Malta

Risk perception survey questionnaire report

2023

Risk perception questionnaire report

Department of Geosciences, University of Malta

Malta

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3. CITATION PAGE: *Citation page should include:*

- *The institution that implements the survey*
- *Where additional information can be obtained (contact person, address, phone, email etc.)*
- *Disclaimer*
- *Recommended citation*

Example:

The 2023 Risk Perception Survey was implemented by the Geoscience Department of the University of Malta.

The funding for the survey was provided by the IOC-UNESCO and DG-ECHO

Additional information about the survey may be obtained from Blanca Mendiguren. Email: blanca.mendiguren@um.edu.mt

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CONTENTS

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

MAP OF THE COMMUNITY

Covering an area of 4.7 km^2 and located southeast of Malta, Marsaxlokk hosts a population of 3.988 citizens, of which 52.9% are males and 47.1% are females, as shown in the latest Maltase census of 2021. In Marsaxlokk, the highest percentage of the population is over 65 years old (18.20%), followed by citizens ranging between 35-44 years old (16.70%). About 13.30% of the population is under 14 years of age and only 9.70% of the total population is between 15 and 24 years old. During the open-air market day, which takes place every Sunday, the population can increase up to 7000, posing a higher risk in the event of a tsunami arriving on the Maltese coasts.

Marsaxlokk has a series of services that provide for both the public and the tourists, as highlighted in Figure 1 Most common services for tourists (restaurants and guesthouses) are located on the waterfront, while the services that mainly provide for the local residents (Municipality, primary school, pharmacy, etc.) are located further landwards.

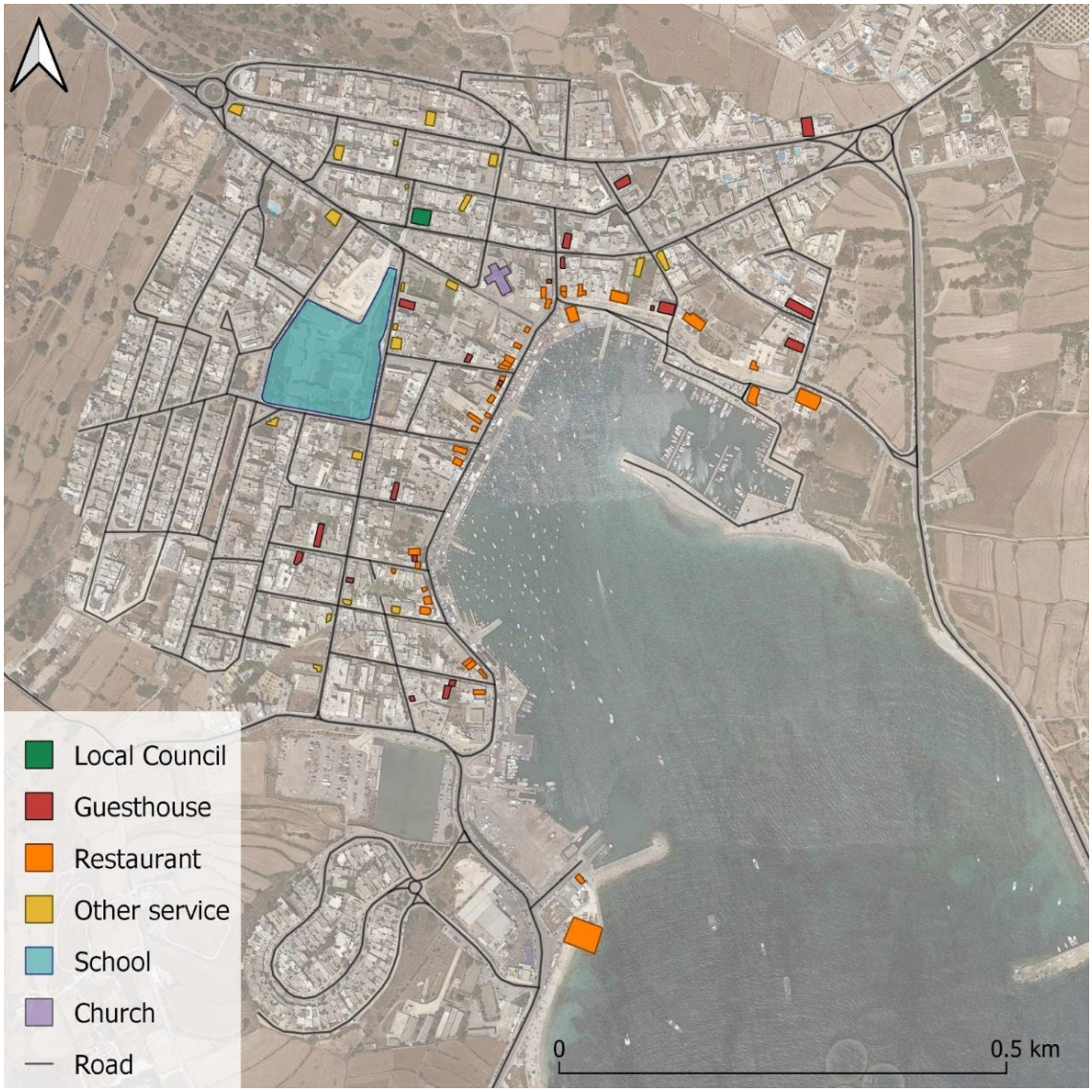


Figure 1.- Map of Marsaxlokk town and location of the primary services contacted for the risk perception survey.

INTRODUCTION

The island of Malta is located in the middle of the Mediterranean Sea and exposed to the marine hazards originated from further areas, including tsunamis (Figure 2). In 2014, Maramai *et al.* catalogued 290 tsunamis generated in the European and Mediterranean seas since 6150 B.C. The rapid demographic growth of Malta in the past decades, accompanied by extensive economic activities, has drastically increased the coastal community's exposure to marine hazards. Although some of these tsunami events were disastrous, similar tsunamis to those from the past would cause greater damage due to the overpopulated coastal areas.

As an example of recent tsunamis, on the 30th of October 2020 Samos Island (Greece) and Izmir Province (Turkey), both in the eastern Aegean Sea, were struck by a M_w 6.6 strong normal-faulting earthquake, which generated a tsunami that hit the coasts of both localities (AFAD, 2020; Dogan *et al*., 2021). More recently, the deadly M_w 7.8 earthquake that hit the Turkey-Syria border, with an epicenter located 90km away from the coast, generated a tsunami ranging from (12-17 cm), as detected on sea level stations around Turkey (IOC-UNESCO site, 2023). The relevance of these events and the level of awareness of the local communities can affect the preparedness and effective evacuation in the occurrence of a tsunami.

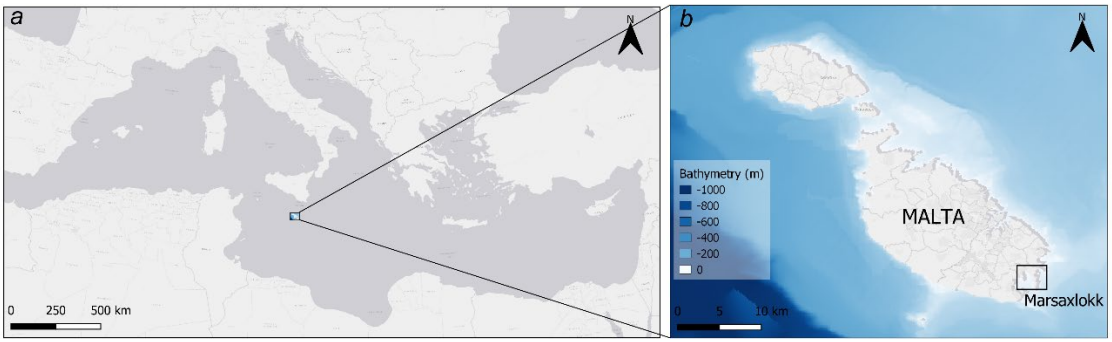


Figure 2.- Location of Malta and Marsaxlokk (b) within the Mediterranean Sea (a).

Malta is not exempt from having suffered the effects of a tsunami, back in 1908 an M_w7.2 earthquake struck southern Italy along the Messina strait, triggering a local tsunami (Borg *et al.,* 2015). Even though there are some inconsistencies regarding the arrival time of the first wave, the waves reached the Maltese coasts flooding the areas of Msida and Marsaxlokk and abnormally high sea level were recorded in the Grand Harbour (Savona-Ventura, 2005). Although Malta is at an advantage due to its location and distance from active faults, which allows the Maltese population an advantage in terms of reactiveness time, building resilience in coastal communities should be a constant measure.

The objective of this survey is to gather information regarding the awareness of the population of Marsaxlokk towards marine hazards, including tsunamis, storm surges and sea-level rise, along with their perception and sense of exposure to them.

SURVEY METHODOLOGY

Several different methodologies were applied in the surveying. Firstly, the primary services provided in Marsaxlokk were identified, as shown in Figure 1, along with their contact. These services were mainly focused on tourists, such as the restaurants on the seafront and the guesthouses that are mainly one block away from the water or further inside the town. The other services that were identified and that are located further inland, are those that mainly provide for the residents, such as the Local Council, , the primary school, or others (pharmacies, grocery stores, etc.). Once identified, an email was sent to the diverse service providers including a brief explanation of the CoastWAVE project and the link to the survey.

In order to reach the youngest population of Marsaxlokk, on January 11th was carried out an activity at St. Lucia Secondary School, which is located in the vicinity of Marsaxlokk. It is where most of the local students attend in order to complete their secondary education since there is no such option in their town. Around 35 students fulfilled the questionnaire under the supervision of the CoastWAVE team members, with minimum interference to their knowledge to obtain the most uninfluenced responses.

Social media is a very helpful tool when aiming to reach a high percentage of the population. In this sense, a poster with the questionnaire linked to a QR code was designed (Figure 3) and, disseminated through the online platform *Facebook* more specifically on the channel of the Local Council. The posters containing a QR code linked to the questionnaire were circulated throughout Marsaxlokk, including a stand at the entrance of the Local Council, various restaurants and coffee shops at the seafront, a pharmacy and the local police station.

Two focus groups were included in the survey, due to the difficulty of assessing individually the awareness of all the population representing these groups: the elderly population and fishermen. The two groups were surveyed through one-to-one direct interviews. For this purpose, the elderly population was represented by the sisters at the convent, which is located on the seafront whilst the fishermen were interviewed while mending the fishing nets by the sea.

Figure 3.- QR code poster linked to the risk perception survey.

QUESTIONNAIRE

The survey intends to provide valuable information on the population's awareness regarding tsunamis and other coastal hazards, such as sea level rise and storm surges. It aims at a population above 14 years of age, from different backgrounds and sectors (regarding levels of school completed and job positions). The data used in the survey is anonymous and will only be used for the purpose of the project, which is informed to each person interviewed as well as their possibility of accepting or denying the usage of such information in further publications.

The questionnaire sums up a total of 36 questions, from which some were joined in order to simplify the quantity if graphs and it is divided into 5 main topics:

1. Personal Information: this section of the survey questions regarding the person's area of establishment, gender and age. Furthermore, it includes the person's level of school completed (from primary school to university) and whether they belong to one of the following sectors: tourism, education, emergency responder or other.

2. Awareness/Knowledge: this section focused on the awareness of the population regarding tsunamis, storm surges and sea level rise, their expectations of these events to happen in their community or in the Mediterranean.

3. Exposure and sense of Exposure: in this section it is gathered information about the respondent’s home or workspace distance from the shoreline.

4. Assessment, Preparedness and Response: this section explores the feeling of the respondents towards the marine hazards, regarding the impact and risk of their community and the Mediterranean, if they have taken any actions against them and what would be their behavior in the case of an earthquake.

5. Governance: The final section of the questionnaire aimed at the person's perception of their local and national authorities to manage an emergency response operation and, who is responsible, in their opinion, for managing a crisis. The questions found in this section include which channel of communication they’d rather receive the alert message and, who should be responsible in terms of risk reduction or management

SURVEY IMPLEMENTATION

Following sub-sections should be included in the survey Implementation Section:

- *Field work*
- *Data Processing: the data was automatically updated in Alchemer software.*
- *Response Rates*

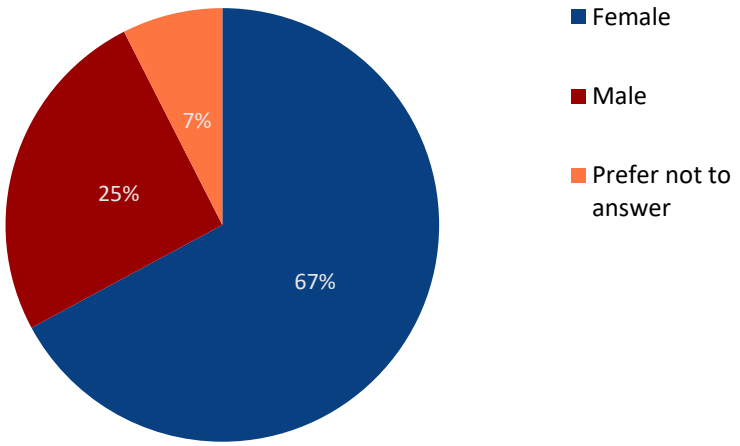
RESULTS

This chapter presents the results of the surveying, with a total of 236 participants from Marsaxlokk, from which 134 completed the full survey and 98 partially completed it. The chapter is subdivided into the 5 main topics above mentioned and each one includes the corresponding questions with a graph showing the percentage of answers from the respondents.

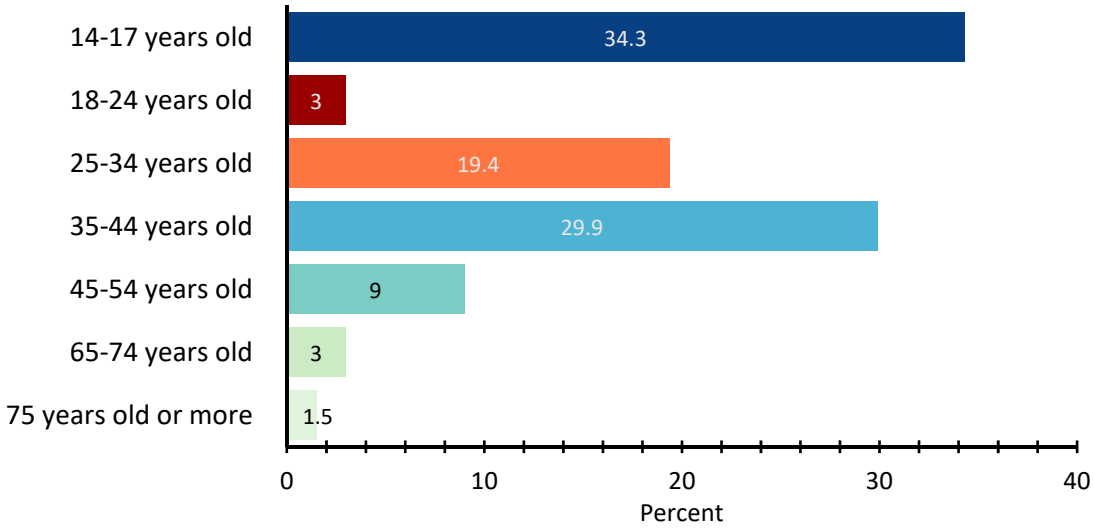
Personal Information

The majority of the respondents were females (67.2%) and, regarding the age group that answered the most, it was the youngest population ranging between 14-17 (34.3%), followed by the group ranging 35-44 years old, corresponding to 29.9% of the respondents. Only 1.5 of the respondents were 75 years old or above and, 3% ranged between 18 and 24 years old. Up to 30.3% of the responders hold a university degree and 45.5% went to high school. Almost half of the respondents were part of the education sector (students and teachers), 35.8% belonged to the main public and 14.9% to the tourism sector.

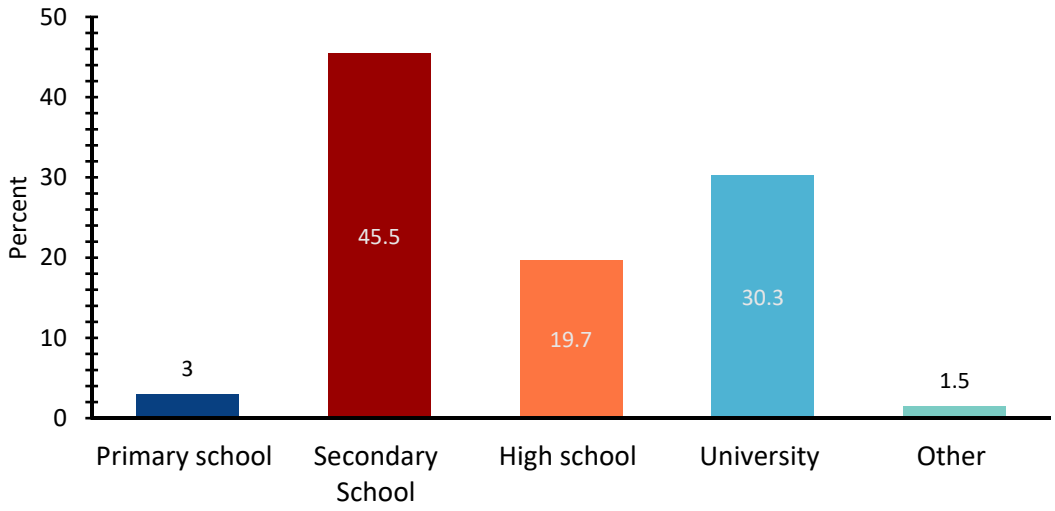
1. What is your gender?



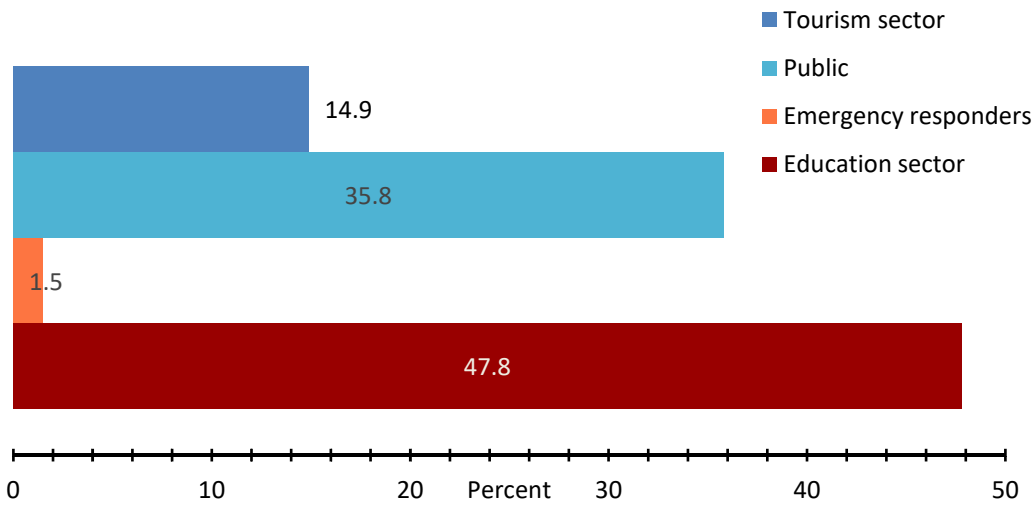
2. How old are you?



3. What is your highest level of school completed?



4. Are you part of one of the following sectors?



Awareness/Knowledge

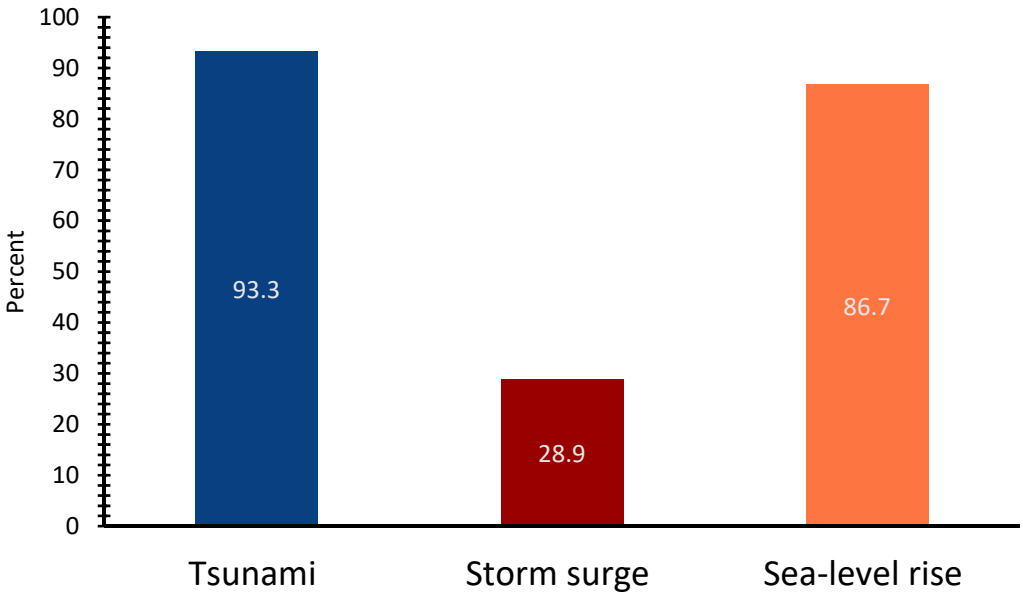
The vast majority of the respondents are aware of the terms tsunami and sea-level rise, whilst storm surge created a bit of confusion among the population. This is due to the fact of not knowing the exact terminology, as many of them are aware of the causes or impacts of these events since they are common during the storm period in the locality. As expected, almost 91% never experienced a tsunami event and surprisingly, a small percentage recalled having experienced it. Although storm surge was not a known hazard, 53% of the participants assumed having experienced it, whilst 25% were not sure about it.

Regarding the likeliness of a tsunami, storm surge or sea-level rise to happen in the Mediterranean region in the next 10 years, the majority (between 42% and 53%) believes there's a moderate possibility. Regarding these hazards occurring in Marsaxlokk similar answers were collected except for sea-level rise, where the majority believes the likeliness is higher.

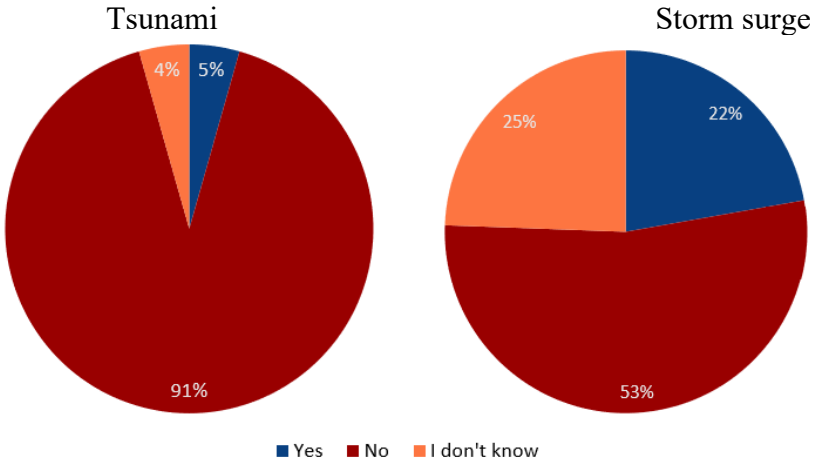
If there was to be a tsunami, the population assumes it will have a wave height between 2 to 5m (27.3%) or higher than 5 m (29.5%). A tsunami of less than 50cm was the less expected (4.5%) and regarding the arrival time 32% of the population pointed out that it will take between 10 and 30 minutes, and 16% believed that it will take longer than 30 minutes.

Regarding the municipality's capacities and infrastructure to alert and or inform the local population, 74.4% of respondents agrees on Marsaxlokk Local Council capacities in the case of a tsunami. Finally, regarding the display of evacuation signs that indicate the best evacuation route, 76.6% acknowledge that the municipality does indeed have tsunami evacuation signs visually located thought Marsaxlokk, whilst 51.2% agreed that there is none for storm surge.

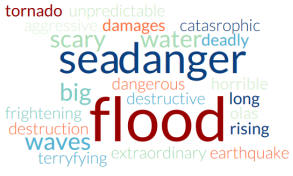
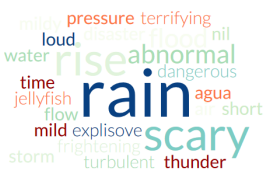
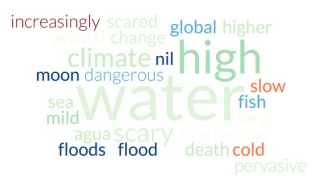
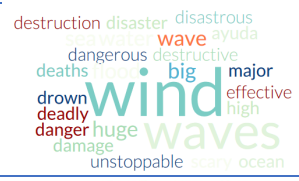
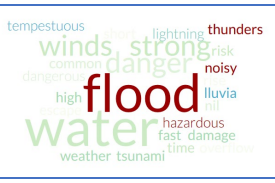
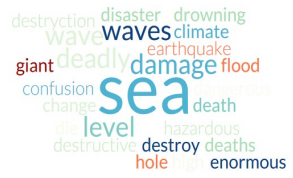
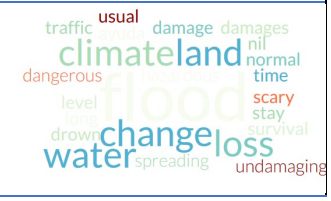
5. Have you ever heard of any of the following hazards?



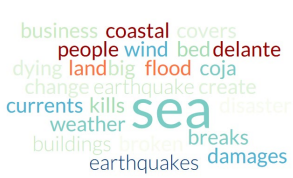
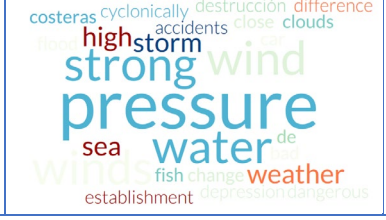
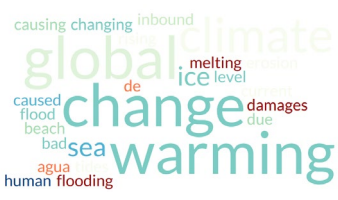
6. Have you ever experienced one or more of these hazards?



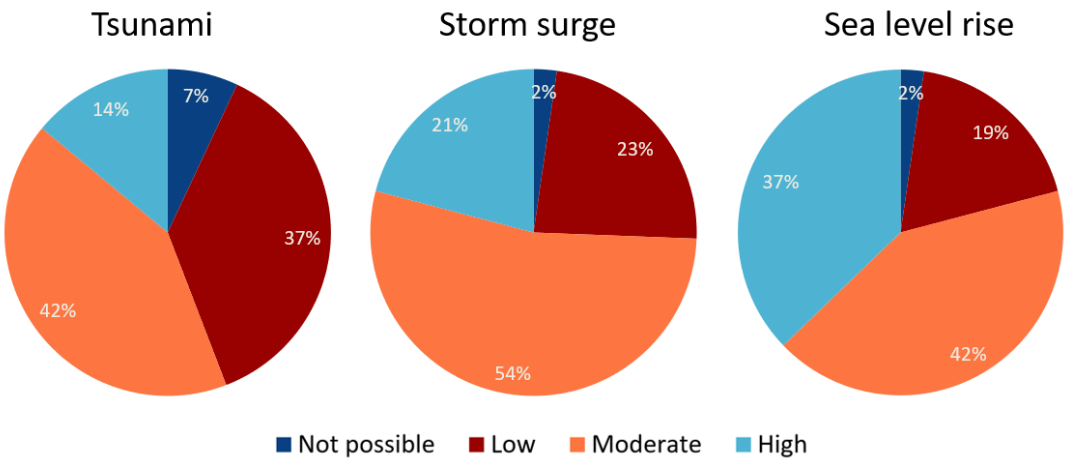
7. Describe each hazard with three words:

	Tsunami	Storm surge	Sea-level rise
1st word			
2nd word			
3rd word			

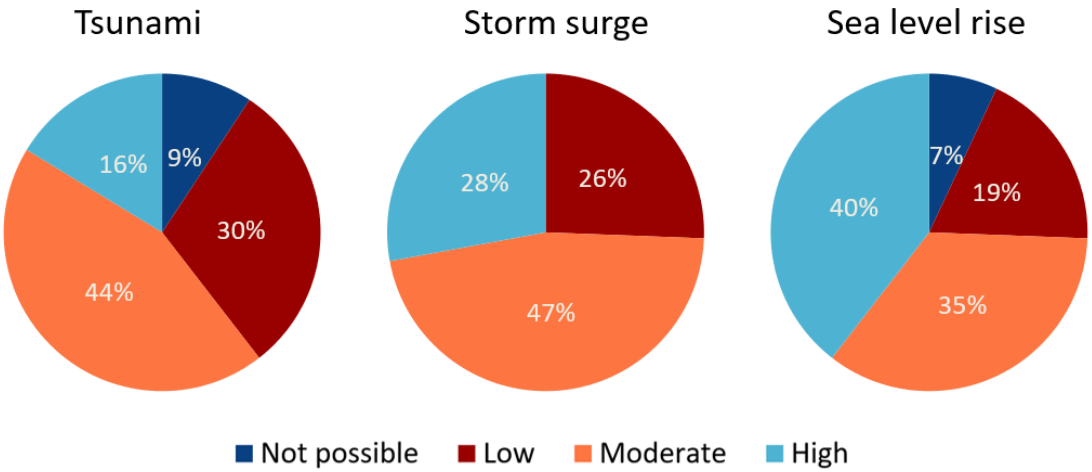
8. In your opinion, what are the causes of these hazards:

Tsunami	Storm surge	Sea-level rise
		

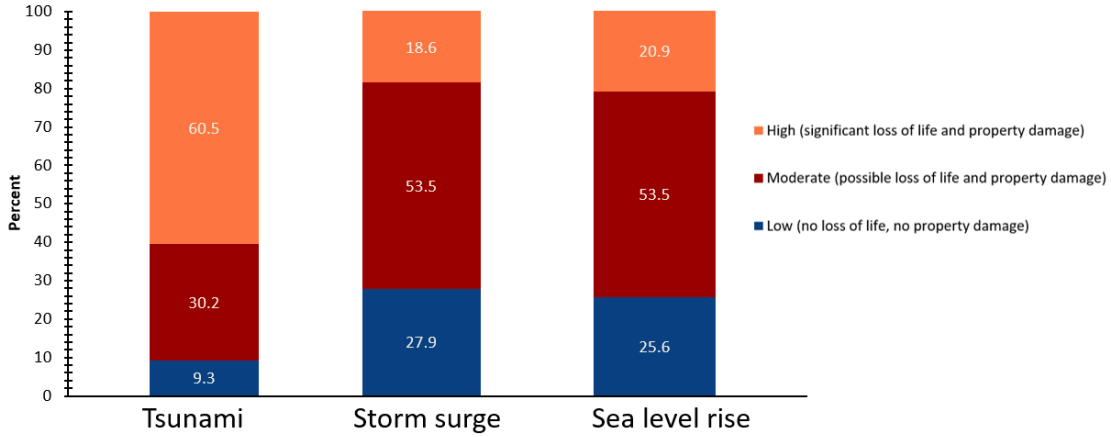
9. How likely, in your opinion, is the coastal zones of the Mediterranean region can experience a tsunami, storm surge, or sea-level rise in the next 10 years?



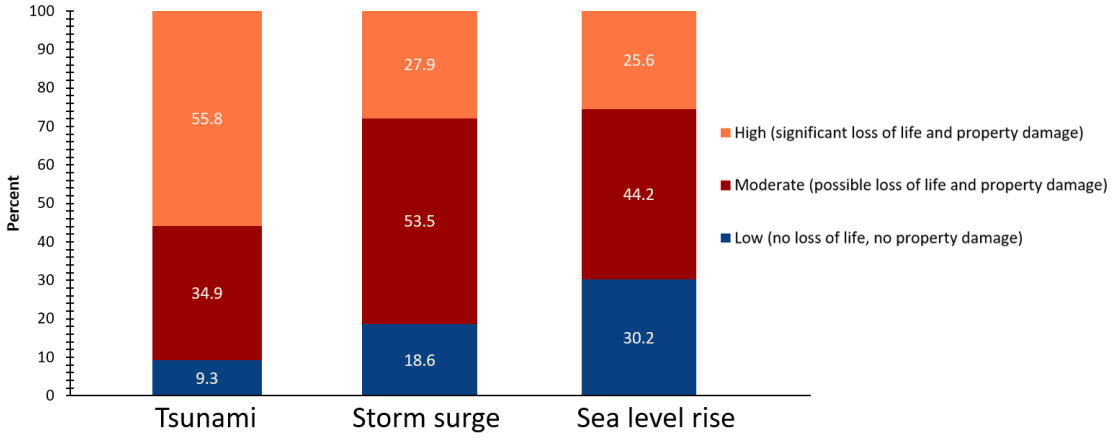
10. How likely, in your opinion, the coastal zones of your community can experience a tsunami, storm surge or sea-level rise in the next 10 years?



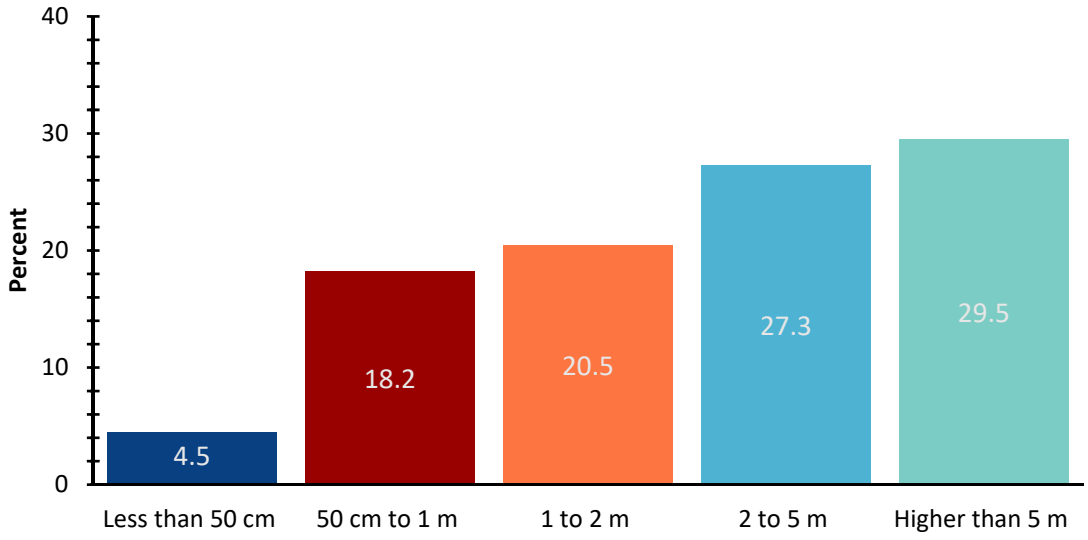
11. What do you think could be the impacts (loss of lives and property damages) of a tsunami, storm surge and sea level rise in coastal regions of the Northeastern Atlantic and Mediterranean?



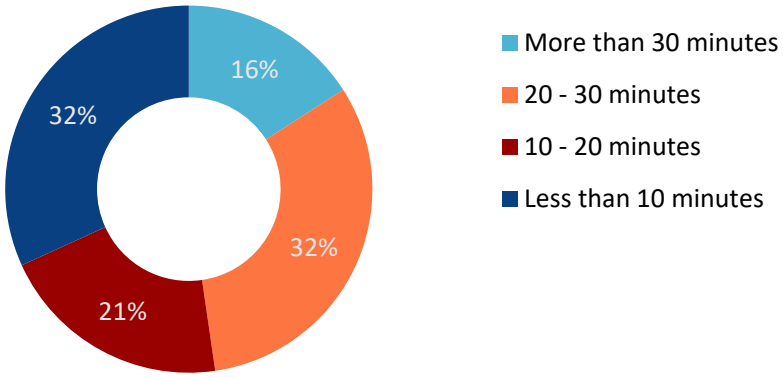
12. What do you think could be the impacts (loss of lives and property damages) of a tsunami, storm surge and sea level rise in coastal regions of your community?



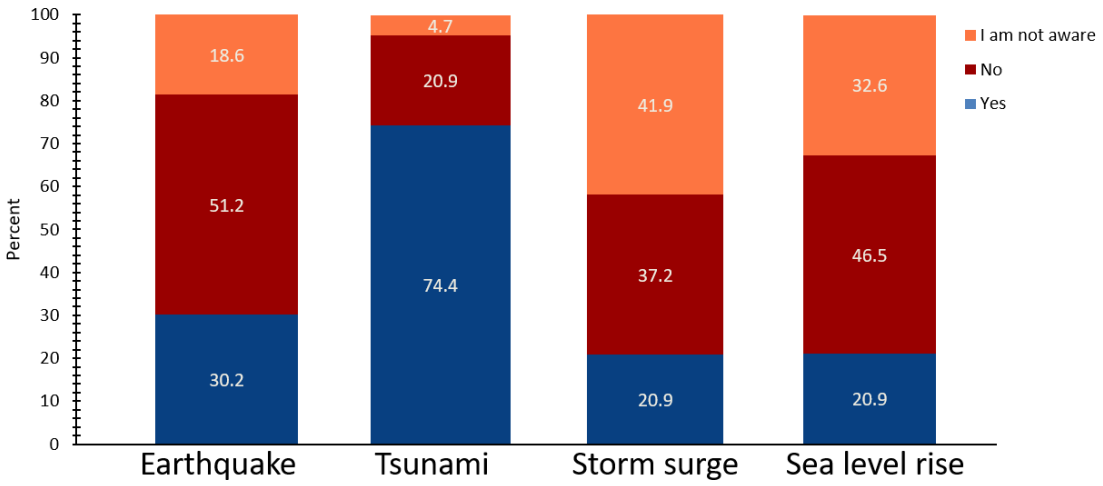
13. In your opinion, what would be the approximate height of a tsunami that can happen soon (e.g. in the next 10 years) in coastal regions of the North-eastern Atlantic and Mediterranean?



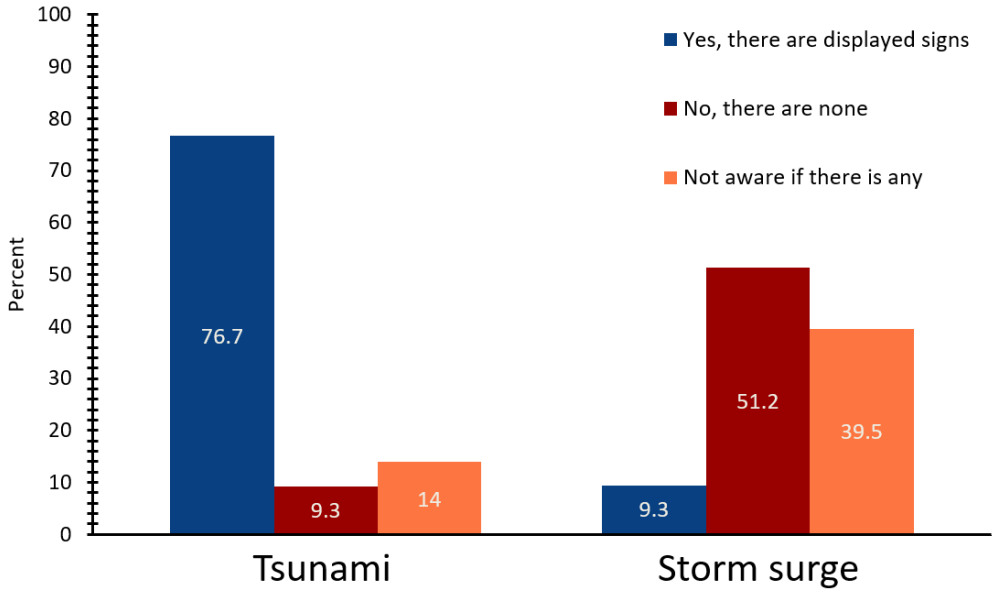
14. In your opinion, how long do you think it will take for a tsunami to arrive to the coastal region of your community?



15. Do you know if your municipality has the necessary capacities and infrastructure to alert and or inform the local population for the following events?



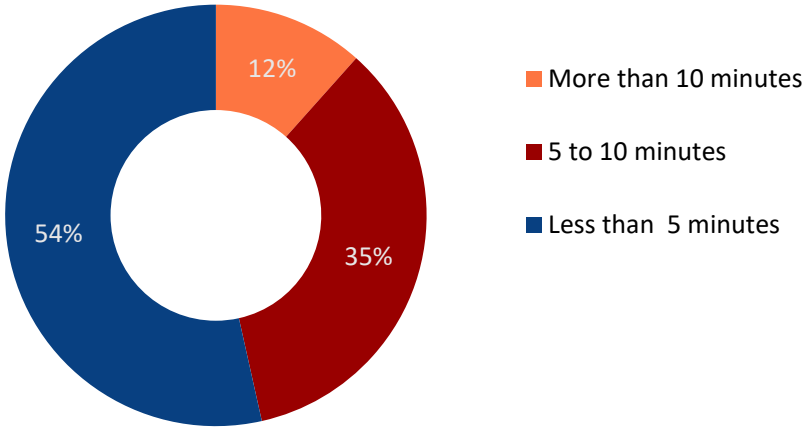
16. Do you know if your municipality displays evacuation signs to indicate the best evacuation routes to take and or what to do in case of tsunami and storm surge?



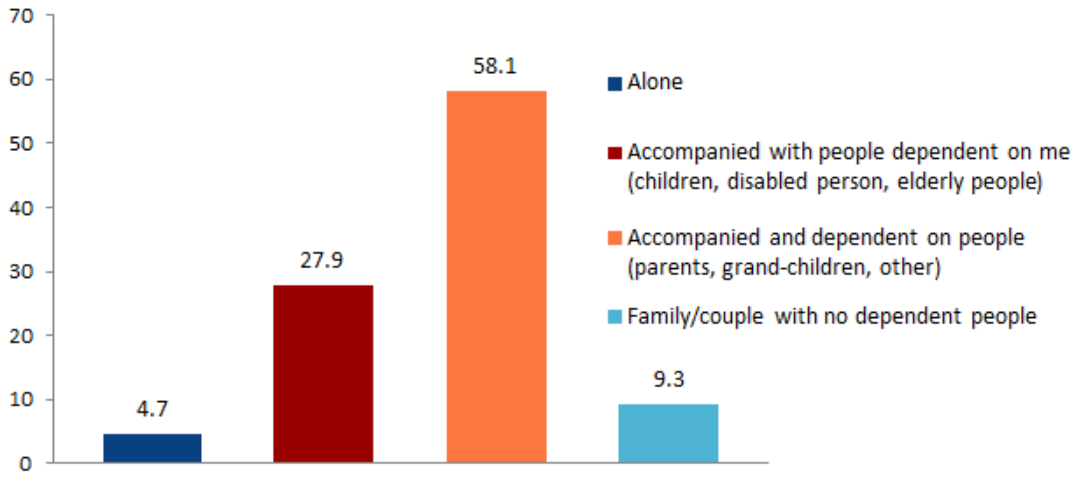
Exposure and sense of Exposure

Although more than half of the population lives less than 5 minutes away from the coast, 56% have their workplace at a distance greater than 2km. It is common in this town to have a family nucleus, therefore most of them are either accompanied by people depending on them or dependent on other people.

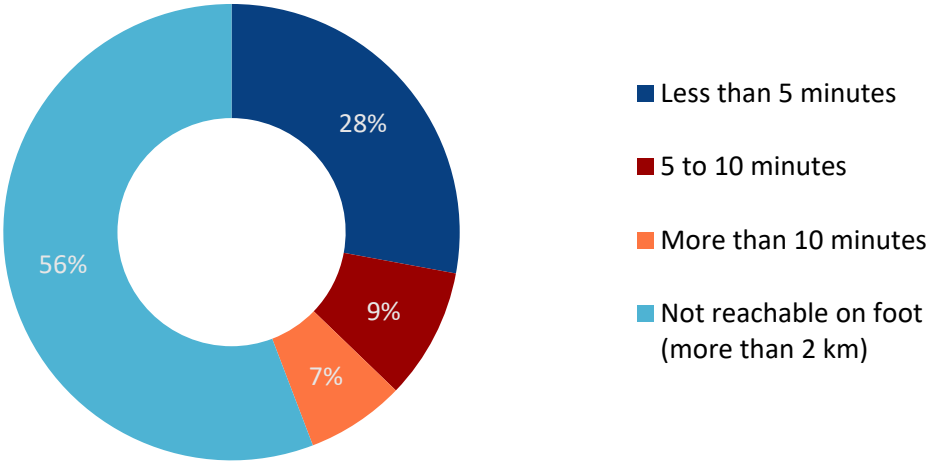
17. How far do you live from the seashore/coast on foot?



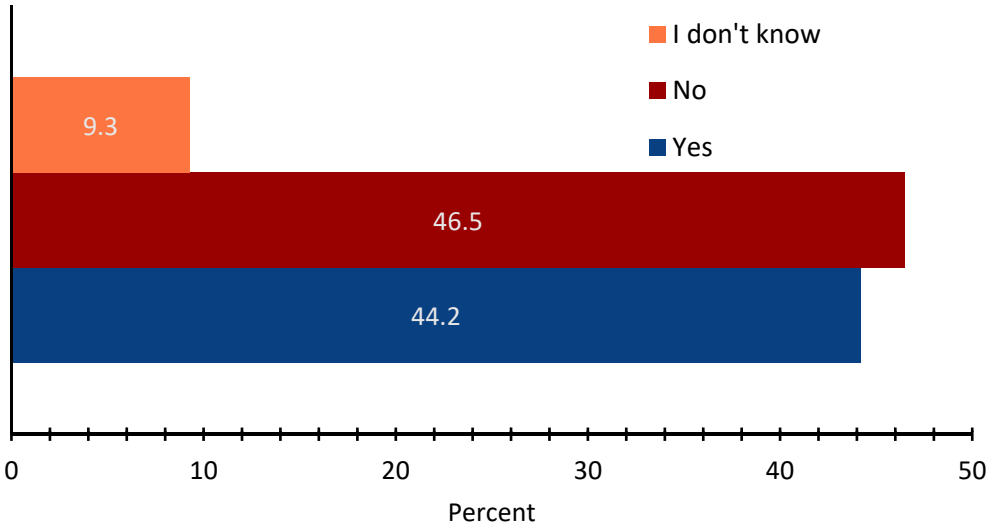
18. Who do you live with?



19. How far is your work place / school / university from the seashore / coast on foot?



20. Do you have other properties within 10 minutes walking distance from the seashore / coast?



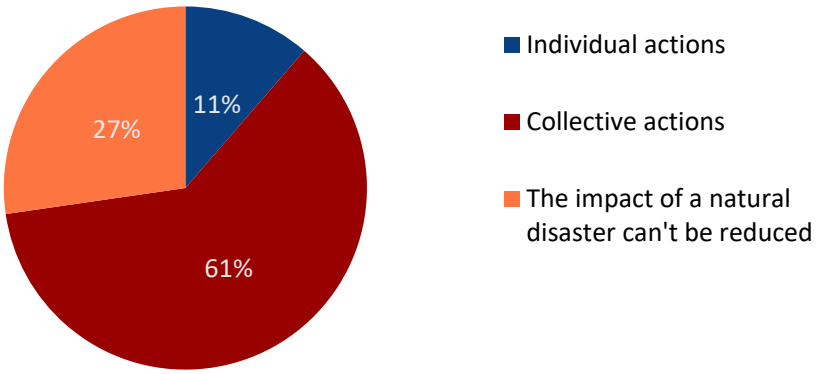
Assessment, Preparedness and Response

Collective actions were said to be the best way to reduce or avoid sea-level related disaster by 61% of the participants, followed by the believe of 27% of the respondents that the impact of natural disasters can't be reduced. In general terms, the population showed to be concerned regarding the marine hazards and well aware of the Municipality's evacuation plan for tsunamis.

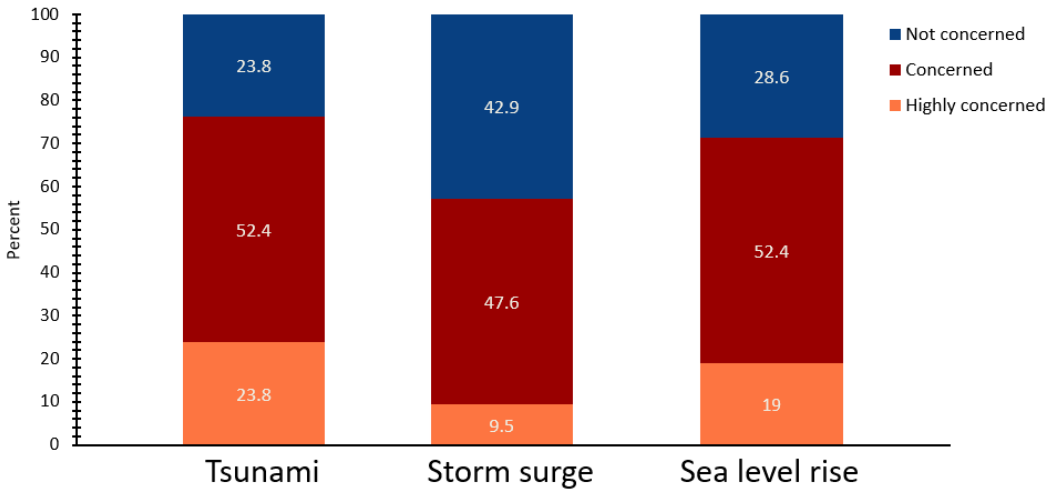
Although being openly concerned about these hazards, 95% of them agreed to not have taken any precautions and more than 60% hasn't taken any kind of insurance against them. Regarding the evacuation exercise or drill, more than half of the respondents didn't hear or participated on it.

In the case of a tsunami, 66% would move away from the shore and 33% would do nothing and continue their business. The most common reason to affect the ability to evacuate is having animals under their care (45%) followed by having either disabled or younger people under their care (31%).

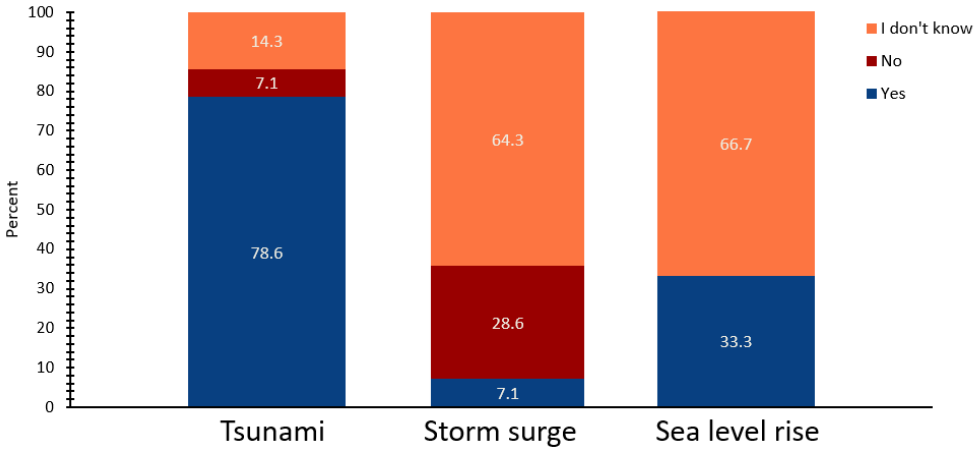
21. The impact of sea level related disasters could be reduced or avoided by?



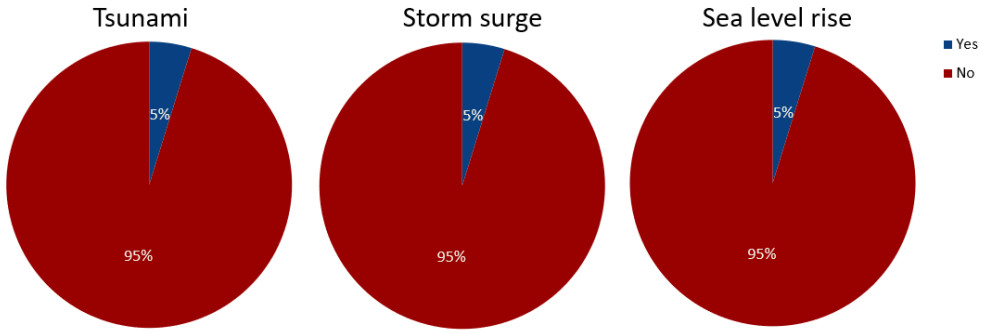
22. How do you feel about the risk and impact of a tsunami, storm surge and sea-level rise in your community?



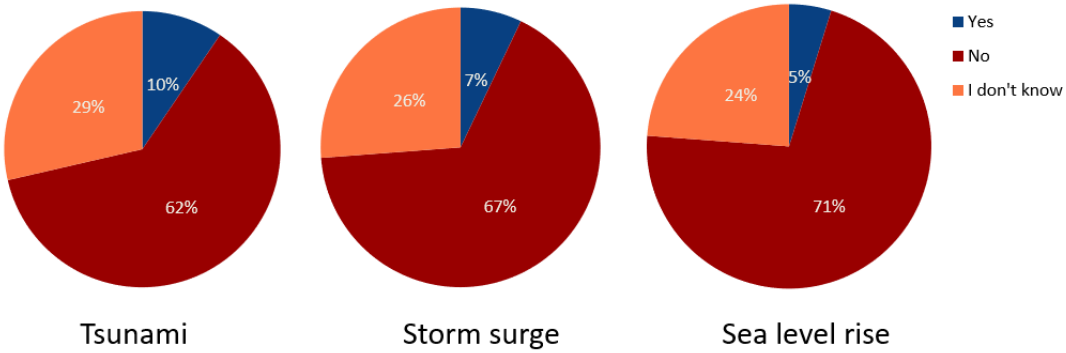
23. Do you know if your Municipality has an evacuation or resettlement plan in place for tsunamis, storm surge and sea level rise?



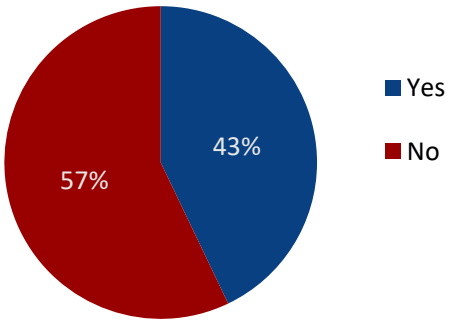
24. Have you taken any precautions or measures of your own against any of these hazards?



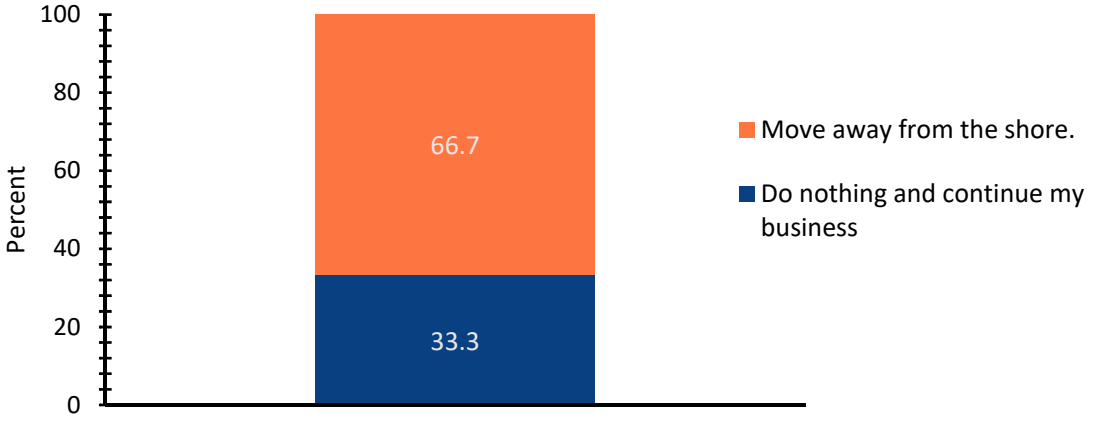
25. Do you have any kind of insurance against any of these hazards?



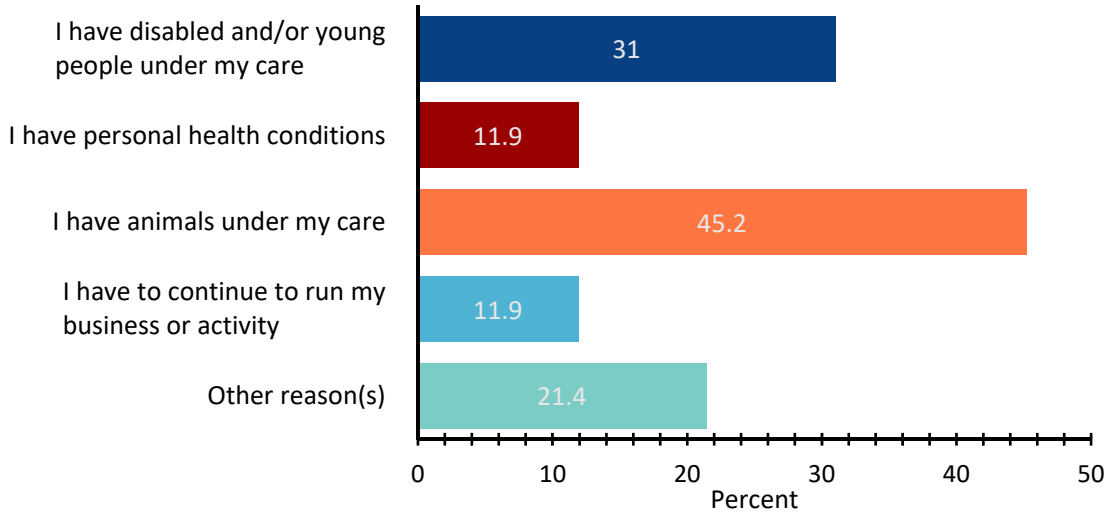
26. Have you ever heard of, or participated in an evacuation exercise, drill, or other actions related to tsunami, storm surge, and sea-level rise?



27. Imagine you are on the coast. What would you do first if you feel a strong shaking due to an earthquake?



28. What could affect your ability to evacuate to a safe area?



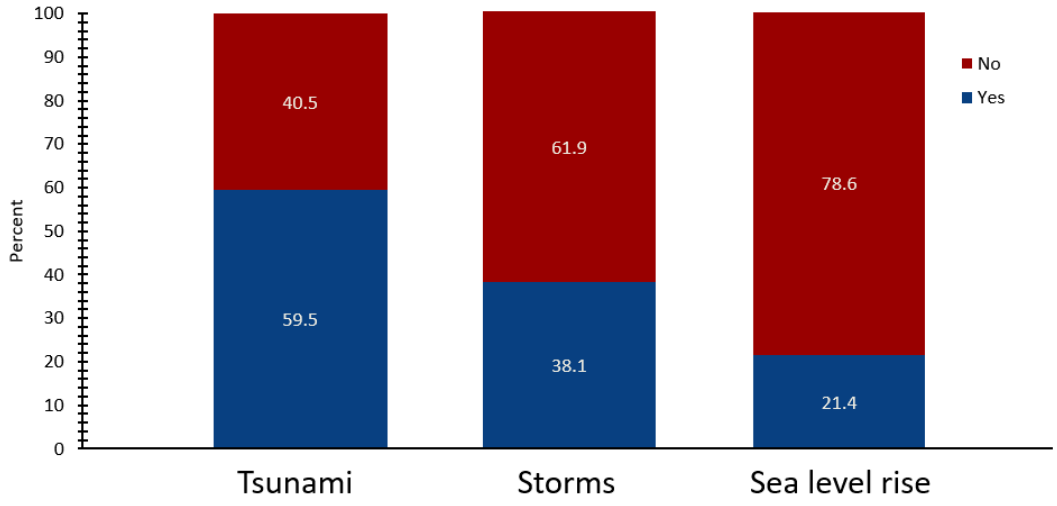
Governance

With the audible alerts (siren or loudspeaker) being the first communication channel, we can happily say that these projects are evidencing to be an improvement to the coastal communities. More unexpected was to observe that the population will secondly rely on checking their emails over other channels to receive their alert messages. There is a mixed feeling regarding the capacity of the Municipality to manage an emergency response towards a tsunami with 59.5% believing in them, whilst almost 62% don't think they will be capable in the case of storm surge, probably this last one based on past experiences. Regarding their capability to manage an emergency response towards sea-level rise, 78% of the respondents didn't feel that the municipality was able to do so.

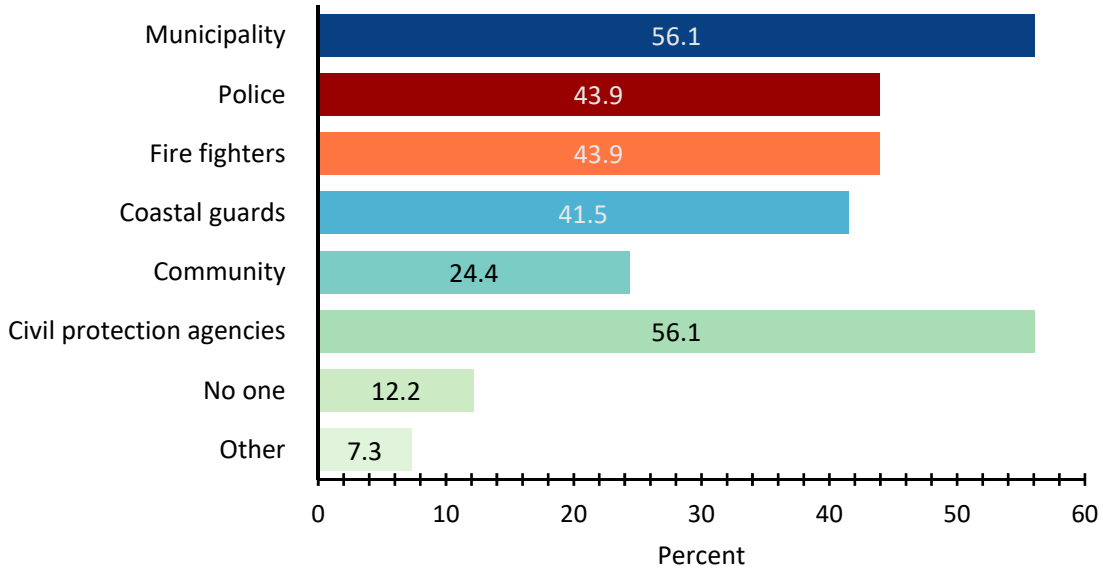
29. Which communication channel would you prefer to receive alert messages? Please order from most important to least important? (1 is the most important, 6 is the least important)

	Television	Radio	Internet	Audible alerts	SMS	E-mail	Responses
1	10.5%	2.6%	2.6%	52.6%	31.6%	0.0%	38
2	7.9%	15.8%	28.9%	23.7%	21.1%	2.6%	38
3	28.9%	7.9%	28.9%	2.6%	7.9%	23.7%	38
4	15.8%	15.8%	18.4%	15.8%	21.1%	13.2%	38
5	21.1%	26.3%	18.4%	2.6%	13.2%	18.4%	38
6	15.8%	31.6%	2.6%	2.6%	5.3%	42.1%	38
Totals							228

30. Do you feel that your Municipality is able to manage emergency response operations during the listed hazards and doing anything to reduce sea level rise impacts (adaption)?



31. In case of a sea-level-related hazard, who do you think is responsible for managing the crisis in your Municipality?



KEY FINDINGS

Awareness/Knowledge

How does the understanding of hazards (its formation mechanisms, characteristics, risks, and impact) vary according to age/educational level /sector?

1. Risks and impacts ranked as low/moderate/high vs education level, and age.

For all age groups and levels of studies, sea-level rise is perceived as the least risky hazard, with the majority of respondents perceiving it as low risk, whereas tsunami poses the highest risk. Younger age groups (14-17 and 18-24) generally perceive higher levels of risk for all hazards compared to older age groups.

Regarding the level of education, respondents with higher levels of education generally perceive higher levels of risk for all hazards compared to those with lower levels of education. For example, respondents with a university education generally perceive higher levels of risk for tsunami and storm surge compared to those with a primary school or secondary school education.

Table 1.- Percentage of respondents by age group, educational level and risk perception towards marine hazards.

AGE	Level of studies (% responses)				Tsunami (% responses)			Storm surge (% responses)			Sea-level rise (% responses)		
	Primary school	Secondary school	High School	University	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
14-17	-	100	-	-	7	41	52	33	50	17	39	47	14
18-24	7	-	57	36	-	50	50	-	50	50	17	50	33
25-34	-	8	39	45	-	21	79	5	53	42	10	58	32
35-44	2	10	30	53	11	44	44	19	44	37	22	44	33
45-54	-	24	41	35	6	44	50	19	62	19	25	62	13
55-64	-	23	27	39	17	44	39	11	61	28	28	44	28
65-74	-	11	11	78	-	50	50	50	50	-	75	-	25
75	-	1	1	-	100	-	-	-	100	-	100	-	-

2. Is it known/well understood (hazard is, formation characteristics and mechanism, and the impacts vs age, educational level and sector

Exposure and sense of Exposure

1. How does proximity to hazards (live or work) determine sense of exposure and action/preparedness to the hazard by age?

Regarding sea-level rise, the age groups that show less concern are 14-17, 65-75 and over 75, with the first two groups having their workspace farther than 2km while the last one being at less than 5 minutes. The most concerned age group regarding a tsunami event is 65-74 with 100% of respondents showing this feeling whilst the majority of them have their workspace further (see Table 2).

The groups that have their workplace or school at a distance greater than 2km are equally unconcerned about the three marine hazards proposed. For example, in the 14-17 age group, where the 88% of respondents have their school more than 2 km away from the hazard zone, are concerned to not concerned, similar to the age groups of 35-44, 45-55, 55-64 and 65-74, who also have their work place at more than 2km are concerned about tsunami events, storm surge and sea-level rise rather than not concerned or highly concerned. The oldest group (75 or above) are mainly exposed to the hazards based on their proximity and they show no concern about any of the hazards.

Table 2.- Percentage of respondents by age group, proximity to hazards (workplace/school/university) and level of concern towards marine hazards.

AGE	Proximity to hazards (% responses)				Tsunami (% responses)			Storm surge (% responses)			Sea-level rise (% responses)		
	less than 5 min	5 to 10 min	more than 10 min	more than 2 km	not concerned	concerned	highly concerned	not concerned	concerned	highly concerned	not concerned	concerned	highly concerned
14-17	-	3	9	88	23	53	23	47	38	15	44	38	18
18-24	40	20	40	-	40	40	20	20	80	-	20	80	-
25-34	42	5	11	42	19	50	31	44	44	12	25	44	31
35-44	26	15	22	37	40	48	12	40	60	-	16	76	8
45-54	21	14	7	57	29	57	14	36	42	21	21	57	21
55-64	21	7	21	50	18	64	18	18	73	9	27	55	18
65-74	25	-	-	75	-	-	100	50	50	-	75	25	-
75	100	-	-	-	100	-	-	100	-	-	100	-	-

2. What is the age/gender distribution of dependent people in the hazard zone?

The majority of individuals in all age groups live either with people dependent on them or they depend on people. The youngest age group, 14-17, has the highest percentage of dependency on people as they most likely live with their parents and family. The next age group, 18-24, which has a higher ratio of females compared to males, is expected to be either studying in university or starting to work and thus they have the highest percentage of living alone (see Table 3).

Table 3.- Percentage of respondents by age group, gender and distribution of dependent people in Marsaxlokk.

AGE	Gender (% responses)			Who do you live with (% responses)			
	Female	Male	Prefer not to answer	Alone	Accompanied with people dependent on me	Accompanied and dependent on people	Family/Couple with no dependent people
14-17	47	37	16	-	3	97	-
18-24	64	36	-	40	20	20	20
25-34	25	75	-	-	36	32	32
35-44	79	21	-	-	56	15	29
45-54	57	43	-	14	50	7	29
55-64	56	44	-	28	57	-	15
65-74	78	22	-	-	25	-	75
75	50	50	-	0	100	-	-

On the other hand, the highest percentage of people living in couples or without people dependent on them is between 25-34 and 65-74, which is either the time when people tend to start a family or are to be retired.

There was no clear relation between gender and the distribution of dependent people in the case of Marsaxlokk. The living arrangements regarding age groups are as expected, where the youngest is the most dependent and as the age groups advance there is lower dependency, whilst the responsibility of having people that depend on the respondent increase towards the population aged 25-64.

Preparedness and Response

1. What and how are the levels of concern expressed / understood (Feelings vs Level of preparedness against hazards i.e.concerned but not prepared, concerned, and prepared etc. by age and education level?

2. What is the level of preparedness vs first reactions to earthquake by age and education level

3. What is the feeling of safeness across age and educational level towards mandated governmental emergency responses

Governance

1. How do the modes and channels of communication channel used, compared with the level of importance of communication channels vs age, education level and sector?

The audible alert is the preferred among all the age groups and sectors, being chosen as their preferred communication channel in 5 out of the 8 age groups. Communication via SMS was chosen as the second most preferred channel by 6 of the 8 age groups, closely followed by the internet. The age groups from 25 to 74, which have the highest population being from the public sector and with a university degree, chose the audible alert, SMS and the internet as their main preferred ways of communication (see Table 4).

Surprisingly, the students aged 14-17, chose the television to be their second way of communication and the eldest groups preferred the radio. This shows the preferred technological uses, since, for example, the youngest population wasn't brought up in a time where there was no internet on the phones and, SMS was the fastest and most common way to receive a message whilst the rest of the groups recognize the value of this communication channel. On the other hand, the elderly would most likely be listening to the radio throughout the day instead of checking their emails or navigating the web. Lastly, the age group with the highest percentage corresponding to the emergency responder sector preferred the SMS over the audible alert.

Table 4.- Percentage of respondents by age group, education level, sector and preferred communication channel towards marine hazards.

AGE	Level of studies (% responses)				Sector (% responses)				Communication channel (1 most important; 6 least important)					
	Primary school	Secondary school	High School	University	Tourism	Education	Emergency responder	Public	Television	Radio	Internet	Audible alert	SMS	E-mail
14-17	-	100	-	-	-	97	-	3	2	-	3	1	5	6
18-24	7	-	57	36	7	7	14	71	-	6	-	4	2	3
25-34	-	8	39	45	12	20	4	63	5	-	4	1	2	3
35-44	2	10	30	53	19	21	2	58	4	5	3	1	2	6
45-54	-	24	41	35	17	26	-	57	4	5	3	1	2	6
55-64	-	23	27	39	23	27	38	11	6	5	3	2	1	4
65-74	-	11	11	78	11	33	22	33	6	4	3	1	2	5
75	-	1	1	-	-	-	-	100	3	1	5	4	2	6

This suggests that communication methods that can quickly capture their attention and are easily accessible on mobile devices (such as audible alerts and SMS) may be most effective, while E-mail may be less important as the majority chose it to be the least important.

2. How do people understand role and responsibilities of municipality for preparation to risks of hazards by age, education level and sector?

DISCUSSION

There is a general sense of concern in the population regarding marine hazards, as Marsaxlokk is a low-lying coast that strongly depends on the sea for its economic activities. It is the town where the fishermen have their boats and sells their products, well known for hosting an open market on Sundays and a must-visit for tourists. With all these in place, and based on the responses gathered through the survey, there seems to not be much action taken by the population regarding these hazards, even though they suffer the impacts of storm surges from time to time.

We can confirm that the efforts of previous projects regarding tsunami preparedness in Marsaxlokk have been fruitful since the vast majority are aware of the Municipality's resettlement plan, previous exercises of evacuation, the display of evacuation routes as well as the fact that the audible siren was chosen by the all the age groups as their preferred communication channel.

In order to reduce the risk and impact of these disasters, it is important to provide coastal communities with the tools and knowledge necessary to prepare for and respond to these events. Through education and awareness in coastal communities such as Marsaxlokk, we can make these places more resilient in the face of natural disasters. Greater awareness can lead to changes in behavior, such as having a more active response in the case of a tsunami, where a surpassingly 33% answered they'd do nothing and continue their business.

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