a flood event has historically been recorded but it was not significant and therefore, it has been characterized as a low-risk flood zone according to the "Kallikratis" program. A river basin means "the land area from which all rainfall and/or snowfall of a river is drained of all the rainfall and/or snowfall of an area through the hydrographic network (successive streams, streams, rivers, and possibly lakes) and is drained into the sea through the delta of a river" (Flood Risk Management Plan of the River Basins of the Attica Water District, 2017).

Finally, the COVID-19 pandemic is a natural disaster that has been taking place on a global level since the end of 2019 and has naturally affected at a local level the Municipality of Elliniko - Argyroupoli in various aspects of people's daily lives and in areas such as public health, building stock and tourism with a high level of risk, while sectors such as transport and energy are affected at lower levels of risk. However, due to the complexity of the city, all sectors are interrelated as the increase or decrease of one sector can negatively affect another sector resulting in adverse effects both on a social, economic, and even environmental level (Yaourdimou, 2020).

Civil protection operational plan

One of the main priorities and obligations of each municipality is the protection of human life, property and the health of the citizens in the context of its social mission (Law 3013/02, Government Gazette 102/Α΄/1-5-2002). The purpose of any operational plan for Civil Protection is to prevent and deal with possible natural or technological disasters through the formation of a system of effective mobilization and preparation of competent services. the Municipality of Elliniko - Argyroupoli and the stakeholders (Politis, 2018).

For the Civil Protection Plans of the Municipality of Elliniko-Argyroupoli to be effective, it is necessary to prepare for emergency response, detailed planning, effective organization and staffing, adequacy of material resources as well as integrated coordination of these

(Emergency Action Plan, 2018). Finally, it is necessary to meet the requirements of effective and timely management of various risks, which should be based on prevention, preparedness, response and finally recovery. One of the most basic planning principles in response to and management of mass emergencies is coordination and excellent cooperation between the competent bodies, with clear and specific roles, before, during and after the outbreak of a disaster (Emergency action plan, 2018).

The Municipality of Elliniko – Argyroupoli on its official website has published an updated plan of actions for the organized evacuation of citizens for reasons of protection from impending destruction due to forest fires in August 2020, which was undertaken by the Directorate of Environment and Civil Protection (Plan for dealing with emergencies due to forest fires). In addition, it has published another Operational Policy Plan Protection for the confrontation of natural disasters, which contains all the necessary information for the immediate response to forest fires, emergencies, earthquake and flood cases (Emergency Action Plan, 2018). In addition, in the context of the implementation of a system of effective information and prevention of the Directorate of Environment and Civil Protection has published a protection guide under the name "Elli and Argyris learn about the fire, the earthquake, the flood" which addresses in the form of comics a strong message to the students at the school community (Directorate of Environment and Civil Protection).

In addition, the Municipality of Elliniko - Argyroupoli has made sure to publish on its official page on social media, useful instructions as well as information on the self-protection of citizens in cases such as severe weather conditions, heatwaves, fires as well as earthquakes. daily based on the internet, thus making it more immediate and timelier to inform citizens as well as to raise their awareness.

Finally, a major earthquake response exercise was carried out under the name "SEIZHON 2019", which included four seminars aiming at the readiness for rescue, the effectiveness of the stakeholders involved as well as the optimization of their cooperation (Fire Brigade of Greece, 2019).

It is necessary to mention at this point that the Municipality of Elliniko - Argyroupoli is a model of the municipality. This is reflected by the fact that it was awarded in 2019 in the framework of the annual bravo sustain and ability, dialogue and awards for its multidimensional effort in the organization and execution of Civil Protection plans and prevention measures for the Protection of the Natural Environment (Quality Net Foundation, 2019).

Sustainable urban mobility plan

A Sustainable Urban Mobility Plan is defined as the Strategic Mobility Plan which aims to meet the needs for people's mobility by reducing the use of private cars and increasing travel through more sustainable modes of transport. In addition, it aims to ensure a better quality of life through the transport of goods to the urban and peri-urban fabric. It builds on existing planning practices and includes all areas indirectly or directly involved in the scope of employment of a sustainable urban mobility plan (Sustainable Urban Mobility Plan). Sustainable urban mobility plans contribute to the sustainable development of urban areas through the design of policies and actions to reduce air pollution, energy consumption, traffic congestion, etc. (Municipality of Elliniko Argyroupoli).

The Municipality of Elliniko - Argyroupoli, through the Integrated Sustainable Urban Mobility Plan (SUMP), aims to ensure accessibility of services and jobs to all citizens, to improve both the protection and safety of commuters. In addition, it contributes to the mitigation of air pollution and noise, while increasing economic efficiency and result. the quality of the transport of people and goods. In addition, it contributes to the improvement of the quality and attractiveness of the urban environment (Sustainable Urban Mobility Plan of the Municipality of Elliniko Argyroupoli). The SUMP of the Municipality of Elliniko - Argyroupoli has as its primary objective the creation of a network of mild mobility roads that will operate within the municipality but also in neighbouring municipalities to improve the movement of residents. In particular, the aim is to reduce the problems found in the traffic network. More specifically, it aims to increase mild forms of transport, such as the promotion of walking and public transport, to reduce the use of private cars and the parking problems they entail. In addition, as part of the implementation of the SUMP, a bicycle path has been built in Argyroupoli to operate a single network of cycle paths in both municipal units (Municipality of Elliniko-Argyroupoli, 2018).

The sustainable development of cities develops and raises the standard of living of the region. The successful implementation of a SUMP is based on the bodies and their responsibilities to be clear for the implementation of an action. The sustainable urban mobility plan of the Municipality of Elliniko - Argyroupoli operates with a specific timetable for the implementation of works. It is necessary recently to estimate the cost in full cooperation with the technical service of the Municipality of Elliniko - Argyroupoli. Cooperation and finding available resources are reflected in the instructions of the Urban Mobility Observatory (ELTIS, 2014) in the final straight of implementing measures as to the cost of the programme. The cost of implementing the SUMP is not the responsibility of the Municipality of Elliniko - Argyroupoli alone. Each metro has an indicative cost. The presentation of the project is made per thematic category and by time priority. The cost and sources of funding and the bodies that will undertake its implementation will be assessed (Sustainable Urban Mobility Plan of the Municipality of Elliniko Argyroupoli).

Waste management plan

One of the most important and primary responsibilities and obligations of each municipality is the cleanliness and management of waste under article 75, par. 1 of Law 2463/2006 (Government Gazette 114 issue A/8.6.2006). According to the City Regulation of the Municipality of Elliniko-Argyroupoli, which is carried out for the first time in the municipality, defines as waste - waste management "the collection, the transport, transshipment, temporary storage, recovery and management of waste, including the supervision of these operations, as well as the subsequent care of disposal sites" (City Regulation, 2015).

The vision of the Municipality of Elliniko - Argyroupoli seeks an environmentally optimal and sustainable management of its waste, which can constitute a local community of "zero waste" in cooperation with other geographically close municipalities. The basic principles of the Municipality of Elliniko - Argyroupoli regarding waste management at a local level are initially the prevention of waste creation, the setting of specific quantitative targets based on both national and European policy to reduce the final disposal of waste through re-use. It also seeks to recover materials and safely recover energy from waste, which cannot be recycled. Finally, emphasis is placed on informing and raising awareness among citizens as well as the environmental education of pupils in schools (Decentralized Local Plan Waste Management of the Municipality of Elliniko-Argyroupoli, 2015).

The Local Plan of Decentralized Waste Management (TSDA) of the Municipality of Elliniko - Argyroupoli, was established by Harokopio University in the context of the implementation of a new decentralized waste management system in Attica. Its primary objective is to constitute a Local Action Plan (CSSR) with best practices for the better management of most waste at a local level of the Municipality of Hellinikon - Argyroupoli, with goals and actions for the next 10 years (2015-2025). This Local Action Plan was based on a new management model that focuses on combined actions of the Municipality as well as the Region. The aim is to analyse and evaluate the defined waste management framework of the Municipality of Hellinikon – Argyroupoli to submit proposals for practices and actions to optimize savings, natural and human resources. Therefore, this Local Action Plan includes the modern requirements and objectives of national and Community legislation on solid waste management. In addition, it incorporates the objectives of the new National Waste Management Plan for the prevention of waste as well as identifies specific qualitative and quantitative targets adopted by the Municipality of Elliniko-Argyroupoli. It highlights the necessary local projects as well as actions in cooperation with the competent bodies to achieve both the prevention and re-use and the recycling of waste to recover resources as well as reduce the waste that is buried. Finally, it places particular emphasis on the importance of raising awareness and informing citizens about the successful completion of the proposed actions and calculates the required budget regarding the investment cost for the implementation of the proposed projects and actions (Local Plan of Decentralized Waste Management of the Municipality of Elliniko-Argyroupoli, 2015).

In conclusion, it is worth mentioning that the Municipality of Elliniko – Argyroupoli on its official website has posted in Public Consultation the proposal to update the Local Waste Management Plan to collect proposals and observations from the citizens of the municipality and had held an educational event to the public in December 2021 to inform citizens about the management of bio-waste in the Municipality of Hellinikon – Argyroupoli (Municipality of Elliniko Argyroupoli).

SWOT analysis of the existing situations of the Municipality of Elliniko - Argyroupoli

Table 1 is the SWOT analysis for the Municipality of Elliniko-Argyroupoli to better understand the strengths, weaknesses, opportunities and threats of the current situation regarding the urban resilience of the municipality of Elliniko - Argyroupoli.

As can be distinguished from the SWOT analysis of the current situation of the Municipality of Elliniko - Argyroupoli, the advantages outweigh the disadvantages. Moreover, there is a possibility of preventing and addressing the disadvantages through the opportunities presented in the table as well as the reduction of the impact of the potential threats threatening the Municipality of Elliniko-Argyroupoli.

On-the-spot investigation

For the preparation of this paper, the bibliography was collected through bibliographic research and review, which is available in books and scientific references. This bibliographic research was conducted in conjunction with the search for scientific articles and studies through the Internet which have been published in a journal as well as official websites. More specifically, the official website of the Municipality of Elliniko - Argyroupoli was used.

Firstly, this research was conducted during the winter academic semester of the year 2021-2022. The present survey was self-funded from Roido Mitoula, Professor of the Department

of Economics and Sustainable Development of Harokopio University. More specifically, the creation of the questionnaire, the instructions and delivery of the survey were undertaken by Roido Mitoula. Furthermore, this research constitutes quantitative research and statistical means of descriptive statistics were used for the collection, processing and presentation of the results. More specifically, this present research was a primary form of research as well as inductive. For the collection of the sample probability sampling was used through questionnaires for the collection of primary data filled in electronically or in person, mainly, by citizens of the Municipality of Elliniko - Argyroupoli. In particular, they were supplemented through the "Google Forms" program. ", 67 specially designed questionnaires with 30 closed-ended questions about the place of residence of the respondents. The completion of the questionnaires took place from October to January of the year 2021 – 2022.

Table 1: SWOT analysis of the Municipality of Elliniko – Argyroupoli.

INTERNAL ENVIRONMENT	Strengths	WEAKNESSES
	▪ Prevention of raising awareness and informing citizens about impending disasters ▪ Detailed and careful design of civil protection plans ▪ Preventive actions and exercises in cases of emergency ▪ Satisfactory and effective cooperation with competent bodies ▪ It provides the opportunity to citizens to address ideas and suggestions regarding the improvement of their everyday life	▪ Large-scale municipality ▪ Difficulty in moving due to the urban area ▪ Inadequate traffic lanes ▪ Air pollution due to the increased use of private cars ▪ Increasing trend of urbanization
EXTERNAL ENVIRONMENT	OPPORTUNITIES	THREATS
	▪ Possibility of a grant through programs to optimize the sustainability of the Municipality of Elliniko-Argyroupoli ▪ Ability to cooperate with neighboring and other municipalities ▪ It can be a model of a municipality for other municipalities as an example to be emulated	▪ Complexity of the city ▪ Increasing trend of urbanization ▪ Scalar Change ▪ The municipality, due to its geographical position, is more vulnerable to forest fires and hydrological disasters (tsunami, rise of the sea)

For the execution phase of this present survey the participation was voluntary as well as confidential. Regarding the feasible and the ethical factor, was civil and ethical and the were no questions where the responders must answer even, they don't know the answer. Also, in the questionnaires they were not personal questions reflecting the researcher's bias (Glasow, 2005)

Finally, the questions were not long or involved double negatives according to McIntryre 199. Also, all the questions were consisted of closed-ended questions because according to Salant and Dillman 1994 those questions does not require much effort from the responders.

According to the census of the Hellenic Statistical Authority that took place in 2022 the permanent population consists of 53,1% women and 46,9% men which is accord to the sample of this present research. (Hellenic Statistical Authority, 2022). Regarding the age group in the

Municipality of Elliniko-Argiroupoli the age group is 15-39 years old combining the two municipalities' units according to the Hellenic Statistical Authority that have been conducted in 2001. (Hellenic Statistical Authority, 2001) while in this present paper over 50% of the respondents was between 18 and 34 years old which is accord to Hellenic Statistical Authority.

Also, regarding the marital status of the population of the Municipality of Elliniko-Argiroupoli 52% of the population were single and 48% were married which agrees with the demographic findings of the present survey (Hellenic Statistical Authority, 2011).

At this point, limitations of this present study must be acknowledged. A possible methodological limitation found to be the sample size. Even though some of the demographic is accord to the census of the National Statistical Authority the sample is considered to be small. Another limitation of this present research is the "sample bias" that means, even though measures was taken to prevent this the respondents may not truly be a random sample. In addition, lack of available data was observed about the demographic and social statistics for the municipality of Elliniko-Arguroupoli.

Finally, this research can be used for further research for the assessment of urban resilience research not only in the study area but in national level. In addition, can be used as a starting point for the collection of views of the residents of the study area or any other municipality for future research and studies aimed at improving the standard of living as well as their quality of life.

Results

Regarding the gender factor, 52.2% of respondents are women while 47.7% are men (Figure 1). On the age of the respondents, 30% of respondents are 18 to 24 years old and 26.9% of respondents are 25 to 34 years old (Figure 2). 25% of the sample is a graduate of an I.E.K. and 24% of the sample is a high school graduate (Figure 3). As far as the marital status of the respondents is concerned, 57% of them are unmarried (Figure 4) and 37.3% of the sample live with parents or a partner or a friend (Figure 5). 33% of respondents are full-time employees (Figure 6) of which 51% are self-employed (Figure 7) and 51% could and would like to work remotely during the covid-19 pandemic (Figure 8). Most of the sample by a wide margin (52%) stated that it has an annual net personal income of up to 6,000 euros (Figure 9). 93% of the sample lives in the Regional Unit of the Southern Sector of Athens and specifically in the municipality of Elliniko – Argyroupoli (62 out of 67 total responses) (Figure 10). The survey showed that most respondents live in a municipality located by the seaside (48 responses) (Figure 11). 27% of the respondents consider the change of the local climate seasons as the most important, direct or indirect, consequence of climate change that has affected their municipality/city (Figure 12).

The majority of respondents consider that fire, explosion and/or dispersion of toxic fumes and gases are unlikely to occur in their municipality/city (37 responses) (Figure 13). 32.8% of respondents say they are little informed about climate change (Figure 14).

Newspapers/magazines as well as the organisation where respondents work are how respondents say they are not informed about climate change at all (Figure 15). 41.8% think that climate change is too serious a problem for the planet (Figure 16). Most respondents consider that the agricultural sector may be more affected by climate change in our country by a large margin than the rest of the sectors (Figure 17). Respondents do not consider climate change to be an important reason to support an MP (23 responses) and a political party (21

responses), for a MEP they consider it quite an important reason (23 responses while for a mayor and regional governor they consider climate change as a very (24 responses) and especially important reason respectively (24 replies) (Figure 18). Most respondents replied that the main means of transport before the pandemic was Public Transport (26 responses) as during the evolution of the COVID-19 pandemic the main means of transport was the car (37 responses) (Figure 19). Most respondents chose the option "overcrowding on public transport" as the main reason for choosing a means of transport. (46 responses) (Figure 20). 51of respondents said they would focus on zoning sidewalks, cycle paths as well as upgrading infrastructure. (Figure 21). Before the COVID-19 pandemic, most respondents said that they visit the open public space of their neighbourhood quite a bit (29 responses), while during the evolution of the COVID-19 pandemic a little bit (19 responses) (Figure 22).

The majority of respondents chose contact with nature (38 responses), mental health (38 responses) and socialization for the justification. (37 replies) (Figure 23). The majority of respondents said they would focus on cleanliness (51 responses) and the modernization of urban furniture (48 responses) if they had the opportunity. (Figure 24).

35.8% of the respondents consider the image that the Municipality presents to its residents, employees and/or visitors to be positive about the emergency response? (Figure 25). Many respondents consider that it is quite necessary for their municipality/city to adapt to the emergency response before the COVID-19 pandemic (33 responses) while during the evolution of the COVID-19 pandemic they consider that it is very necessary (25 responses) (Figure 26). Most respondents consider that priority should be given to the loss of life consequences of emergencies (55 responses) (Figure 27). 35.8% of respondents consider that the first person responsible is the Municipality for the adaptation (taking of measures/ interventions) of your city/municipality regarding the emergency response (Figure 28).

Most respondents consider that emphasis should be placed on early warning systems for emergencies (49 responses) as well as on information campaigns on emergency response (47 responses) (Figure 29). Most respondents feel that they are not at all aware of how to react if a major technological accident. (26 replies) (Figure 30). Many respondents would like to receive instructions via text messages on mobile (SMS) and audio notifications. (45 replies) (Figure 31). 34.3% of respondents say they are very satisfied with the operation of the 112-emergency number (Figure 32). 49.3% of respondents say that they have never been asked for their opinion or to take part in the planning of measures/interventions regarding the adaptation of your municipality/ city to the emergency response? (Figure 33). 44 of respondents say that filling out questionnaires is the way they could or would like to participate (Figure 34).

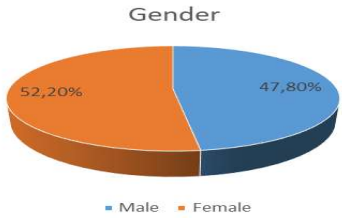

Figure 1

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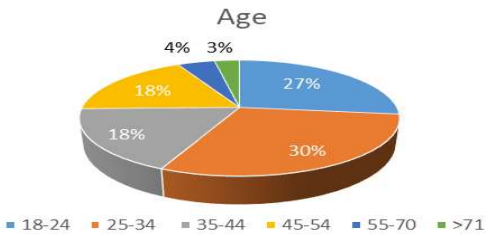

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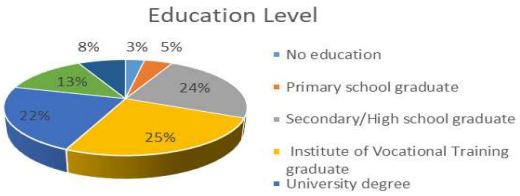

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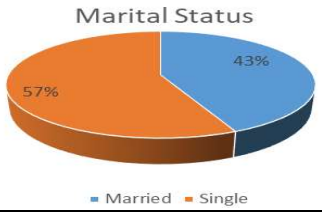

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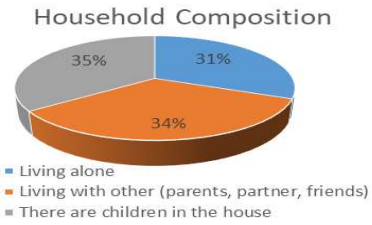

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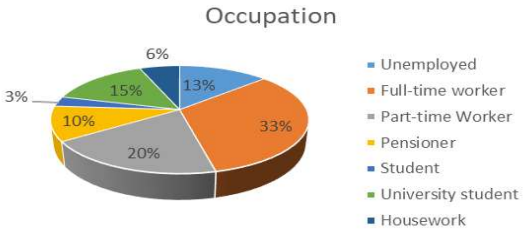

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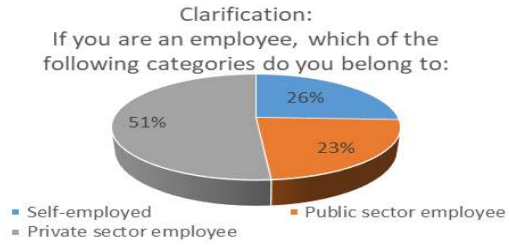

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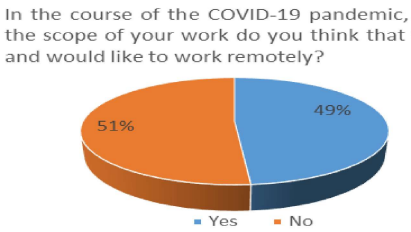

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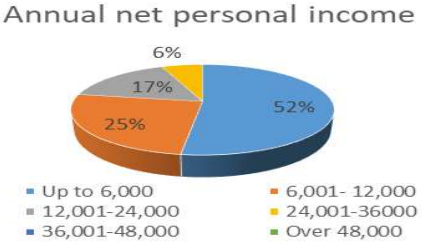

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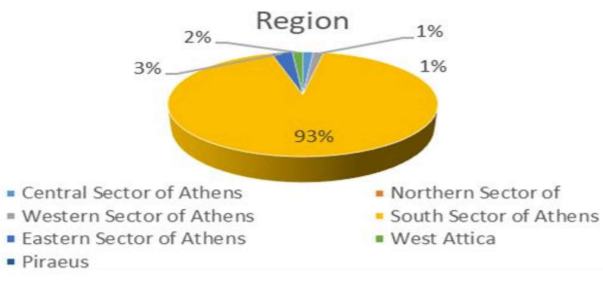

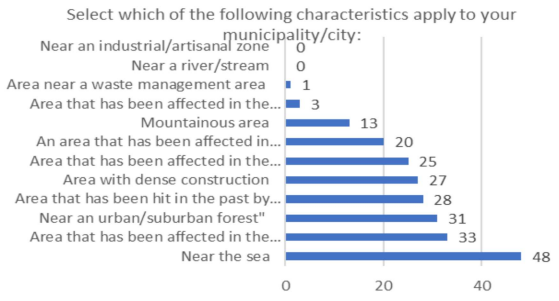

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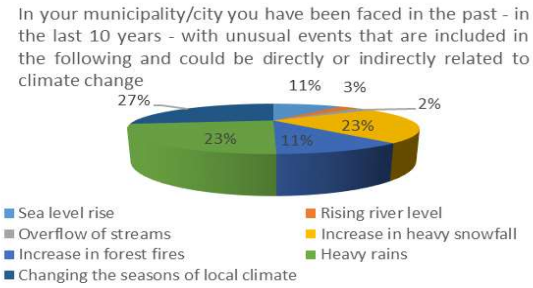

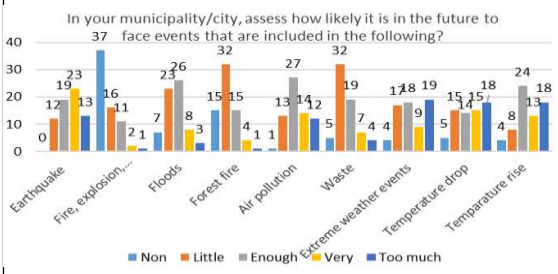

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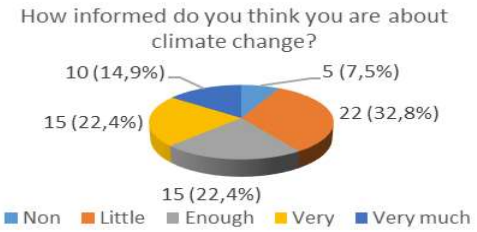

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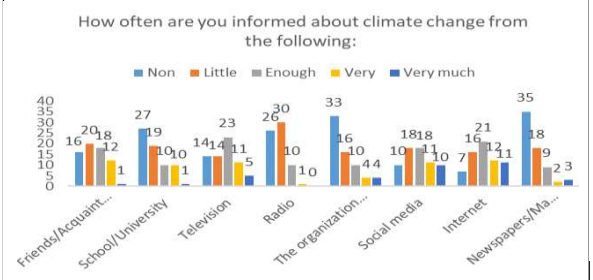

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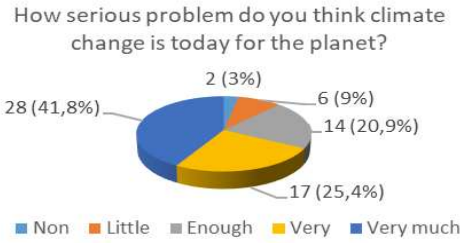

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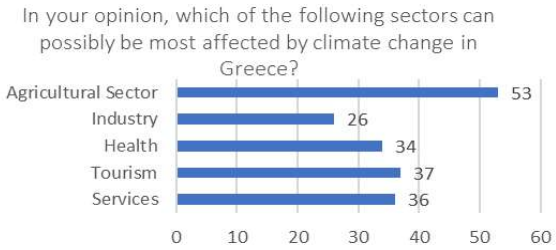

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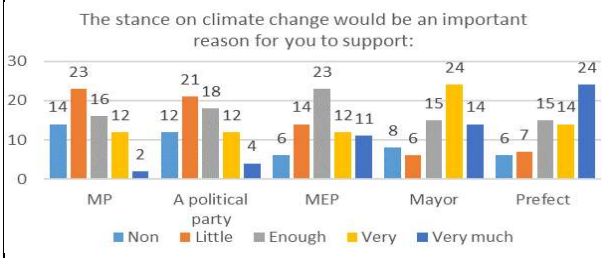

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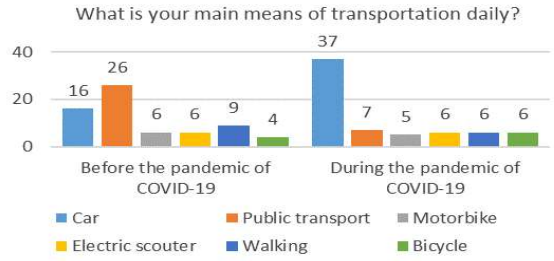

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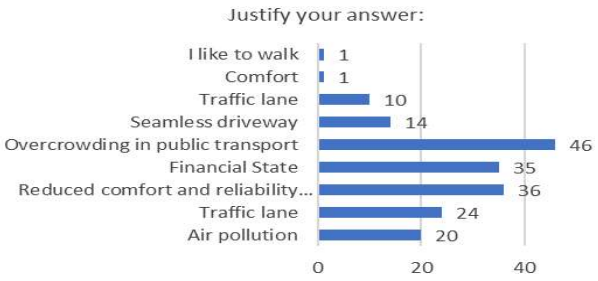

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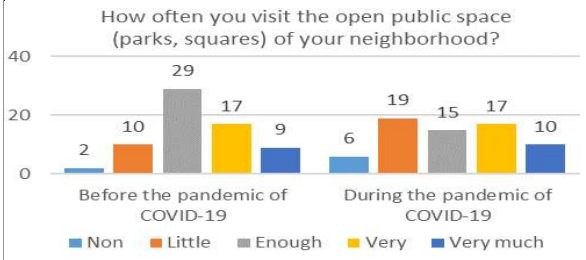

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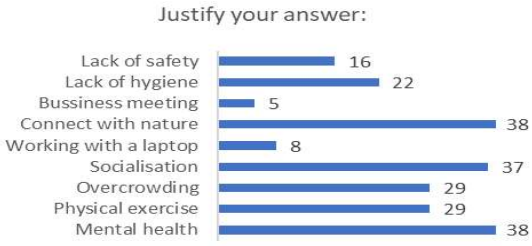

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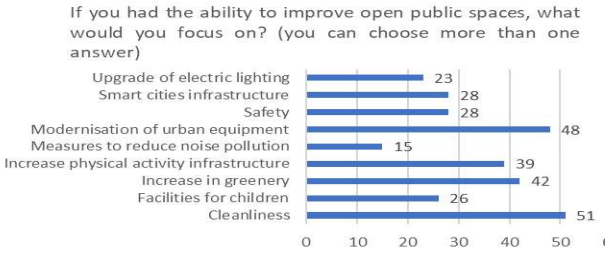

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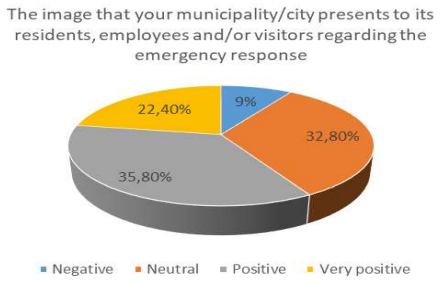

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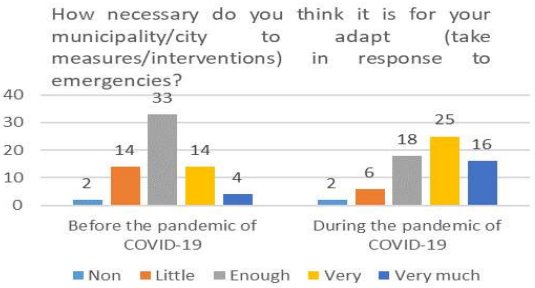

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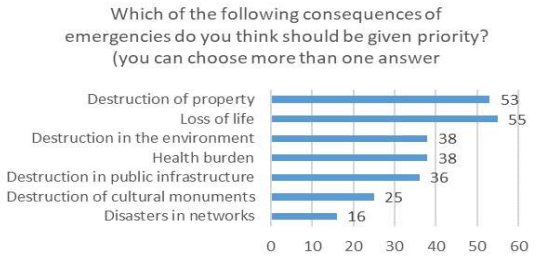

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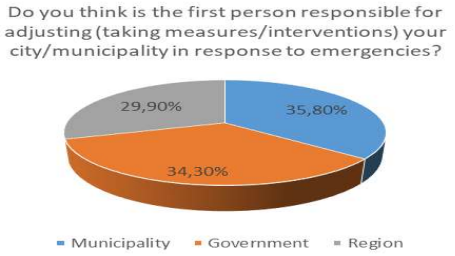

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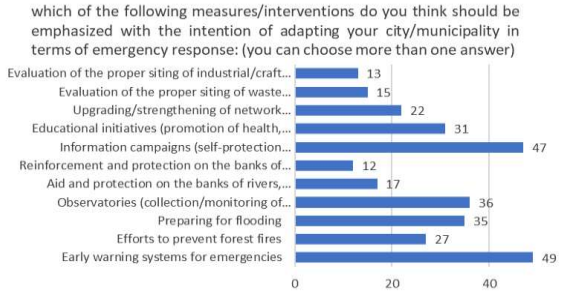

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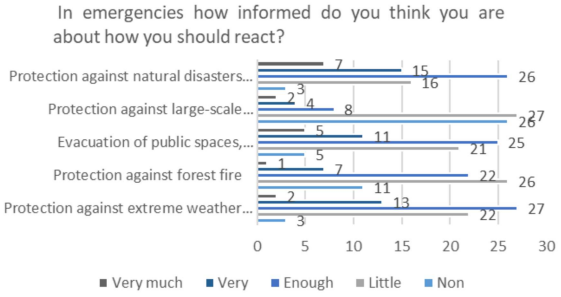

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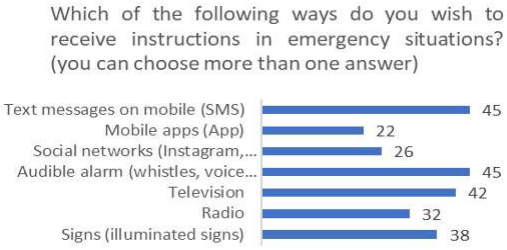

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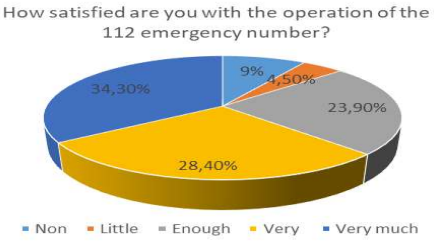

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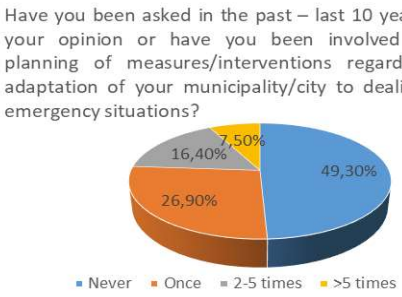

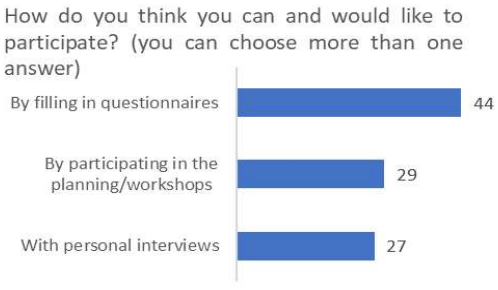

Figure 34

Conclusions

According to the results of the conduct of the survey, several conclusions can be distinguished. Initially, although most respondents do not consider that they are fully informed about climate change, (specifically 32.8% of respondents replied that they are not informed), the majority overwhelmingly consider climate change as a major problem nowadays (specifically 41.8% of respondents consider it to be too serious a problem). Respondents say that climate change would be too important a reason to support a regional governor (24 responses) while for a mayor most respondents say it would be a particularly important reason (24 responses).

The COVID-19 pandemic has affected respondents in various aspects of their daily lives. Initially, as can be seen in Figure 11, the evolution of the COVID-19 pandemic has greatly affected respondents as to their main means of transport. Whereas before the COVID-19 pandemic, 16 respondents used the car as a basic means of transport, as the course of the pandemic, the car was selected by 37 respondents. Similarly, public transport was chosen by 26 respondents as the main means of transport before the coronavirus pandemic, while during the pandemic, only 7 respondents used public transport as the main means of transport. According to the justification, the prevailing reason for the choice of the main means of transport is overcrowding in public transport, followed by the reduced comfort and reliability of public transport. In addition, respondents during the COVID-19 pandemic visited less the open space of their neighbourhood than before the pandemic, and the prevailing justifications for the answers are contact with nature and mental health (Figure 15). Moreover, during the evolution of the coronavirus pandemic, a rapid increase in the necessity of adapting-taking measures/interventions related to emergency response is being observed (Figure 18).

The largest percentage of respondents consider positive the image that their demos / city projects to its residents, employees and / or visitors regarding the emergency response (35.8% of respondents chose "Positive" and 22.4% chose "Very positive"). The answers regarding the person responsible for taking measures/ interventions were divided, as can be seen in Figure 20. In general, the majority of respondents say they are satisfied with the operation of the emergency number.

It is necessary for the Municipality of Elliniko - Argyroupoli to place further emphasis on the response of citizens to emergencies, as shown by Figure 22. In addition, it should focus on citizen participation because, as can be seen in Figure 25, most of the citizens have not been asked to contribute in any way to the response to emergencies.

According to the analysis of the current situation and the conduct of a primary form of research, as analyzed in the above chapters, it is concluded that the Municipality of Elliniko - Argyroupoli can become a model municipality in the analysis and preparation of emergency plans, sustainable urban mobility plans as well as plans for the waste management. In conclusion, the Municipality of Elliniko - Argyroupoli has the potential to achieve to the maximum extent possible the urban resilience to be able to face various challenges through analytical planning, taking policies and interventions, taking policies at a preventive level, further sensitizing, and informing citizens as well as their participation.

References

Bankoff, G., G., et al. Mapping Vulnerability. Edited by Greg Bankoff et al., Routledge, 2004, www.taylorfrancis.com/books/edit/10.4324/9781849771924/mapping-vulnerability-greg-bankoff-georg-frerks-dorothea-hilhorst. Accessed 10 June 2022.

Council for Sustainable Development. “On Sustainable Development.” Www.sevbcsd.org.gr, www.sevbcsd.org.gr/about_sustainable_development. Accessed 15 June 2022.

DB.City.com. Elliniko-Argyroupoli. el.db-city.com/%CE%95%CE%BB%CE%BB%CE%AC%CE%B4%CE%B1--%CE%91%CF%84%CF%84%CE%B9%CE%BA%CE%AE--%CE%95%CE%BB%CE%BB%CE%B7%CE%BD%CE%B9%CE%BA%CF%8C-%CE%91%CF%81%CE%B3%CF%85%CF%81%CE%BF%CF%8D%CF%80%CE%BF%CE%BB%CE%B7. Accessed 1 June 2022.

Directorate of Environment and Civil Protection. “Plan to Deal with Emergencies due to Forest Fires.” Google Docs, Mar. 2020, drive.google.com/file/d/1xZXXywZMAV9tq_FNjnYII0TEUxIVZSha/view. Accessed 5 June 2022.

Municipality of Elliniko-Argyroupoli. “Protection Guide for Responsible Children- Elli and Argyris Learn about Fire, Earthquake, Flooding.” Municipality of Elliniko-Argyroupoli, www.elliniko-argyroupoli.gr/article.php?id=6081. Accessed 5 June 2022.

EM-DAT, The International Disaster Database for Research on the Epidemiology of Disasters CRED. “Explanatory Notes | EM-DAT.” Www.emdat.be, www.emdat.be/explanatory-notes. Accessed 1 June 2022.

Environment Programme, U. N. “GOAL 11: Sustainable Cities and Communities.” UNEP - UN Environment Programme, 2 Oct. 2017, www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-11. Accessed 6 June 2022.

European Commission. “Glossary.” Ec.europa.eu, ec.europa.eu/regional_policy/en/policy/what/glossary/s/sustainable-development. Accessed 5 June 2022.

European Union. “Climate Change: EU Action.” Www.consilium.europa.eu, www.consilium.europa.eu/el/policies/climate-change/. Accessed 8 June 2022.

---. “What Is Climate Change? | European Youth Portal.” Europa.eu, europa.eu/youth/get-involved/sustainable-development/what-climate-change_el. Accessed 17 June 2022.

Fire Brigade of Greece. “Earthquake Exercise “SEICHTHON 2019” in Attica.” Fireservice.gr, 2019, www.fireservice.gr/el/-/askese-seismou-seisichthon-2019-sten-attike. Accessed 8 June 2022.

Glasow, Priscilla A. Fundamentals of Survey Research Methodology. 2005.

Harokopio University. Local Plan of Decentralized Waste Management of the Municipality of Elliniko-Argyroupoli. Mar. 2015, www.elliniko-argyroupoli.gr/uplds/file/2016/TSDA_DimosEllinikoyArgyroupolis_sxedio.pdf. Accessed 3 June 2022.

Hellenic Republic. Law 3013/02 (Government Gazette 102/a΄ / 1-5-2002): Upgrading of Civil Protection and Other Provisions. Legislation on Citizen Service Centres. 2002, www.secdigital.gov.gr/wp-content/uploads/2020/07/secdigital-kep-nomothesia.pdf. Accessed 2 June 2022.

Hellenic Statistical Authority. Population Census Results 2022. 2022.

---. “Statistics - ELSTAT.” Www.statistics.gr, 2001, www.statistics.gr/el/statistics/-/publication/SAM03/2001. Accessed 2 Sept. 2022.

Index, City Resilience. City Resilience Framework. 2014, www.rockefellerfoundation.org/wp-content/uploads/City-Resilience-Framework-2015.pdf. Accessed 6 June 2022.

International Labor Organization, et al. Major Hazard Control – a Practical Manual, an ILO Contribution to the International Programme on Chemical Safety of UNEP. 1988, www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/instructionalmaterial/wcms_235686.pdf. Accessed 10 June 2022.

International Panel on Climate Change. An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems Climate Change and Land Summary for Policymakers WG I WG II WG III. 2019.

Labaka, Leire, et al. “Defining the Roadmap towards City Resilience.” Technological Forecasting and Social Change, vol. 146, Sept. 2019, pp. 281–296, 10.1016/j.techfore.2019.05.019. Accessed 14 June 2022.

Lekkas, E. (2000). Natural & Technological Disasters (Department of Dynamics, Tectonics & Applied Geology – Department of Geology and Geoenvironment ed.), https://www.elekkas.gr/images/stories/pdfdocs/books/tk.pdf. Accessed 10 June 2022

Ministry of Environment & Energy. Climate Change. ypen.gov.gr/perivallon/klimatiki-allagi/. Accessed 2 June 2022.

Ministry of Environment and Energy: Special Secretariat for Water. Flood Risk Management Plan of the Rivers’ Pollution Basins of the Attica Water District. July 2017,

thyamis.itia.ntua.gr/egyfloods/sdkp/GR06/II_1_P12_GR06.pdf. Accessed 9 June 2022.

Mohamed Shaluf, Ibrahim. “Disaster Types.” Disaster Prevention and Management: An International Journal, vol. 16, no. 5, 13 Nov. 2007, pp. 704–717, www.emerald.com/insight/content/doi/10.1108/09653560710837019/full/html, 10.1108/09653560710837019. Accessed 15 June 2022.

Municipality of Elliniko - Argyroupoli.). City Regulation. 2015, www.elliniko-argyroupoli.gr/uplds/file/KANONISMOSPOLIS.pdf. Accessed 10 June 2022.

---. “Municipality of Elliniko - Argyroupoli.” Www.elliniko-Argyroupoli.gr, www.elliniko-argyroupoli.gr/. Accessed 7 June 2022.

Municipality of Elliniko Argyroupoli. “Sustainable Urban Mobility Plan of the Municipality of Elliniko-Argyroupoli.” Elliniko-Argyroupoli, ellinikoargyroupol.wixsite.com/svak. Accessed 5 June 2022.

Municipality of Elliniko-Argyroupoli. PUBLIC PROCUREMENT FILE. 2018.

Politis, D. Operational Plan for Civil Protection of the Municipality of Ilion to Address Natural and Technological Risks. Diploma Thesis, pergamos.l ib.uoa.gr/uoa/dl/object/2700339. Accessed 22 June 2022.

Prasad, Abhaya S., and Louis Hugo Francescutti. “Natural Disasters.” International Encyclopedia of Public Health, 2017, pp. 215–222, www.ncbi.nlm.nih.gov/pmc/articles/PMC7171902/, 10.1016/B978-0-12-803678-5.00519-1. Accessed 13 June 2022.

Quality Net Foundation. “BRAVO Sustain and Ability, Dialogue & Awards.” QualityNet Foundation, 2019, qualitynetfoundation.org. Accessed 14 June 2022.

Sapountzaki, K, et al. “Dangers and Disasters.” Handle.net, 2016. Association of Greek Academic Libraries, hdl.handle.net/11419/6297, 978-960-603-305-6. Accessed 9 June 2022.

Sustainable Mobility Unit. “Σχέδια Βιώσιμης Αστικής Κινητικότητας.” Svak, www.svak.gr/. Accessed 13 June 2022.

United Nations. “World Urbanization Prospects - Population Division - United Nations.” Un.org, 2018, population.un.org/wup/. Accessed 12 June 2022.

United Nations Office for Disaster Risk Reduction. Living with Risk: A Global Review of Disaster Reduction Initiatives. 2004, www.humanitarianlibrary.org/sites/default/files/2014/02/ISDR_LivingWithRiskAGlobalReview.pdf. Accessed 18 June 2022.

Voluntary Group of Forest Protection Firefighting of the Municipality of Elliniko Argyroupoli. “Emergency Action Plan.” EODDEA, 2018, eoddea.gr/schedio-energeion-ektaktis-anagkis/#9.3. Accessed 11 June 2022.