



Athens University of Economics and Business  
Department of International and European Economic Studies  
Graduating Thesis with the Subject of:

# **Implications of natural disasters on women and factors that influence perceived levels of affection| Evidence from Greece**

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«Η Αλεξάνδρα Μουτσάτσου βεβαιώνω ότι το έργο που εκπονήθηκε και παρουσιάζεται στην υποβαλλόμενη διπλωματική εργασία είναι αποκλειστικά ατομικά δικό μου. Όποιες πληροφορίες και υλικό που περιέχονται έχουν αντληθεί από άλλες πηγές, έχουν καταλλήλως αναφερθεί στην παρούσα διπλωματική εργασία, συνδυαστικά με δικές μου γνώσεις. Επιπλέον τελώ εν γνώσει ότι σε περίπτωση διαπίστωσης ότι δεν συντρέχουν όσα βεβαιώνονται από μέρος μου η εργασία μου θα μηδενιστεί.»

# Thanks

I want to give special thanks to the organization Lean in Women for letting me use this data for my thesis. A warm thanks to my mother for brainstorming with me and supporting me, a huge thanks to my friend group for their love and support and lending an ear to the despair, comforting and making me smile every time, and finally a huge thank you to Irene, for listening every step of the way, for proofreading, and her endless love and support.

# Research Context

The organization Lean in Network Greece (Athens), in collaboration with the General Secretariat for Equality and Human Rights of the Ministry of Social Cohesion and Family, presented the results of the first major study on the impact of natural disasters on women as a consequence of the climate crisis, focusing on the affected regions of Thessaly and Evros. This study was conducted within the framework of the Task Force on "Climate Crisis and Gender Equality," which was established in December 2023, at the initiative of the General Secretariat for Equality and Human Rights.

The research was conducted by the research company Truberries between March 1-10, 2024, with the aim of incorporating its findings into the extensive report by the General Secretariat for Equality and Human Rights for the analysis, processing, and creation of policies to support women in areas affected by the impacts of the climate crisis.

The research was carried out with the generous sponsorship of Bayer Greece, as part of the company's important strategic pillar for Inclusion, Equal Treatment, and Diversity, aiming to enhance the position of women in all aspects of professional and private life.

I was working as an account executive at truberries and was responsible of designing, implementing, analyzing and reporting this research. I want to thank Leanin Women Greece for kindly letting me use this data to complete my thesis and further analyze the data.

# Executive Summary

The data of this thesis is from women who have suffered substantially from a natural disaster, as they are the group whose voices are the key to driving policies, due to their recent experience. This thesis uses quantitative data with a sample of 300 women who have suffered from a natural disaster, 200 from a flood, and 100 from a wildfire. The purpose is to find out the factors that influence the perception of how much a woman is affected by a natural disaster. To do this, a probit model is used. The factors that have significant influence on the perception are feeling of preparedness, type of natural disaster experienced, caregiving responsibilities, employment, if the house, physical and mental health were affected, socioeconomic status, and views on gender discrimination. This multifaceted analysis provides insights on the deeper needs women have, and the invisible extra burdens they carry in an already stressed situation.

This paper is organized as follows: first, a literature review of academic literature that was used to build the questionnaire, and context on the situation in the areas during the natural disasters. Following is a questionnaire review. After that, the descriptive statistics section, where the results of the survey will be presented, in order to paint a picture of the situation while it was happening, in the immediate aftermath and in the long run. Then, the model and regression section, where the econometric process is explained and the results analyzed. A conclusion followed by policy recommendation and future research recommendation. Finally, the references.

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# Literature review

## Academic literature

With climate change becoming a climate crisis, we should expect to witness more frequent and catastrophic natural disasters in regions where the frequency was previously low (Archer, D., & Rahmstorf, S. (2010)).

To this day, significant research on the implications of natural disasters on women is made in developing countries, where infrastructure is insufficient to mitigate the impact of these disasters or plan to halt devastating results (Erman et al, 2021). In the developing world, severe natural disasters, such as typhoons, tsunamis, and catastrophic earthquakes, have a high probability of leading to a high death toll, severe public health consequences, poverty, and increased gender inequality (Zorn, M., 2018).

Gender inequality is affected by the impact natural disasters have on factors of endowment, economic outcomes, and voice and agency. Women can experience irreversible property loss, due to them not being the main beneficiaries of that property, unemployment, trouble re-entering the labor force, and gender-based violence to name a few (Erman et al, 2021). In agricultural settings, women suffer the consequences as they are left without work and take on more household responsibility. Women have a higher mortality rate from natural disasters in developing countries, where natural disasters kill those more vulnerable, women from low socioeconomic class (Neumayer et al, 2007), while the reverse is true in developed countries, mainly since men are mostly leading rescues (Erman et al, 2021).

This study will be centered around the implications of natural disasters in Greece. Flooding and wildfires are reported to be the most frequent types of natural disasters that occur in southern Europe with Greece being no stranger to them, as reports exist even from antiquity (Diakakis et al, 2014). These phenomena cause damage and have a high mortality risk (Molina-terren, 2019). High-density population and urban expansion were flagged as the main contributors to increased flooding risk (Diakakis et al, 2014). Climate change makes these phenomena more intense and frequent, and the implications are severe, costly, and lasting. It comes as no surprise that these phenomena occur, but it is surprising that after extensive research and years of warnings and occurrence state response and provisions remain inadequate.

These natural disasters disproportionately affect women's mental health, healthcare access, education, family life economics- and freedom. And its not only important to investigate these affects but also assess whether they are consciously perceived by women. Especially in a country that believes that gender equality is achieved, or is in a better place than other countries in the EU(Λυμπεράκη, 2024), while Greece is scoring last in the EU cross-country assessment of gender equality by the European Institute for Gender Equality (EIGE, 2023).

Natural disasters significantly impact women's mental health. Studies indicate that the ratio of women experiencing depression, PTSD, and anxiety disorders to women who aren't is larger than that of men following a disaster, greatly due to the responsibilities they have as caregivers, having to manage both their health and that of dependent members (Erman et al., 2021). For instance, a study conducted after Hurricane Katrina revealed that women reported higher levels of anxiety, depression, and post-traumatic stress disorder (PTSD) compared to men. (Mills et al, 2007)

Women often bear the burden of being the sole person to take on household responsibilities, being the primary guardian of children and a caregiver to elders during and after natural disasters. These increased responsibilities affect their ability to have a work-life balance or even work at all, and their overall well-being. Following the 2018 California wildfires, many women reported difficulties balancing work, family care, and recovery efforts (Nicosia, F. M., 2022). The stress of managing these roles can lead to long-term health consequences and hinder their ability to participate fully in the recovery process (Erman et al, 2021).

The economic impact of natural disasters also tends to disproportionately affect women. Women are often employed in sectors that are more vulnerable to disruption, such as retail and service industries. Additionally, they are more likely to have part-time or lower-paying jobs, which can make financial recovery more challenging (Enarson, E. P. , 2000)

In the case of Greece, the primary affected regions were rural or semi-urban areas, that relied heavily on agriculture. This is a tricky field to navigate, as the needs of women farmers differ from region to region. Women farmers often find it hard to access up-to-date heavy machinery (Glazebrook et al, 2020) and funds for protecting their crops from potential disasters (droughts included), due to their underrepresentation in decision-making as well (Women on Top, 2022). Another characteristic is that Greece's agricultural model is still a family matter, which means that women farmers might not directly own land but work on their husbands' property, which immediately means that for the state, these women have lost no property due to the disaster.

Mentioned before are some manmade reasons flooding occurs and that is urban planning. Women are underrepresented in these roles and public service (UCP Knowledge Network, 2024). This can influence their preparedness levels or how powerful they feel managing a situation.

Women identify risks more than men, but this does not guarantee that it translates to preparedness (Erman et al., 2021). However, perceived preparedness and effectiveness can be associated with different characteristics. Knowledge of previous natural disasters and evacuations can greatly influence preparedness (Omuna, 2017). Knowledge of governmental guidelines, preparation of emergency items, and understanding the difference between being "on watch" and "warning" for a natural disaster were also fundamental to people's preparedness levels (Onuma, H. et al, 2017).

As with agricultural property same with housing, typically it belongs to a male relative, even though the household lead is a woman. And this house is a woman's space, losing it, means losing a safe space amongst other things.

Taking all these facts into account, as well as some additional regional matters the questionnaire for this thesis was drafted, to understand the implications of two disasters that struck Greece in 2023, the floods of the Daniel storm and the Wildfire in Evros, and what influences the perception of preparedness and the feeling of being affected for Greek women and understand where gender lies.

## The flood in Thessaly and the wildfire in Evros, Greece 2023

### Thessaly flood in 2023

Storm Daniel hit Greece on the 4th of September 2023, with its epicenter being the region of Thessaly. As a result, there were vast consequences, 17 people were killed and in the area of Karditsa alone, 870.000 acres of land were flooded, 90% farmland. (CNN Greece, 2023)

The aftermath was catastrophic, homes were lost, and farmlands were destroyed, there was a halt in transportation for days on the main road from Athens to Thessaloniki and neither trains nor vehicles could pass.

Criticism was made to the Greek Government for the way they responded to the storm and lack of preparation. Specifically, the emergency system of 112, did not work properly or worked belated resulting in residents of small villages being trapped. Even when they were called to evacuate, there wasn't a clear system where to evacuate to.

After the storm, houses were left destroyed. The owners, some of them with state help, others with volunteer help, managed to clean their homes, while others never managed to do so, as the storm made irreversible damage. These people needed a place to stay. Others got the help of family and relatives while others relied on the state. The state provided overrun mass housing, with bad living conditions, which led these victims to either relocate or go back and try to rebuild.

There was little to no economic help. You could get state aid only if you had a property item that was damaged in your name, and even then, the amount was not even close to the worth of the cost of the damages, and they got reimbursed months after the effects. Farmers must stop their activities for at least 2-3 years before the land is ready to be used again, and those who own livestock lose it all to the storm. Strikes were held for days by the farmers who have not got reimbursed for crop losses.

Another consequence was health concerns. Livestock drowned and contaminated the water, causing diseases to those who came in contact with it. Staphylococcus was among the main diseases affecting people who had been trapped and had to flee through the water or whoever encountered any remains after the floods. Health concerns remain to this day, as water sources

had been contaminated with salmonella, raising concerns about how well the restoration of the system was.

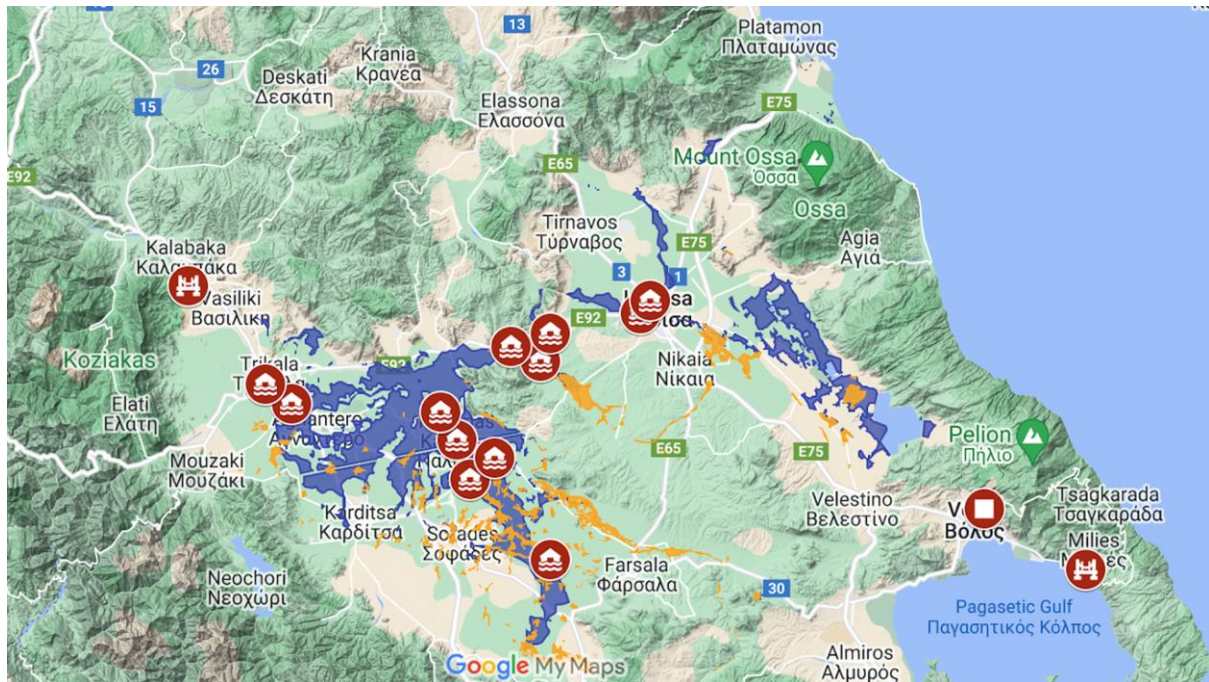


Figure 1 - [Map of Thessaly floods 2023](#)

## Evros Wildfire in 2023

The Wildfire in Evros burned for 15 days and destroyed 93.000 hectares of land. It was reported as one of the biggest fires in Europe. Burned in the general area of Dadia and spread all over the forest. It got so close to Alexandroupoli that the general hospital had to be evacuated. As a result, an unidentified number of persons died, mostly people trying to cross from Turkey to Greece.

Fortunately, the areas where the fire swept villages were successfully evacuated, and more human lives were not lost. The 112-emergency mechanism worked well and coordinated alongside the Greek firefighters, other countries' firefighters, volunteers, and people from the communities.

Evros is an area already facing rapid depopulation, with numbers dropping each decade. This disaster causes even more strain on this problem. The forest is a natura protected forest, fostering different and unique species, and more and more natura forests are being lost in Greece every year.

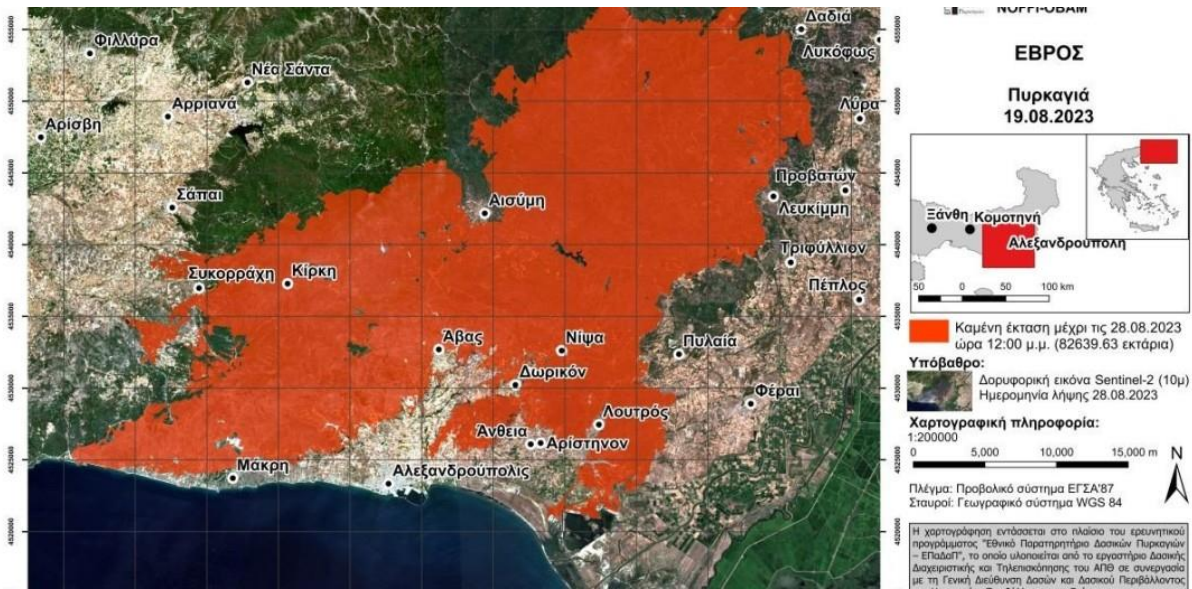


Figure 2 - [Map of Evros Wildfires 2023](#)

## Questionnaire Review

Due to the project commission, we had to consider the client and the company funding the project. Elements of this questionnaire were co-designed, especially regarding mental health issues, and the perceptions women have on how they were affected, by the NGO Leanin Women.

Surveys were conducted during 5-10 March 2024, at various areas in Larisa, Karditsa, Trikala, and areas at Evros that were affected by the Wildfire. In Thessaly, the Urban cities surveyed were Larisa, Karditsa, Trikala, and Volos, the semi-urban areas were Velestino, Giannouli, Palamas, and Farkadona and the rural areas were Agria, Megalochori, Proastio, and Falani. In Evros the semi-urban and rural cities were Avandas, Antheia, Mesimvria, Makri, and Sikorachi.

These areas were chosen as the ones greatly affected by the natural disasters associated with the area. A Prerequisite was having the emergency number 112 sent to the area, even belated, when the severity of the phenomenon called for an evacuation.

The final number of surveys completed is N=300 and are distributed as such:

Age	Sum	Thessalia			Evros
		Urban	Semi-urban	Rural	Semi-urban/ Rural
20-29	N=74	N=25	N=12	N=12	N=25
30-39	N=74	N=23	N=14	N=12	N=25
40-49	N=74	N=25	N=12	N=12	N=25
50-59	N=78	N=27	N=14	N=12	N=25
Sum	N=300	N=100	N=100		N=100

*Table 1 - Sample Distribution*

This is the sample. The Thessalian women N=200 are the ones that were affected by the flood and the women from Evros are the ones affected by the wildfires N=100. More women were surveyed for floods due to the phenomenon being catastrophic for the residents of these areas.

The floods affected not only rural areas but 3 of the largest cities in Greece, so for sample representation 200 surveys were completed.

The surveys were conducted face-to-face, with tablets. The questionnaire comprised of 83 questions. The first section; R, was the researcher's section, where two screening questions were displayed, to ensure the residence matches with the areas examined. The following are the filtering questions for the respondents, from Q1 to Q13. These questions are mainly demographic questions to ensure the quotas are met. The hard quotas were regarding the area of research and age as shown in Table 1. The soft quotas regarded occupation and children as follows:

	Nmin	Nmax	Nfinal
Employed	145	190	186
Unemployed	110	155	114
With Child	140	180	168
Without Child	120	160	132

*Table 2 - Sample Quotas*

Additional questions were added such as responsibility for elders, and responsibility for household functionality.

Section B of the questionnaire contains questions about the floods. This section was answered only by the women who suffered floods. These questions had to do with losses in physical items and property items, feelings, mental health effects, and how they perceived information. Following was an identical section, completed only by the women who suffered Wildfires.

The last section was dedicated to class characteristics, psychographics, and some questions about personal beliefs.



# Descriptive Statistics

This chapter aims to report a detailed analysis of the survey results and discuss potential matters that provide insights and can drive policy.

Both natural disasters—the flood in Thessaly and the forest fire in Evros—profoundly impacted women's lives, emphasizing the need for preparedness and comprehensive support that addresses immediate and long-term challenges. The results of these findings highlight the importance of addressing gender-specific needs and ensuring organized, specialized support for affected women.

## Demographics

### Family Status

67% of the respondents are married, 28% are single, and the remaining 5% are widowed (2%), divorced (1%), or living as a couple (2%). On average, households have 3 members, with 4% being single-member households, 31% two-member households, 38% three-member households, and 27% four-member households. 56% of the women who participated in the survey have children, with about half of these (25%) having children up to 12 years old, and the rest (31%) having children aged 13 or older. *These statistics indicate that most of these women are living in a family environment and a substantial share are responsible for young children.*

Regarding household management, 33% have exclusive responsibility, 25% have primary responsibility but another household member also participates, 35% share responsibility equally with others, 5% primarily have others responsible, and for 2% the responsibility lies exclusively with others. This proved to be an important metric, that affected how prepared women felt to deal with this catastrophe, and how affected they were by the disaster. Women who had shared responsibility were more empowered and felt more confident, than those with sole or no responsibility at all. *Moreover, 42% of women with sole responsibility answered that they believe women are more affected by natural disasters than men, expressing their perception of gender disparities.*

44% have responsibility for the care of elderly relatives (8% have exclusive responsibility), while the remaining 56% do not participate in the care of elderly relatives. *Those who were responsible for elders, were also statistically inclined to not be trapped, hence following early evacuation.* This is an insight that was also brought up in the qualitative interviews.

## Employment

6 out of 10 women who participated in the survey are employed (58% of the sample are full-time employees and 4% are part-time employees). 3% of the sample have occasional employment and 35% do not work at all. The survey covered a wide range of professions, ensuring distribution across different fields.

More detailed information is provided in the table below:

Occupation	Number of respondents
Head of household, housewife	N=48
Non-manual office employee outside the office	N=47
Salaried manager or executive with 6+ subordinates	N=41
Entrepreneur, business/shop owner with 0-5 employees	N=31
Non-manual office employee	N=24
Salaried manager or executive with 0-5 subordinates	N=18
Student, pupil	N=17
Unskilled manual worker	N=14
Salaried professional (doctor, lawyer, accountant, etc.)	N=14
Salaried supervisor with 0-5 subordinates	N=12
Farmer, livestock breeder, poultry farmer, fisher	N=10

Self-employed professional (doctor, lawyer, accountant, etc.)	N=9
Skilled manual worker	N=7
Entrepreneur, business/shop owner with 6+ employees	N=4
Retired (with previous occupation), temporarily unemployed	N=3

## Education

31% of the sample have higher education, 16% have upper secondary education, 46% have secondary education, and the remaining 7% have lower/elementary education.

## Socioeconomic Categorization

Finally, these women belong to different socio-economic classes. Specifically, 27% belong to the upper and upper-middle class (A, B, C1). 50% belong to the middle socio-economic class (C2), and 23% belong to the lower-middle and lower socio-economic class. Out of all women, 5% declare that they are the primary breadwinners of the household, while the remaining 95% are not.

For this thesis, the socioeconomic categories were both clustered concerning:

- the main earners' status, which means that if a woman declared not to be the main earner, her socioeconomic class would be the same as the main earners
- the woman's status regardless of whether she is the main earner or not

The socioeconomic category was given to the respondents based on the model proposed by “SEDEA”, the Greek Association of Polling and Market Research Firms. This system suggests a combination of education level and professional status to categorize consumers into socioeconomic classes (ΣΕΔΕΑ, 2019). The categories purposed are:

**AB:** Business executives and professionals

**C1:** Highly educated employees in non-manual jobs or skilled employees

**C2:** Employees in non-manual tasks or skilled employees

**DE:** Unskilled workers in manual work or low level of education employees

For this analysis, we have merged AB with C1, C2 stands alone and finally DE.

## The Impact of the Flood

The flood in Thessaly had a severe impact on women's lives, causing disruptions in their daily routines. The analysis highlights the importance of preparedness and addressing both material and psychological needs. The findings underline the need for comprehensive support for women, addressing immediate needs and long-term challenges like economic implications, work reintegration, mental well-being, and property implications.

Most women in Thessaly reported their degree of effect to fall under the significantly affected by the flood category (7-8). The average impact rating on a 10-point scale (where 1 = not at all affected and 10 = extremely affected) is 8.2. Extremely affected women (ratings of 9-10) make up 37%, severely affected women (ratings of 7-8) are the majority at 56%, and moderately affected women (ratings of 5-6) make up 6%. Those who reported being unaffected (ratings of 1-4) were excluded from the sample since the study aimed to focus on women who have been impacted. The flood has particularly affected residents in semi-urban and rural areas, such as towns, large and small villages.

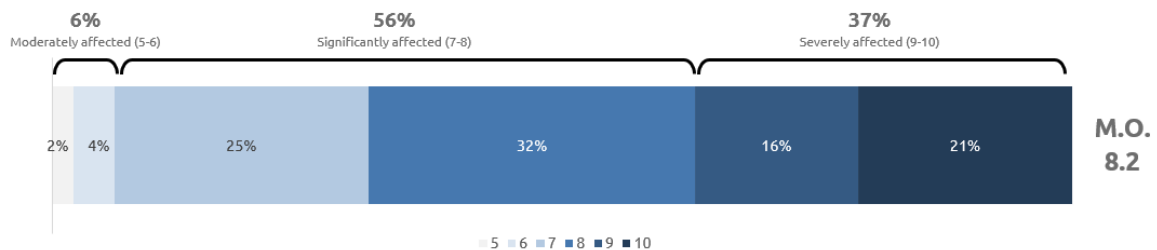


Figure 3 - How affected were you by the flood?

## Degree of Preparedness and Consequences

The flood had a significantly greater impact on those who rated their preparedness low. Women with higher preparedness ratings experienced less severe consequences (average rating of 7.9/10), while those with lower preparedness ratings suffered more severe consequences (average rating of 8.4/10).

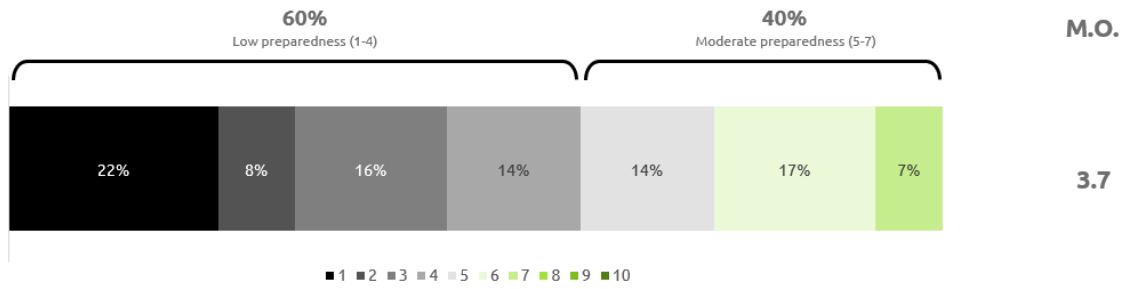


Figure 4 - How prepared did you feel to face the flood?

### Material Losses

Significant material losses after the storm were necessities like clean water 59%, electricity 83%, a house 26% and internet 66%. 60% were left without work and 20% without food safety.

Furthermore, more material losses were reported such as the ones shown in Figure 6. Noteworthy is to comment on the 42% of women that reported home appliances losses, the 26% kitchen items losses, sheets and other bedding and expensive materials 30%, that are often overlooked or underreported, but very important as these are appliances and items that women use often in their daily lives and are important and expensive losses for the function of the household.

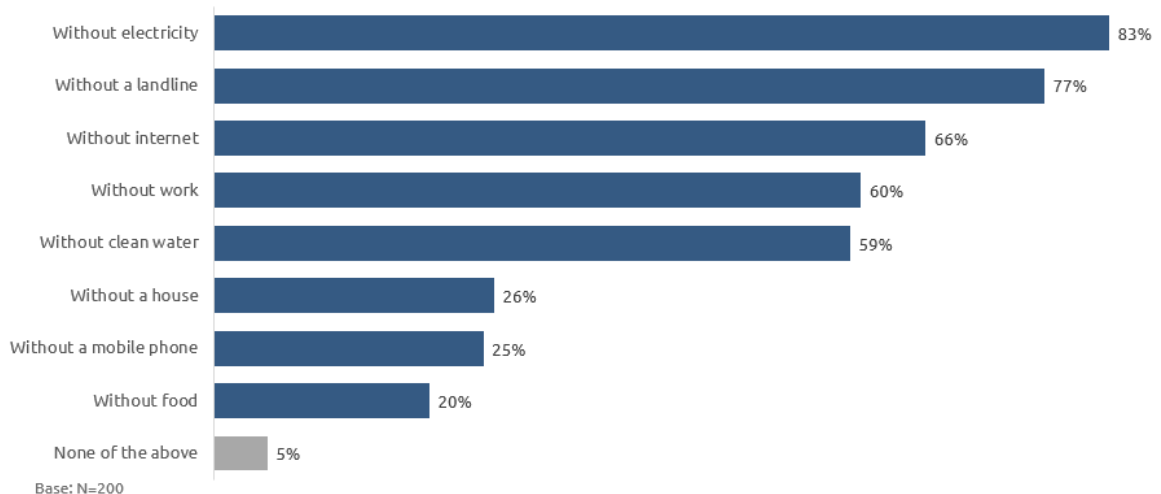


Figure 5 - After the flood what were you left without?

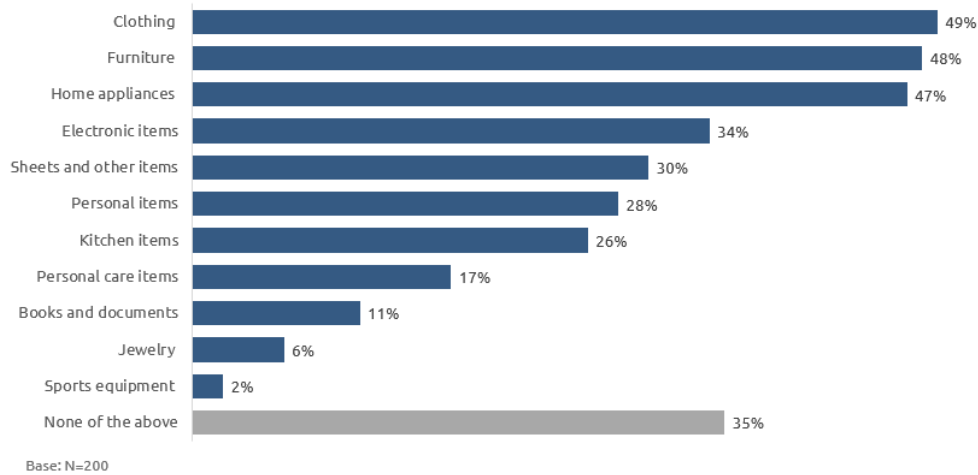


Figure 6 - After the flood which of these items were affected?

## Health

**Health Consequences:** The floods had multiple health impacts on women, with the most significant issues including exposure to microbes/bacteria (78%), exhaustion/overexertion (53%), respiratory problems (40%), and exposure to hazardous materials (36%). More severely affected women reported higher rates of exhaustion/overexertion (81%), increased incidence of infectious diseases (24% vs. 16% overall), and dehydration (18% vs. 10% overall). Women who were trapped during the flood reported higher health impacts, such as exposure to microbes/bacteria (84%), exhaustion/overexertion (62%), exposure to hazardous materials (46%), and poor nutrition/malnutrition (25%).

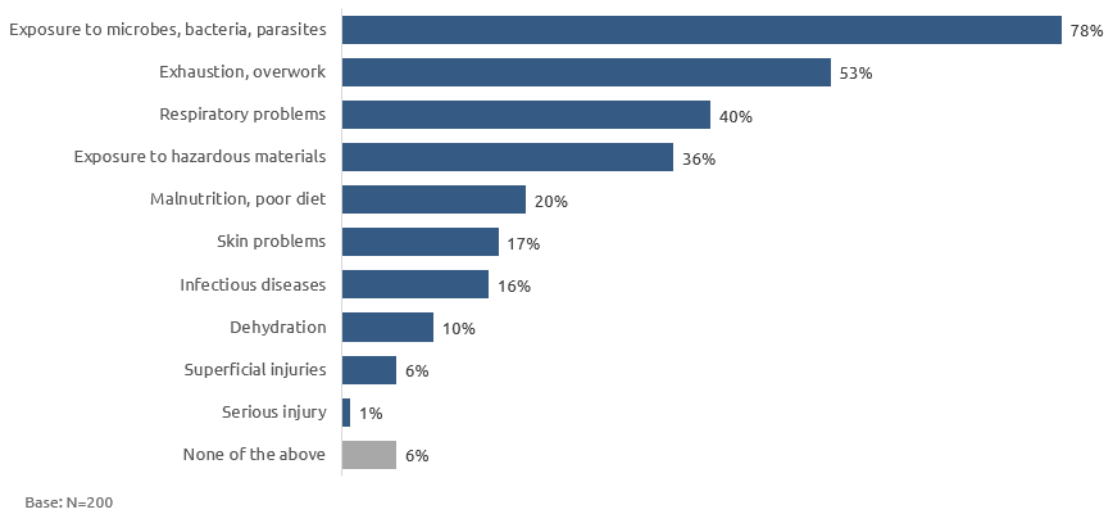


Figure 7 - What were your health implications due to the flood?

## Managing the Situation During the Flood

A lack of knowledge about CPR and First Aid is a significant gap, as it can affect women's sense of preparedness and their ability to protect themselves and their families. Nearly 2 out of 3 women do not know CPR, and a similar proportion are unaware of First Aid procedures. Most affected women consider their pre-flood information inadequate (50%), a sentiment that increases significantly among those who felt unprepared (78%) and powerless (94%).

Post-flood information focused on compensation and damage restoration, but there were gaps in other important areas, such as home and item cleaning instructions (12%), psychological support (4%), legal aid (3%), and health services (3%). Figure 9 details how informed these women felt before the flood, with 55% being inadequately informed.

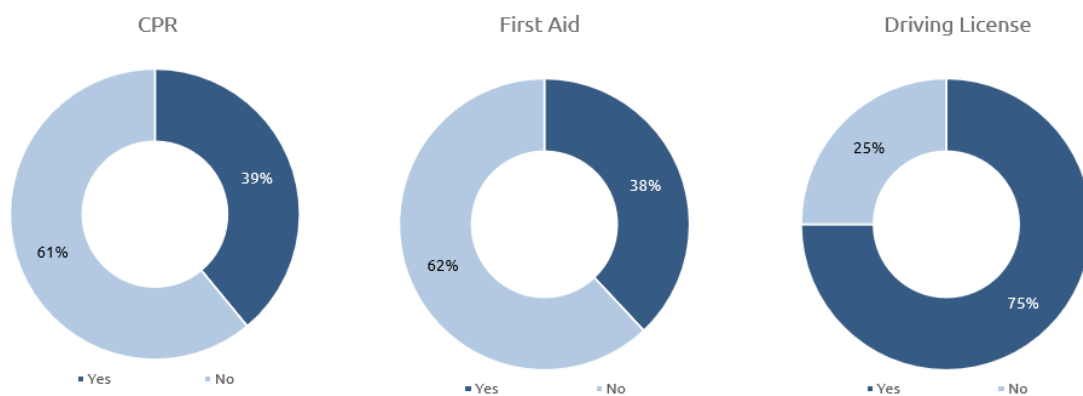


Figure 8 - Before the storm, did you know CPR, First aid, or a driving license?

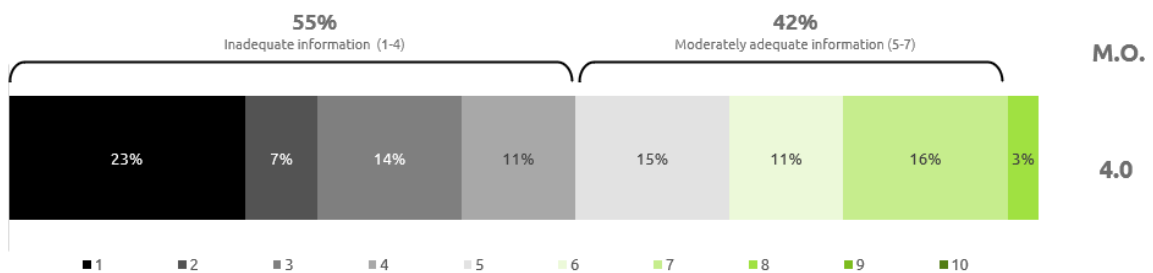


Figure 9 - How adequately informed did you feel before the flood?

## Life Consequences of the Flood for Women

The flood disrupted the economic stability of 43% of women, employment for 36%, and housing for 34%. The gendered nature of the flood's consequences is highlighted by women

emphasizing the impact on their work (82%). Loss of employment is linked to reduced autonomy and a more significant disruption of daily life. A third of women reported their mental health was greatly affected, with half stating their mental health was considerably impacted. These numbers are higher for those who faced more severe consequences from the flood.

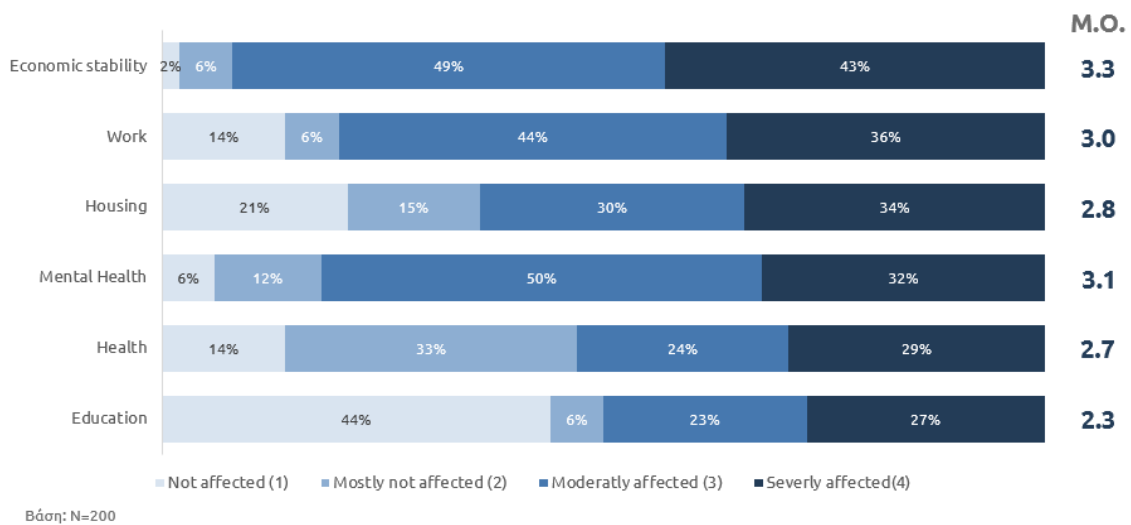


Figure 10 - How affected were the following due to the flood?

### Needs of Women Post-Flood

Affected women highlight the importance of organized action and specialized support. Specifically, 83% emphasize the need for local organizations, 82% seek official information on necessary actions, and 55% underline the need for guidance and support from experts. Financial support (43%) and state support (16%) have been received by some, but key areas remain under-addressed, such as support for children and adolescents (0%), medical and pharmaceutical assistance (1%), job search assistance (0%), stress management help (1%), and mental health support (0%).

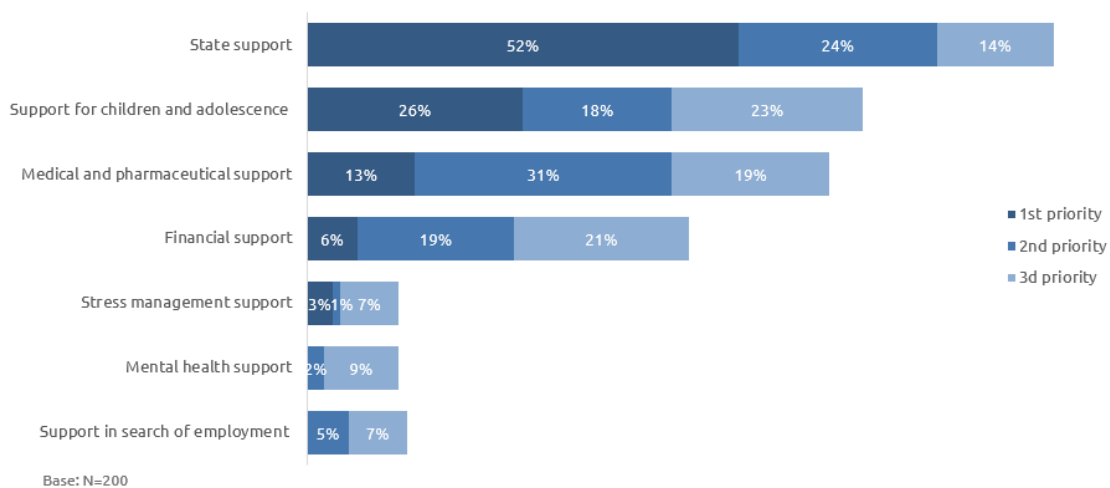


Figure 11 - What were your needs after the flood?



## The impact of the Wildfire

The forest fire has had a sweeping impact, leaving women unprepared and significantly affecting their mental health and economic stability. Despite some assistance, significant needs remain unmet, particularly in mental health support and employment reintegration. The cooperation between state structures and local communities is crucial for comprehensive support.

Affected women faced serious consequences from the forest fire. 78% were left without electricity, 71% without a landline, and 68% without drinking water. Furthermore, 63% lost their homes. Those most affected reported even greater problems, such as lack of drinking water (85%), food (80%), and housing (87%). The average preparedness rating was low (2/10), with most women having no preparation or information on managing the fire. Only 2% knew CPR, and 7% knew First Aid, highlighting a significant knowledge gap essential for dealing with future forest fires.

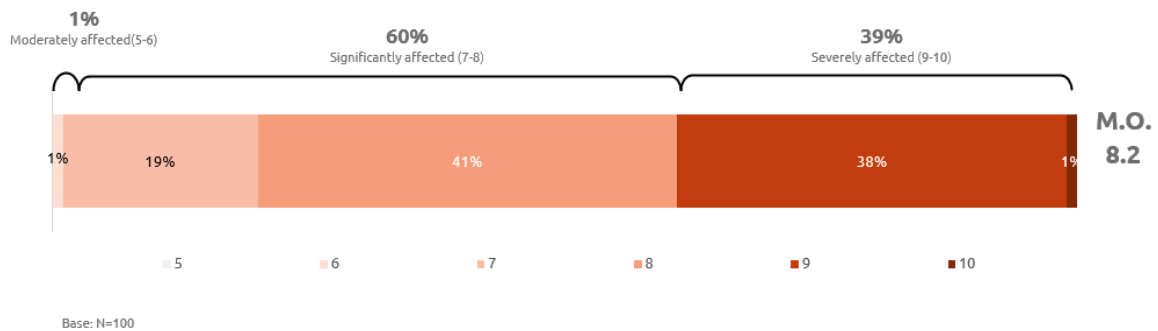


Figure 12 - How affected were you by the fire?

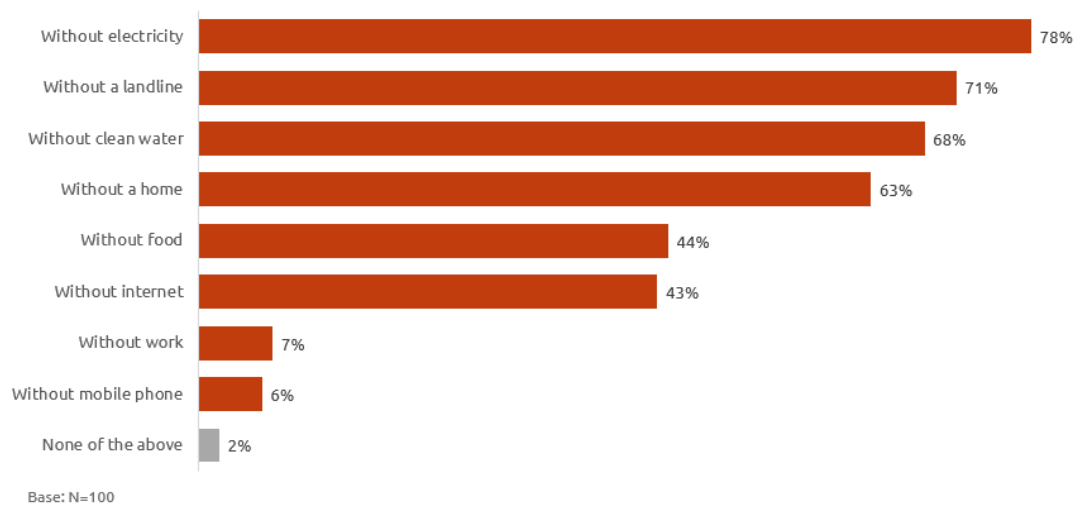


Figure 13 - After the fire what were you left without?

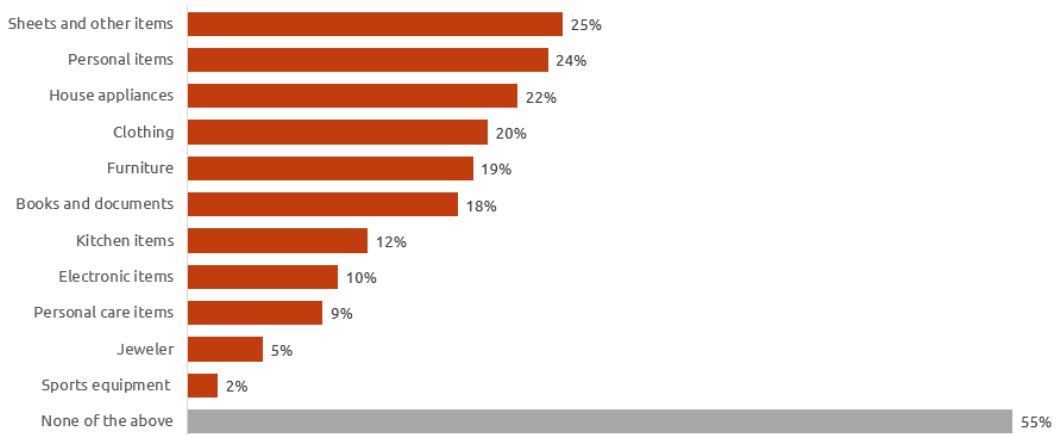


Figure 14 - After the fire which of these items were affected?

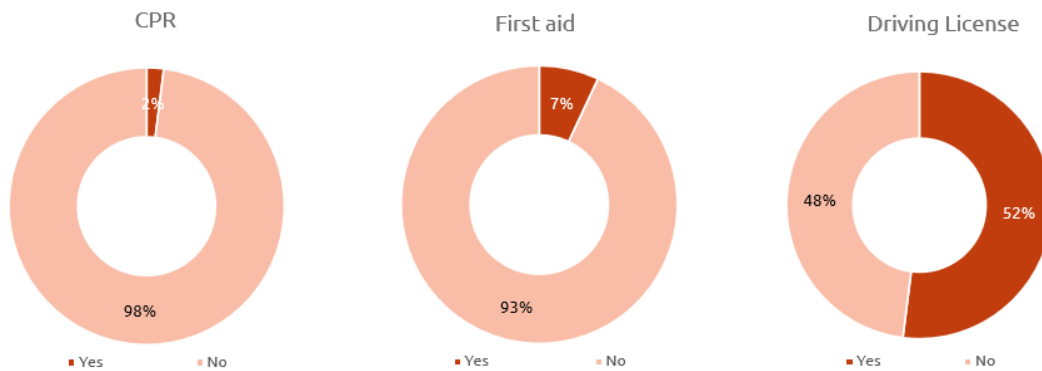


Figure 15 - Before the fire, did you know CPR, First aid, or a driving license?

## Health Consequences

Health impacts focused on respiratory problems (47%), exhaustion/overexertion (31%), and dehydration (27%), with no reports of burns. The fact that all women evacuated in time, and none were trapped explains the relatively limited health impacts.

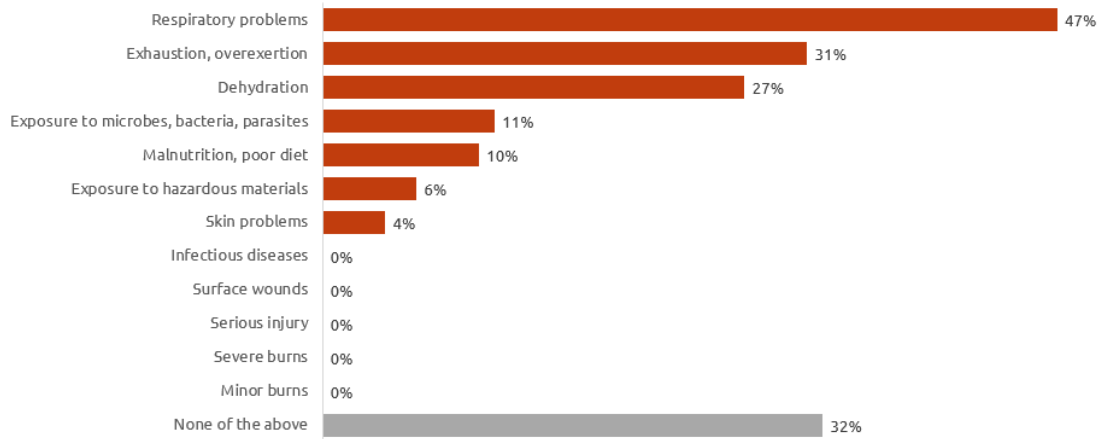


Figure 16 - What were your health implications due to the fire?

### Needs of Women Post-Forest Fire

Medical and pharmaceutical support ranked as the top priority (26%), followed by support for children and adolescents (19%) and mental health support (17%). Financial and state support were lower priorities (15% and 11%, respectively). These findings highlight the importance of diverse responses to the impacts of forest fires, reflecting the different needs and priorities of those affected.

These women also reported getting almost no guidance regarding the aftermath of the fire and what they may need. Even though 97% of the women say their mental health was affected, only 1% got the necessary guidance.

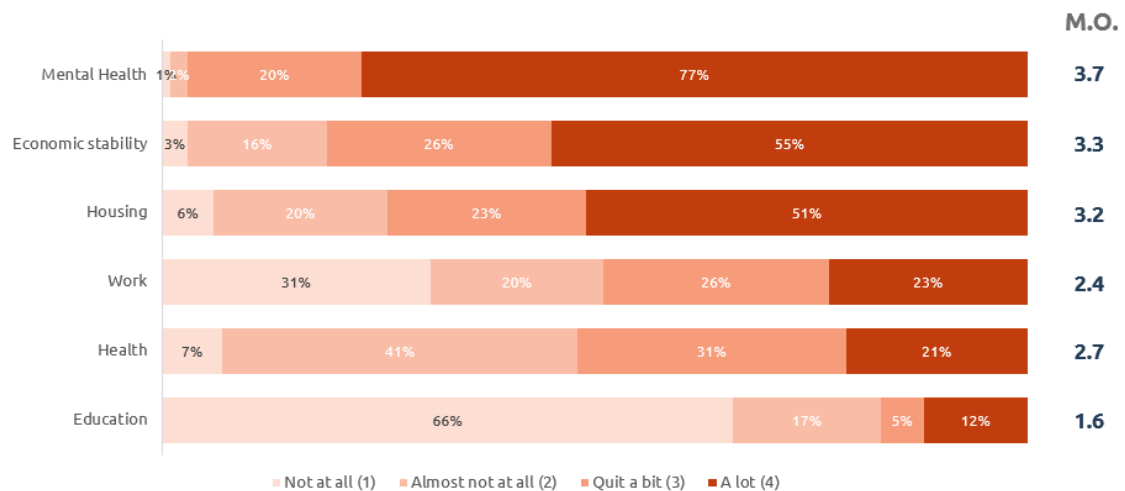


Figure 17 - How affected were the following due to the flood?

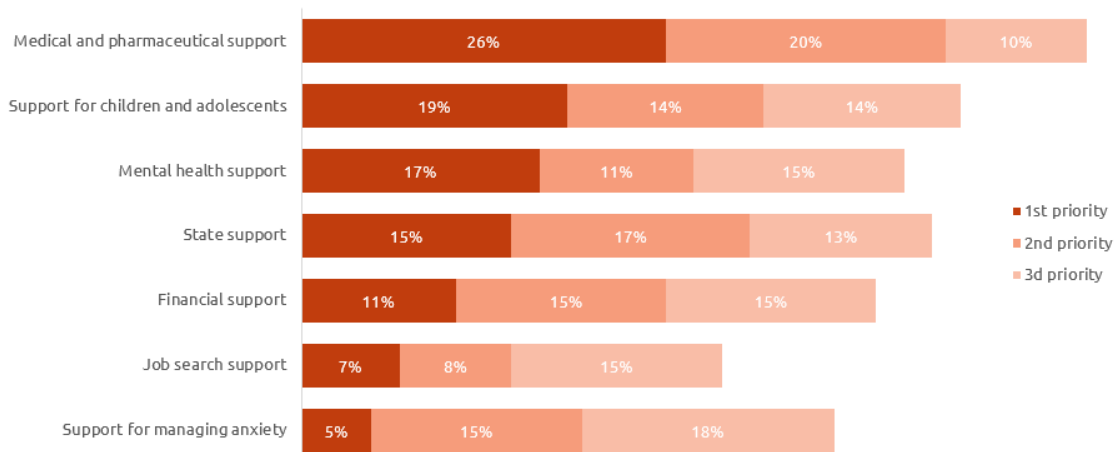


Figure 18 - What were your needs after the flood?

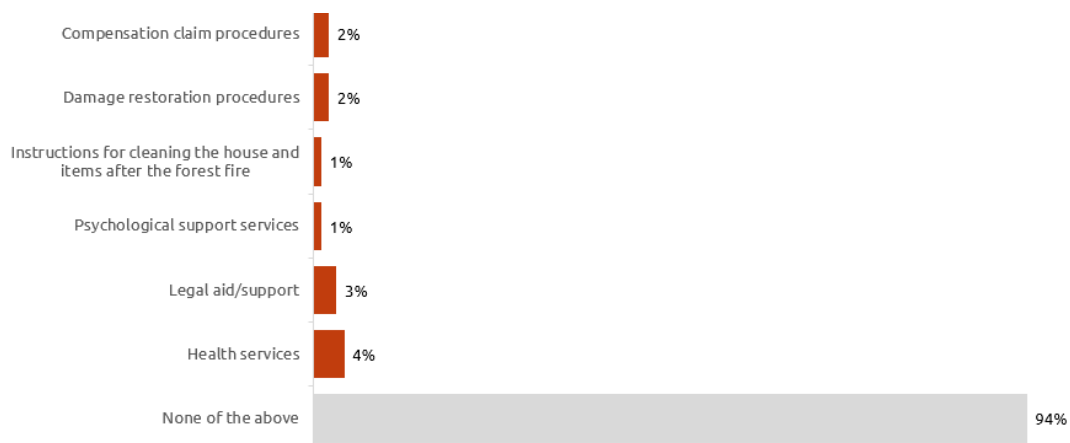


Figure 19 - For which of the following did you get support after the fire?

## Property Losses

Households suffered substantial property loss in both natural disasters. 50% of women in Thessaly reported that the flood affected their main house while the number for Evros is 36%. Auxiliary spaces were reported the highest in Thessaly with 71% and second highest in Evros with 36%. Noteworthy are also the losses in domestic livestock facilities. In Thessaly, it is reported at 13% and in Evros at 26%, a substantial loss, especially for the women from rural areas, for whom these facilities are one of their main activities and a way to engage in the community's transactional economy and gain a bit of income.

The biggest loss for both regions was fields and cultivated agricultural land, with losses being at 84% in Evros and 40% in Thessaly. This is an economic catastrophe for these households and for these women as stated in Figure 20 and Figure 21. These regions relied heavily on agriculture and livestock for their occupation.

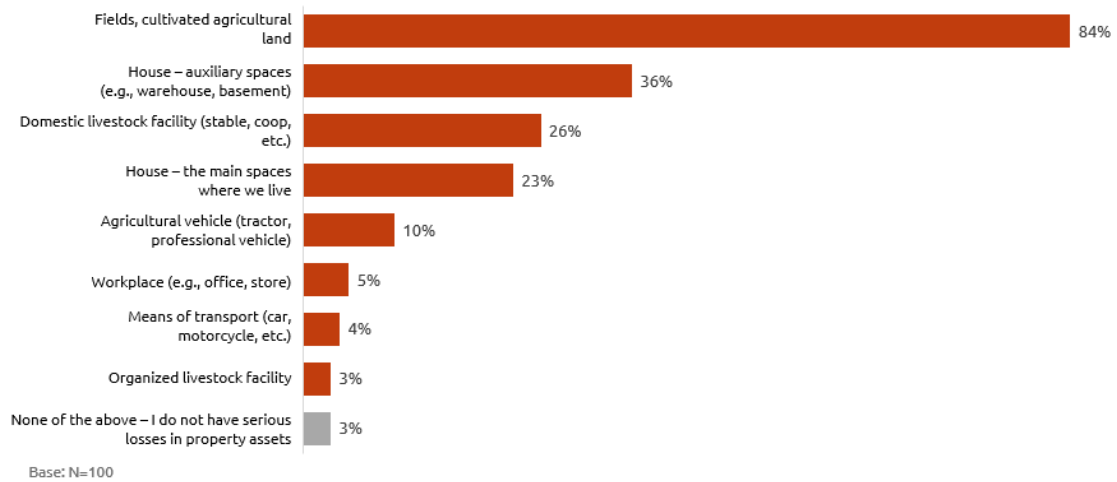


Figure 20 - Which property was affected due to the fire?

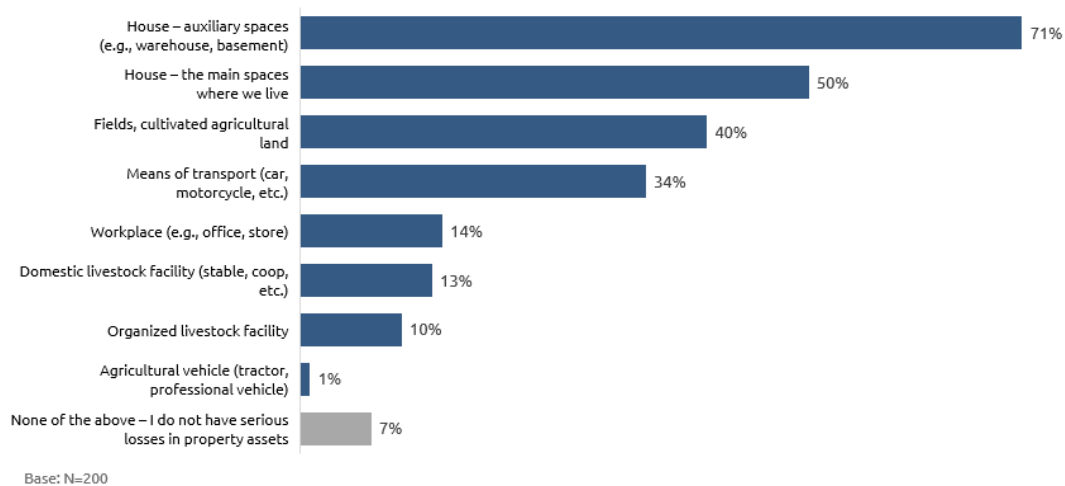
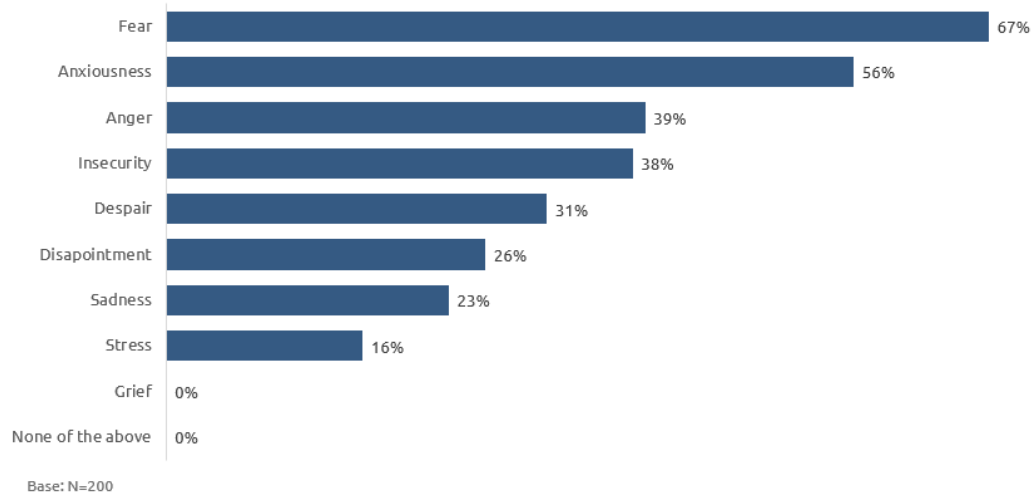


Figure 21 - Which property was affected due to the flood?

## Mental Health

The floods significantly impacted the mental health of affected women. Depression was reported by 63% of affected women, while anxiety disorders were reported by 43%. More severely affected women had higher rates of depression (72%) and anxiety disorders (58%), with 34% experiencing post-traumatic stress and 32% acute stress reactions. Women who were trapped during the flood reported higher levels of anxiety disorders (48% vs. 32%) reported in Figure 24.

Fear (65%) and anxiety (56%) were the dominant emotions among affected women during the flood. Younger women (ages 20-29) experienced more anxiety (71%), while fear (73%) and despair (38%) were more pronounced in non-urban areas. Mothers felt more anger (48%) compared to women without children (27%), and working women felt more disappointment (30%) compared to non-working women (9%). Women in higher socioeconomic classes felt more disappointment (38%).



*Figure 22 - What were your emotions during the flood?*

Surviving a flood, and having housing affected with direct damage to the individual's house can increase the risk of individuals having suicidal ideation (Graham et al., 2019). Severe mental disorders, like suicidal thoughts, were not mentioned in the survey, in part because it was not mental health specific, and in part because this was done on voluntary completion, and we didn't want the respondents to opt out if they were mentally startled.

The disorders associated with stress are very commonly experienced by people surviving floods, PTSD and acute stress disorders are amongst the most lasting disorders (Graham et al., 2019). In one of the interviews I performed, one of the respondents, a woman in the 50-59 age bracket who lost her house in Storm Daniel, reported "I couldn't go back to the house, it was dirty and smelling of rot and sewage. I lost everything, photos, items, and all my life's possessions. My house was violated, it was raped, I can't go back there. We are left to restart with nothing". The very house of survivors acts like a trigger for them, and some survivors are still living in it. Another woman notably answered "I cleaned my house the first time, I got infected by the water. It flooded a second time. I was tired but I cleaned it again. As much as I clean this house, it will never be as before, it has become dirty now."

These are words of women, very clearly dealing with mental health issues, who are getting no treatment. Mental health was chosen by the affected women as the second most affected area of their lives with an MS of 3.1/4 in Figure 10, yet only 4% of them had any form of guidance for mental health issues.

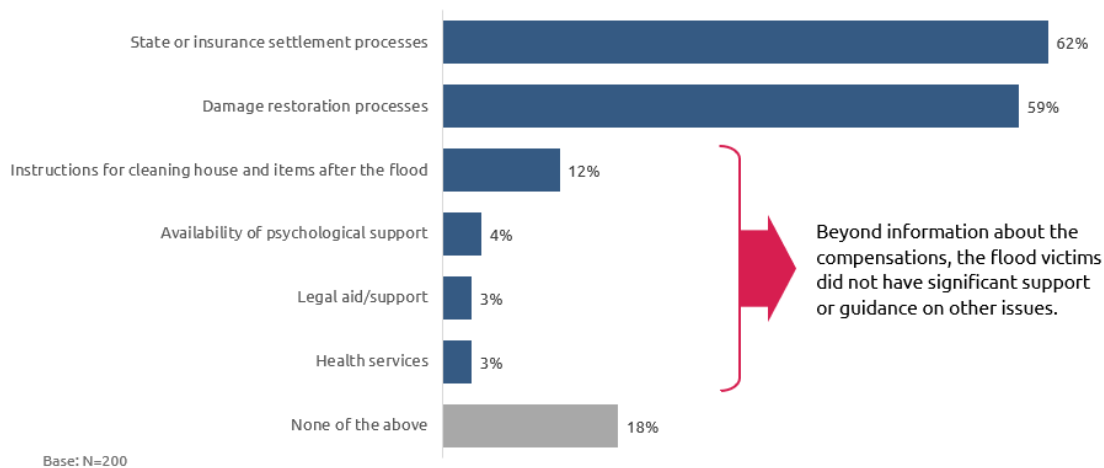


Figure 23 - For which of the following did you get support after the flood?

The wildfire's mental health consequences were significant, with anxiety disorder affecting 56% of women, post-traumatic stress disorder affecting 39%, depression affecting 32%, and acute stress reaction affecting 22% in Figure 21. Direct exposure to a wildfire is known to cause depression and PTSD (Silveira, 2021). These can be the results of pre-existing conditions, but exposure can cause them to be more severe. Dominant emotions during the fire included fear (65%), anxiety (54%), and insecurity (52%). Stress levels were higher among mothers (38%) and women who felt completely powerless (44%) in Figure 25.

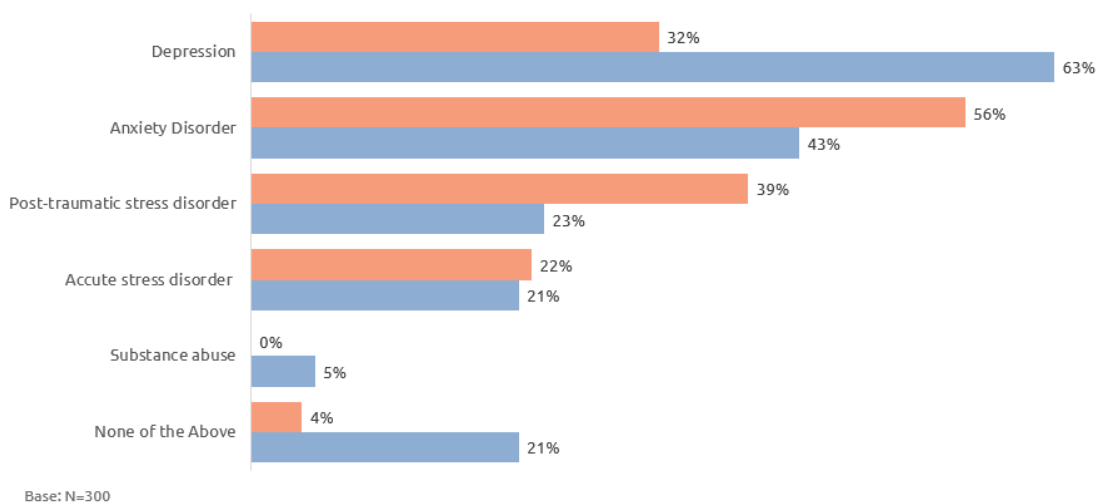


Figure 24 - Did you suffer from any of the below due to the natural disaster

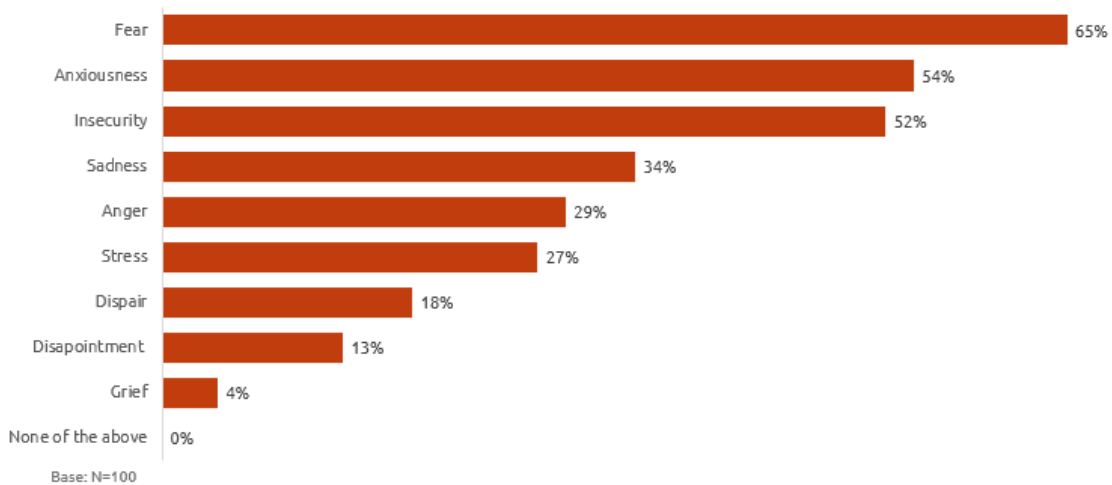


Figure 25 - What were your emotions during the fire?

## Climate change

Only 1 out of 10 women would say they are adequately informed about the climate crisis even though they have suffered a severe natural disaster because of it.

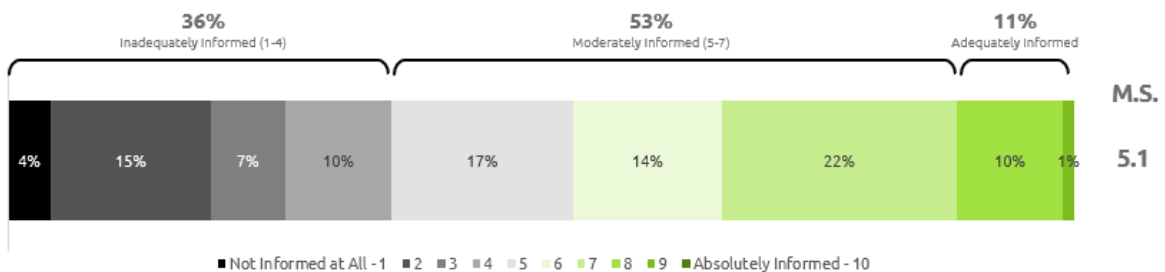


Figure 26 - How informed are you about the climate crisis?

Women who perceive themselves to be more informed are:

- Younger women, aged 20-29 (19% would say they are absolutely informed)
- Women in urban areas (18%)
- Working women (14%)
- Women with children (15%)

Being informed about the climate crisis does not influence how severely a flood or a wildfire affects an area, the women who perceive themselves as more educated on the subjects are also more comfortable in their ability to manage a natural disaster. This will further be examined by running the regressions.



## Knowledge of ministry instructions during a natural disaster

The Hellenic Ministry of Civil Protection and Climate Crisis has a website dedicated to actions that should be done if faced with natural disasters. Amongst others, there is a section for Wildfires and Floods.

For floods, the ministry indicates actions to do when preparing, during, and after a storm hits. (Civil protection, Πλημμύρες). For this research, indicatively, we have chosen 5 of the most life-saving actions, which were avoiding basements and moving to places located higher from the ground, turning off the power switches, not going out in open spaces during the storm, abandoning cars and not attempting to cross while the phenomena are underway and staying away from wires and power supplies.

While the Thessaly women reported not having any formal training (0% of those chose “I had formal training before the phenomena”, Figure 28), many respondents selected these actions as important actions in case of a flood. And 0% of them chose none of the above. Frankly, these actions are quite reason-based actions, and could easily be followed, even without training as basic instinct. (Figure 27)

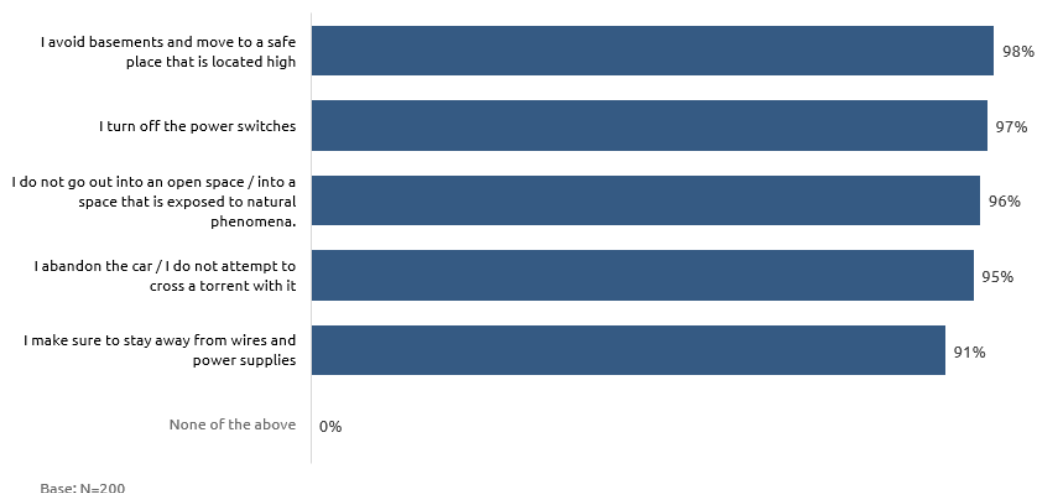


Figure 27 - What are some actions you should do in case of a flood to be safe?

Even though they had this basic instinctive knowledge when asked for further actions their response was inadequate. The following questions were chosen as suggested by Every D. et al in their 2019 research named “Australian householders' psychological preparedness for potential natural hazard threats: An exploration of contributing factors”, where they propose a series of questions to determine psychological and physical preparedness in the events of extreme natural disasters. For this questionnaire, the questions in Figure 28 were used, and the table also presents their results. There is no training for managing extreme floods. This is already a very important insight, as Greece is in a geographical place where this natural phenomenon is occurring, but no training is being done. And we have examined 3 generations of women. To counter this, we would have to report, that in Greek schools there is mandatory

training in earthquake management throughout the country, maybe we should start discussing extensive natural disaster training.

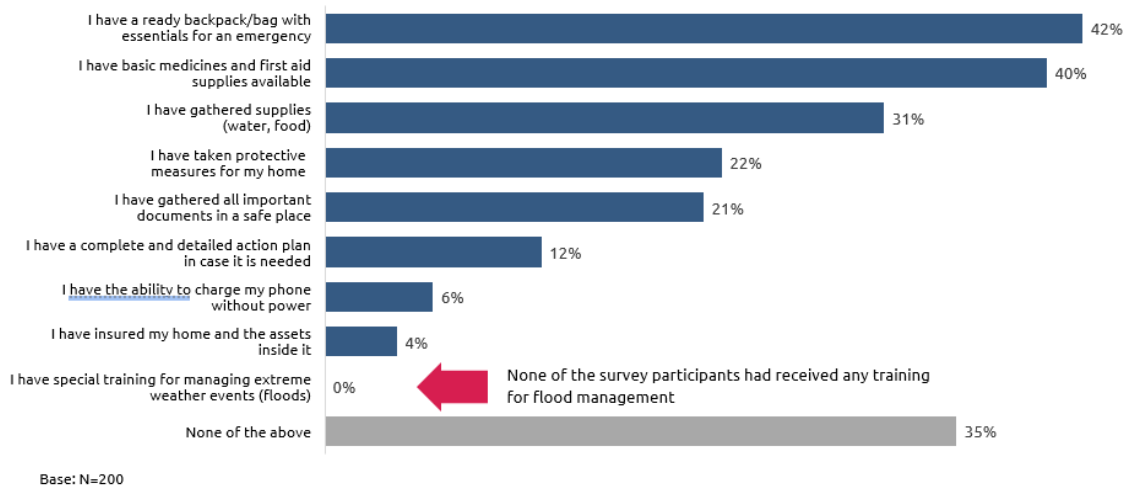


Figure 28 - What are some actions you did to prepare for the flood?

In the case of fires, the ministry directions weren't as widely accepted as proper preparedness actions as the ones for the floods. One of the possible reasons for this is the fact that the area of Evros hadn't seen a fire like that in years, and in general, had very limited forest fires in the region before this massive one. Another is the fact that these women live mostly in rural areas and are not responsible for doing this heavy lifting around the house. The 29% of those that chose none of the above indicates a very crucial gap of the ministry in reaching their target audience when it comes to education on how to do some very basic actions that can prove saving. These were actions also indicated on the website of the ministry (Civil protection, *Δασικές Πυρκαγιές*)

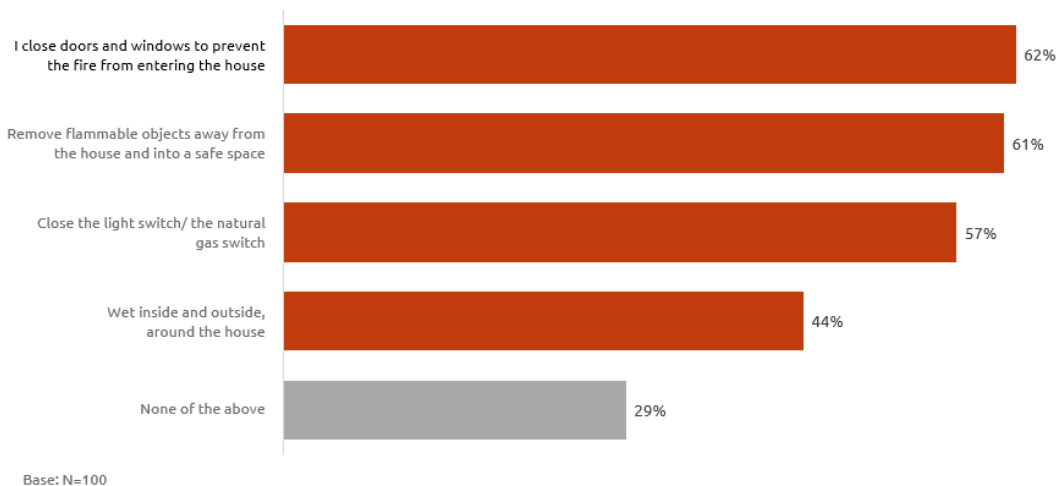


Figure 29 - What are some actions you should do in case of a fire to be safe?

But this wasn't the only gap in information examined, as with the floods, there were a series of questions to assess preparedness levels for wildfires as well. To say the respondents underperformed would be an understatement. The women believed that none of the statements of Figure 30 were useful actions to do during a wildfire. This data left me shocked while I was examining them as they were coming in. So, I requested the researchers on the grounds to ask the participants why they didn't even choose one action. They responded that they didn't even

know that these options existed and that they were actions that could be potentially lifesaving. They recalled the time of the fire when information from the civil services was little to none, there was not a proper “fire watch” state in which they could prepare, and even if there was, they wouldn’t identify what it was and what they were meant to do. The information gap was so severe, that the only thing they could do was flee.



Figure 30 - What are some actions you did to prepare for the fire?

## Perceptions of gender, Swartz personality categorization, and life outlooks

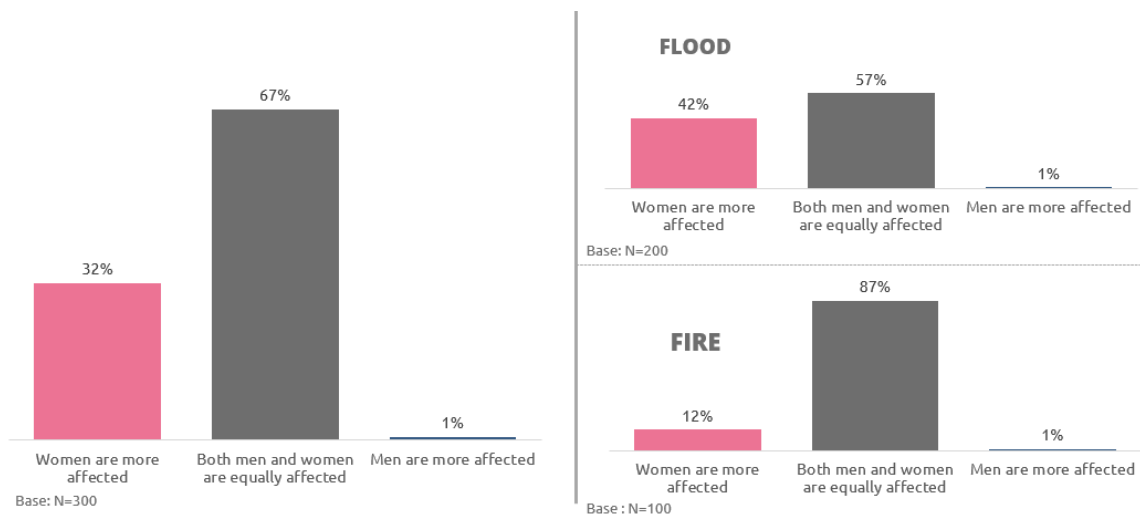


Figure 31 - In your opinion, which gender is more affected by a natural disaster?

In total, 32% of women believe that women are more affected by natural disasters than men, 67% believe that both genders are equally affected and only 1% believe men are more affected than women. These numbers significantly change depending on the natural disaster suffered, 42% of those who have experienced floods believe that women are more affected, whereas 12% of those who experienced the wildfire. This can be because more women from urban and

with higher education and socioeconomic status were in the sample for floods. This is analyzed more in the next chapter.

It can also be hypothesized that the effects of the flood are long-lasting, and disparities are more apparent in the long run. Meaning that the gendered biases these women felt, were more present in the restoration process rather than when the event was happening.

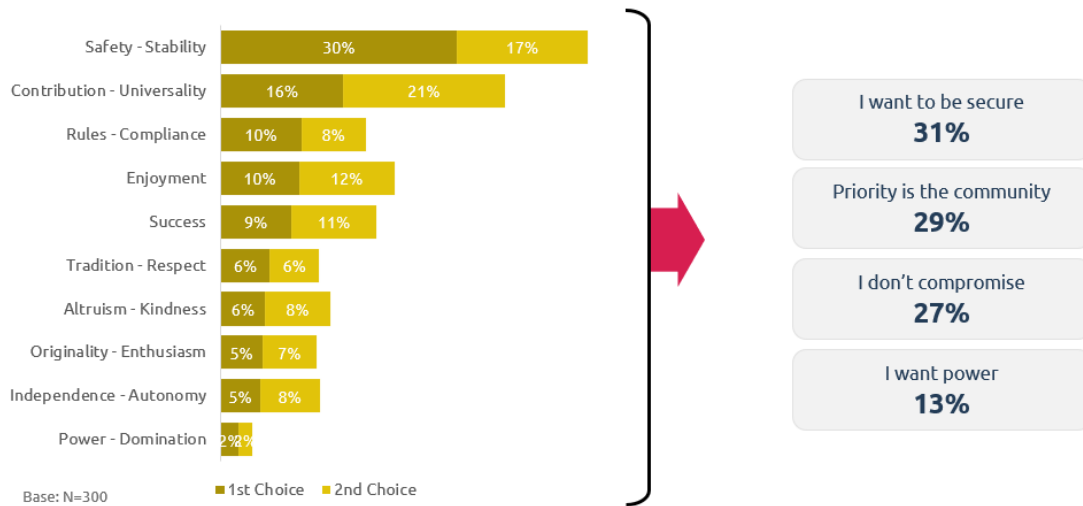


Figure 32 - Swartz personality categorization

Women seem to seek out security first and be benevolent and caregiver second. These profiles they fall under seem to be in line with the gender norms that are widely present, especially in rural Greece, meaning, any part of Greece that isn't the 2 biggest metropolitan areas: Thessaloniki or Athens.

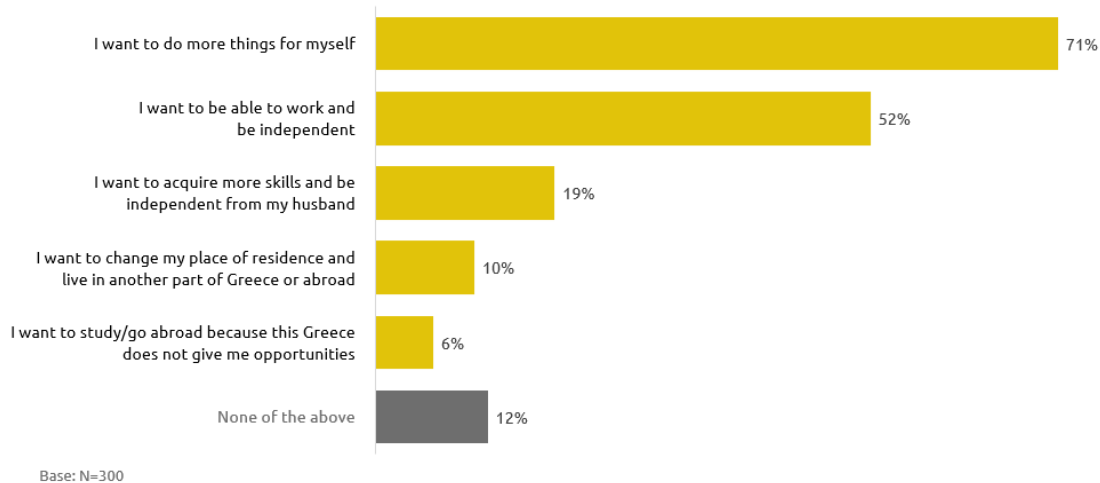


Figure 33 - Which of the following sentiments resonate with you?

Despite the secure and benevolent profile, women do express a need to do more for themselves 71%, as well as the need to work and be independent 52%, while 19% want to acquire more skills to be independent of their husbands. 16% expressed the want to relocate, either just change the place of residence or seek out more opportunities, especially the younger women. Relocation is a phenomenon that we should expect to see more often if natural disasters of this magnitude keep occurring.

# Regressions and Methodology

The question is, what makes these women perceive themselves as severely affected instead of significantly affected? What drives them to choose 9 or 10 in a scaled question asking, “To what degree were you affected by the natural disaster?”

To investigate this, we use a probit model with an instrumented variable. The primary focus is applying the probit model, used for modeling binary outcome variables. The probit model is particularly suitable for our analysis because it can handle binary dependent variables and is theoretically aligned with the research objectives.

## Methodology, Model, and Table Results

The data was collected using a survey as detailed in the section [“Questionnaire review”](#). The dependent variable, "Severely Affected (9 or 10)," is binary, indicating whether an individual is severely affected by a disaster (1) or not (0). Independent variables include factors such as preparedness, evacuation status, socio-economic status, health, and demographic characteristics.

The categorization of the binary affected variable was done due to the very low percentages of women who chose 5 or 6. So 5 and 6 were integrated into the significantly affected category. So this probit model takes the dependent variable “affected”, with 1 being if Affected= 9 or 10, and 0 if Affected=5-8.

Before the analysis, data were cleaned and prepared. There were no missing values. Continuous variables were log-transformed where necessary to address skewness and to ensure a better fit in the regression models.

The probit model was chosen for this analysis due to its appropriateness for binary outcome variables. The probit model is grounded in the cumulative normal distribution function, making it theoretically sound for modeling binary outcomes (Cameron & Trivedi, 2005). It effectively handles cases where the dependent variable is dichotomous, providing estimates of the probability of occurrence of an event (Wooldridge, 2010). The model's coefficients can be interpreted in terms of their impact on the dependent variable, which translates to the probability of the binary outcome (Greene, 2012).

There is also an instrumented variable used, `feeling_of_preparedness_hat`, to address issues with endogeneity brought forward when adding the preparedness variable to the regression. The instrumented variable approach helps with addressing endogeneity and having unbiased and consistent estimates (Angrist & Pischke, 2009).

To interpret the results, average marginal effects (AME) were used. AME provides estimates of how changes in the independent variable affect the probability of the dependent variable equal 1.

The model function

$\Pr(\text{Affected}=9 \text{ or } 10)=$

$\Phi(\beta_0+\beta_1\text{Feeling\_of\_Preparedness\_hat}+\beta_2\text{Semi\_urban\_rural}+\beta_3\text{Age}+\beta_4\text{Flood}+\beta_5$   
 $\text{With\_Partner}+\beta_6\text{Household\_members}+\beta_7\text{With\_kids}+\beta_8\text{Employed}+\beta_9$   
 $\text{Responsible\_for\_Household}+\beta_{10}\text{Elders\_under\_their\_care}+\beta_{11}\text{Main\_earner}+\beta_{12}$   
 $\text{Woman\_upper\_class}+\beta_{13}\text{Woman\_middle\_class}+\beta_{14}\text{Women\_are\_more\_affected}+\beta_{15}$   
 $\text{Evacuated}+\beta_{16}\text{Trapped}+\beta_{17}\text{work}+\beta_{18}\text{health}+\beta_{19}\text{Housing}+\beta_{20}\text{education}+\beta_{21}$   
 $\text{economic\_stability}+\beta_{22}\text{mental\_health}+\epsilon)$

Where:

1. **Semi\_urban\_rural:** Binary independent variable with 1= living in a semi-urban or rural area, while living in urban=0
2. **Age:** Logged continuous independent variable
3. **Flood:** Binary independent variable with flood=1 and fire=0
4. **With\_partner:** Binary independent variable with having a partner (married or living together)=1 and not having a partner=0
5. **Household\_members:** Independent variable logged taking numbers from 1-6
6. **With\_kids:** Binary independent variable with kids=1 and without kids=0
7. **Employed:** Binary independent variable employed=1 and unemployed =0
8. **Responsible\_for\_household:** Binary independent variable mostly responsible for household=1 and sharing responsibility =0
9. **Elders\_under\_their\_care:** Binary independent variable responsible for elders=1 and not responsible for elders=0
10. **Main\_earner:** Binary independent variable being the main earner=1 and not being the main earner=0
11. **Woman upper class:** Binary independent variable being in the upper class (taking into account women's education and occupation)=1 and else=0
12. **Woman middle class:** Binary independent variable being in the middle class (taking into account women's education and occupation)=1 and else=0
13. **Women are more affected:** Binary independent variable perceiving women more affected (perceiving gender bias) =1 and not perceiving gender bias=0
14. **Evacuated:** Binary independent variable being evacuated=1 and not being evacuated=0
15. **Trapped:** Binary independent variable being trapped=1 and not being trapped=0
16. **Work:** Binary independent variable perceiving work as affected=1 and not affected=0
17. **Health:** Binary independent variable perceiving health as affected=1 and not affected=0
18. **Housing:** Binary independent variable perceiving housing as affected=1 and not affected=0
19. **Education:** Binary independent variable perceiving education as affected=1 and not affected=0
20. **Economic\_stability:** Binary independent variable perceiving economic stability as affected=1 and not affected=0

21. **Mental\_Health:** Binary independent variable perceiving mental health as affected=1 and not affected=0

The function of the instrumented variable

$$\text{Feeling\_of\_preparedness} = \gamma_0 + \gamma_1\text{CPR} + \gamma_2\text{First\_aid} + \gamma_3\text{driving\_licence} + \gamma_4\text{prior\_notification} + \gamma_5\text{power} + \gamma_6\text{Climate\_change\_awareness} + \epsilon$$

Where:

1. **Feeling of preparedness:** Logged dependent variable with values from 1-10, scoring perceived preparedness
2. **CPR:** Binary independent variable knowing CPR before the disaster=1 else =0
3. **First aid:** Binary independent variable knowing first aid before the disaster=1 else =0
4. **Driving licence:** Binary independent variable having a driving licence before the disaster=1 else =0
5. **Prior notification:** Logged independent variable with values from 1-10, scoring perceived adequacy of prior notification
6. **Power:** Logged independent variable with values from 1-10, scoring perceived feeling of powerfulness
7. **Climate change awareness:** Logged independent variable with values from 1-10, scoring perceived knowledge of matters regarding the climate crisis

## Results in tables

	Model 1
(Intercept)	0.58 *** (0.04)
CPR	0.06 (0.05)
First.aid	0.03 (0.04)
driving.license	0.00 (0.03)
Prior.notification	0.09 *** (0.01)
log_power	0.25 *** (0.04)
log_climatechange	0.07 * (0.03)
nobs	300
r.squared	0.70
adj.r.squared	0.70
statistic	178.47
p.value	0.00
df.residual	293.00
nobs.1	300.00
se_type	HC2.00

\*\*\* p < 0.001; \*\* p < 0.01; \* p < 0.05.

Table 3 - First stage IV regression results

Probit Model Results

Dependent variable:	
Severely Affected (9 or 10)	
Feeling of Preparedness (Instrumented)	-2.525*** (0.451)
Semi-urban/rural	0.446* (0.244)
Flood	-2.368*** (0.543)
Partner	1.230*** (0.456)
Household Head	0.333** (0.141)
Main Earner	1.830** (0.757)
Evacuated	1.353*** (0.391)
Trapped	0.786*** (0.272)
Health	0.487** (0.244)
Housing	0.748*** (0.283)
Mental Health	0.745* (0.389)
Log Age	0.716 (0.500)
Log Household Members	1.334** (0.677)
With Kids	-0.563 (0.365)
Employed	-0.588* (0.304)
Elders	0.223 (0.161)
Upper Class	0.498* (0.257)
Middle Class	-0.544* (0.295)
Gender (Women)	0.511** (0.223)
Work	0.113 (0.268)
Education	-0.161 (0.242)
Economic Stability	0.303 (0.369)
Constant	-5.709** (2.298)
Observations	300
Log Likelihood	-128.176
Akaike Inf. Crit.	302.352
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 4 - Second stage probit regression results



Factor	AME	SE	z	p	lower	upper
BEvacuated	0.3276	0.0889	3.6846	0.0002	0.1534	0.5019
BTrapped	0.1903	0.0633	3.0060	0.0026	0.0662	0.3144
Economic.stability	0.0735	0.0892	0.8241	0.4099	-0.1013	0.2482
Education	-0.0391	0.0584	-0.6684	0.5039	-0.1536	0.0755
Elders	0.0540	0.0386	1.3980	0.1621	-0.0217	0.1296
Employed	-0.1425	0.0722	-1.9737	0.0484	-0.2839	-0.0010
Feeling_of_Preparedness_hat	-0.6113	0.0920	-6.6416	0.0000	-0.7917	-0.4309
Flood	-0.5734	0.1188	-4.8259	0.0000	-0.8062	-0.3405
health	0.1180	0.0577	2.0435	0.0410	0.0048	0.2312
Housing	0.1810	0.0665	2.7216	0.0065	0.0506	0.3113
HSHLEAD	0.0807	0.0332	2.4326	0.0150	0.0157	0.1458
log_Age	0.1733	0.1198	1.4468	0.1480	-0.0615	0.4082
log_Household_members	0.3228	0.1608	2.0073	0.0447	0.0076	0.6381
Main.earner	0.4431	0.1779	2.4902	0.0128	0.0943	0.7919
Mental.health	0.1802	0.0926	1.9465	0.0516	-0.0012	0.3617
Partner	0.2979	0.1065	2.7969	0.0052	0.0891	0.5066
Semi.urban.rural1	0.1071	0.0569	1.8834	0.0596	-0.0044	0.2186
WABC1	0.1206	0.0612	1.9715	0.0487	0.0007	0.2404
WC0	-0.1317	0.0702	-1.8758	0.0607	-0.2694	0.0059
With.kids	-0.1363	0.0874	-1.5588	0.1190	-0.3077	0.0351
Women.gender	0.1237	0.0527	2.3476	0.0189	0.0204	0.2270
Work	0.0273	0.0649	0.4210	0.6737	-0.0999	0.1546

Table 5 - Average Marginal Effects

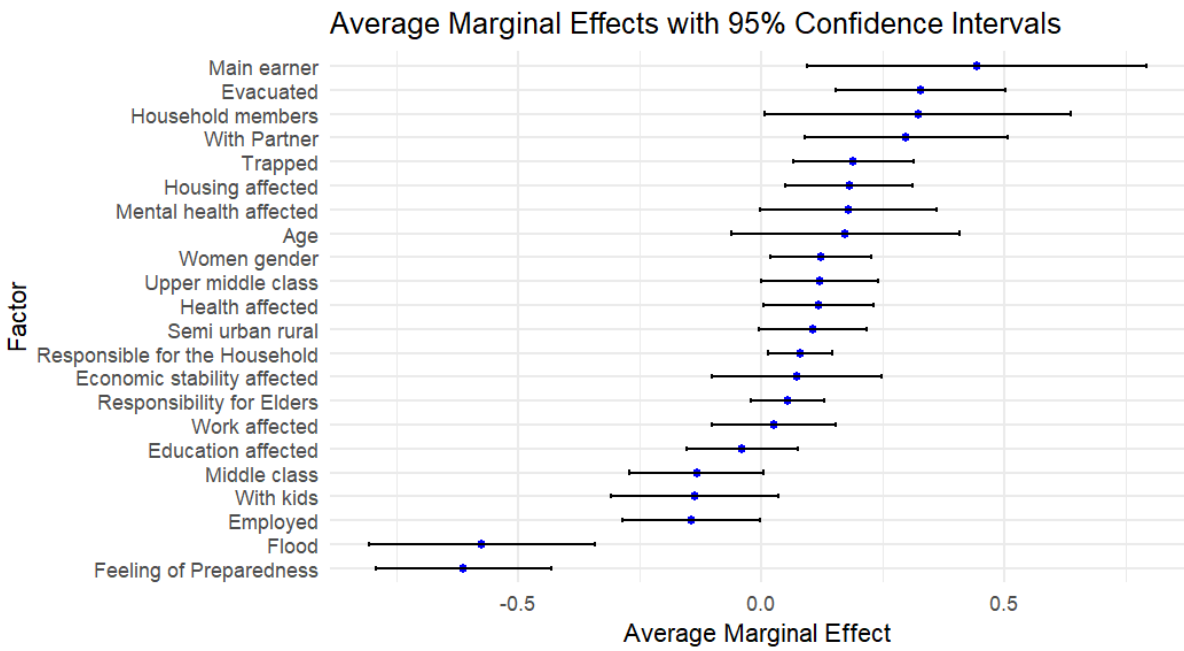


Table 6 - AME visualized

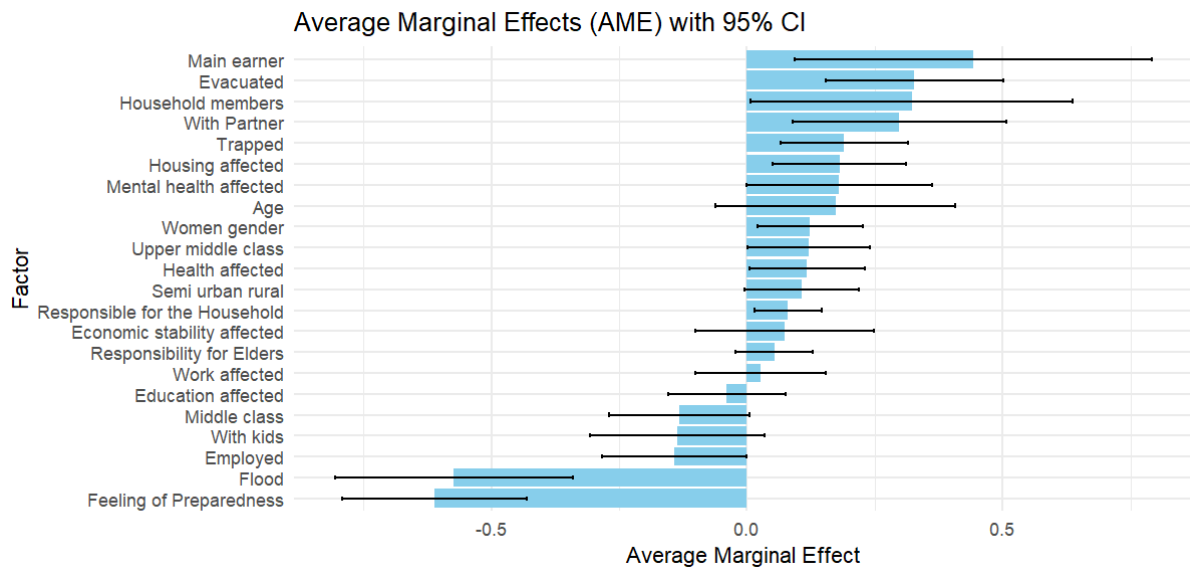


Table 7 - AME visualized 2.0

## Interpretation of the results

The probit model results show the direction of the factors and the probability of women scoring their perceived affected-ness. All the variables are on a perceptual level, the variable “affected” is not based on an objective metric, but rather on how women perceive themselves as affected. What are the factors they rely on most to consider themselves as severely affected, and are there any specific characteristics that they may fall under to probe this even further?

All the following results are displayed comprehensively in Table 7 - AME visualized 2.0.

### Feeling of preparedness

Higher perceived preparedness significantly *decreases* the probability of perceiving oneself as severely affected by approximately 61.30% and is *statistically significant on a 0.1% level*. Prior notification and how empowered a woman felt were significant variables in the first stage. What was also significant, not on the same level, was climate change awareness.

It's interesting to observe climate change awareness as a significant factor affecting preparedness. Perhaps, it's the knowledge that these kinds of disasters are happening, following up on similar disasters, where inevitably a person can see both the severity with which a disaster can strike and its implications. That can subconsciously or proactively make them identify dos and don'ts when faced with a similar situation. A more proactive approach is not only being aware of the dangers, but actively learning about actions to follow.

For example, education on the difference between being “on watch” or “warning” for a disaster and actions to do in each case. When on fire watch, an individual should know that removing flammable material from the house and having a backpack with essentials ready to flee is important, as it saves valuable time if the situation changes to a warning, and they are called to evacuate.

How empowered an individual is, is also an important factor, as is prior information, these were results that were expected.

## Flood

Experiencing a flood decreases the probability of perceiving oneself as severely affected by 57,34%, significant on a 0.1% level. This is in contrast with experiencing a fire. These results were counterintuitive, as the severity of the flood left the region straggling, with effects that hold to this day, but the fire was much more devastating in the perception of the women who lived through it.

Perhaps it has to do with how devastatingly catastrophic a fire is. There is really nothing you can do but flee as the fire destroys everything in its path.

## Responsibilities

Being responsible for the household increases the probability of perceiving oneself as severely affected by approximately 8.07%, significant on 5% vs if responsibility was shared.

## Employment

Being employed decreases the probability of perceiving oneself as severely affected by approximately 14.25%, significant on a 5% level.

## Housing

Having your house affected by a natural disaster significantly *increases* the probability of perceiving oneself as severely affected by approximately 18.10%, significant on a 1% level.

It's not surprising that a woman having her house affected means that she is affected on a deeper level, as, especially in non-urban areas, a woman's house is a significant part of her world. From this result, it can be hypothesized that affected housing is perceived as affecting women directly.

## Health

Having health implications from the natural disaster *increases* the probability of perceiving oneself as severely affected by approximately 11.80%, significant on a 5% level. This was expected mainly due to health implications happening to the person's body, which is directly linked with life, as a person's permanent residence when in this world, is their body. A disaster-causing implication on health is directly linked with a threat to life itself, and how they perceive their affected levels.

## Main earner

Being the main earner *increases* the probability of perceiving oneself as severely affected by approximately 44.31%, significantly on a 5% level. These results indicate that increased responsibility results in a feeling of being more affected and was an insight that was expected. But we need to specify that the sample for main earners was very low.

## Partner

Having a partner *increases* the probability of perceiving oneself as severely affected by approximately 29.79%, significant on a 1% level.

## Trapped or Evacuated

Being trapped or evacuated significantly *increases* the probability of perceiving oneself as severely affected by approximately 19.03% for trapped individuals, significant on a 1% level, and 32.76% for evacuated individuals, significant on a 0.1% level. An expected result, as that means the women lived through this disaster where it was more intense. The fact that the results suggest that evacuation critically increases affected levels is influenced by the evacuated individuals who have experienced the fire, where evacuation was a severely traumatizing experience, but also the only real outcome, as being trapped in a fire likely results in death vs being trapped in a flood, where an individual can seek higher ground and await rescue.

## Mental Health

Experiencing mental health implications caused by the disaster *increases* the probability of perceiving oneself as severely affected by approximately 18.02%, significant on a 5% level. A factor usually overlooked, but that has lasting effects. As the body must heal, so does the mind.

## Perceive women to be more affected than men

Perceiving women as more affected than men by a natural disaster, or in other words, being conscious of gender biases, *increases* the probability of perceiving oneself as severely affected by 12.37%, significant on a 5% level. The share of women conscious of gender bias are the ones who don't undermine it when it is done to them. This is so interesting to unpack, perhaps with the socioeconomic status factor in play as well.

## Socioeconomic status

Being in the upper class *increases* the probability of perceiving oneself as severely affected by approximately 12.06% and being in the middle class *decreases* the probability of perceiving oneself as severely affected by approximately 13.17%.

This insight is interesting to analyze as multiple hypotheses can be made. For context, areas that suffered the most from the disaster were non-urban areas, where the socioeconomic status is generally middle class to lower middle class, with this classification. The ones that felt the biggest change in their lives though, were women from the upper middle class.

These are women who have gained independence and a bigger sense of self. When performing the qualitative interviews, this difference became apparent. Women under the urban/high socioeconomic class profile typically would respond to the question “How did the disaster affect you” with the use of the first person “I was”, and describing their experience they would recall where they were, with whom they were with, and actions they did. When the same question was posed to women with the rural/middle-to-low socioeconomic class profile, they would respond with the use of the first plural, “We were affected” or “What happened to us”, and when describing their experience, they would tell a collective experience, what happened to the village, where friends and family were, and even when asked to tell their personal experience, they would in one sentence sum up their own experience in very little detail, and continue with the collective experience.

This creates two ways in which women experience this disaster and its effects. At the end of the day, it is easier for an independent, and more self-mature individual to assess their affected levels as severe, than a woman who has a more collective outlook on life.

The same analysis can be used on the perceived gender bias factor, as women who are more independent, experience and view gender bias differently than the ones who focus on the collective and grew up with more strict gender norms. In Greece, women the feminism that matured after the restoration of democracy, isn’t a liberating type of feminism, but rather one that protects women only if they comply with the norm of being in a family. And this is more apparent in rural Greece, where gender norms are very strict (Λυμπεράκης, 2024). It’s only logical that women that are not exposed to liberation feminism and were never taught to seek independence but only safety, are not aware or do not report gender bias. During the interviews, when asked about who they perceive to be more affected, rural women would suggest that both genders are affected, and perhaps men are more affected than women, due to their economic damage and their loss of their role in the community and the family as providers.

## Conclusions

Natural disasters are life-threatening, destabilize the lives of individuals, and challenge social norms. They can severely affect women's lives. The factors that come into play when women perceive themselves as severely affected were studied.

**Preparedness significantly decreases impact.** The most important finding is that high preparedness levels can be associated with decreased feelings of effectiveness. In other words, preparedness does not only have positive outcomes regarding material aspects or actions when managing a natural disaster but also affects the way a woman can perceive her way of managing and affects. Other factors in turn affect preparedness as well, such as the overall attitude of women and how powerful they feel, but also how educated they are on the climate crisis. So, education on the climate crisis, amongst other things, is an important factor in increasing preparedness levels, so natural disaster management can be done more efficiently, and to decrease negative emotions.

Unsurprisingly, what occurs during the moment of the disaster is also important. Being both, trapped and evacuated can significantly increase how affected women perceive themselves, in part because being trapped in a trauma-inducing situation, where an individual feels helpless and fears for their lives, but being evacuated is also seen as a traumatic situation, because women's lives have to change so suddenly and abruptly, and they are taken away from their homes and property for days, even months, even permanently. Efficient and effective emergency response, with trained individuals and gender representation, can help reduce the severity of impacts.

Also, it would be helpful for women in positions of power, or with planning responsibilities. During the interviews, the term “invisible women” came up, when discussing how the decision to redirect the waters was taken in the village of Sotirio. The men who owned agricultural property were the ones talking and deciding, while women were sat in silence and listening. Community representation and preparedness should be on top of the priorities local governments, local communities, and the state must take into account when figuring out how to design efficient policies.

**Housing being affected is another factor that significantly increases impact.** The loss of the house, or even the short-term displacement is another factor that increases the probability of women perceiving themselves as severely affected. For every person, shelter is an important basic need, but for women, especially in rural areas, it's a big part of their world, even though it may not be their asset. If it's not their asset, they are not eligible for any government support, or even the title of “disaster-struck individual”. They might lose important items like small and big devices, kitchenware, clothes, sheets, and other fabrics, which are not recognized or accounted for by the state.

**Increased responsibilities increase strain on perceived impact.** Women who have partners and take on the role of household leads, managing and tending to the function of the house, and

who live in a house with multiple members, face increased responsibilities in the aftermath and they are more likely to perceive themselves as severely affected.

**Employment as a protective factor.** Employment helps decrease the perception of being severely affected, likely due to the resources, social networks and support systems it provides, alongside increased independence. Focusing on providing employment, or any form of social activity is important for these women. From the descriptive statistics women aged 40-50 are excellent candidates for community leaders, as they show a resilient mindset. Employment helps the feeling of power.

**Health and Mental Health implications increase impact.** When health is impacted, and especially if it is followed with inadequate medical attention, it can exacerbate the effects of the disaster. Same with mental health, where the implications are severe and lasting, and many times go without treatment. Proper care of mental and physical wounds is important to reduce impact.

**High socioeconomic status and the perception of women's vulnerability increase perceived impact.** Considering the hypothesis in the previous chapter, women who have a sense of independence and increased self-awareness are the ones who have a higher probability of perceiving themselves as affected, whereas women of rural areas with lower socioeconomic status, focus on the collective experience, often overlooking their own needs, and slipping into the role of the caregiver, on the sidelines.

# Policy Recommendations

This research was done by examining multiple factors of social and psychological factors that can make women feel more affected, in a sample comprised of solely women who were affected by two different natural disasters. A comprehensive report on the descriptive statistics and results of the survey was presented, alongside an econometric model to determine the factors. From both analyses, policy recommendations can be made.

## Disaster preparedness

Taking this research into account there is certainly a gap in **disaster preparedness** that needs to be addressed. The EU has made coordinated efforts alongside the Swedish MSB to provide guidelines for future policies that center on three key points (UCP Knowledge Network, 2024):

1. Seek participation in risk assessment procedures and coordination mechanisms from a wide range of stakeholders and demographic groups. This includes women, girls, boys, men, youth, the elderly, people with disabilities, and other minority groups in the local community, as well as government, civil society, and private actors that specialize in gender and human rights concerns.
2. Ascertain that the various needs, hazards, and vulnerabilities of various groups within an impacted community are assessed, reported on, and addressed in emergency response plans, standard operating procedures, and humanitarian scenario creation.
3. Encourage diversity and gender parity among employees and volunteers working on readiness and response projects. Make sure that all employees and volunteers understand the importance of incorporating a gender and human rights perspective into their areas of intervention, and that they utilize participative approaches as well as safety and ethics principles in their work.

There needs to be strengthening in legislation, with a gender approach. Women's experiences and points of view should be heard throughout disaster planning, preparedness, and in matters concerning the aftermath. Germany has made strides in this by incorporating women in decision-making in its National Action Plan on Energy Efficiency. (National Voluntary Report Germany, 2015).

The Greek Ministry of Civil Protection should take these matters well into account when designing policy, and also, acknowledge the knowledge gap its citizens have on actions to take when faced with various natural disasters.



## Employment and Psychological Support

Under European funds such as PowerEU and the ESF green transition and digitalization programs are given substantial funding. On the Commission's semester report on the progress Greece is making regarding the Recovery and Resilience plan, the will to increase funding for upskilling, and battling unemployment is reported. There is also an extended account of the funding available for digitalization and battling urban and rural inequalities that exist heavily in Greece. (Country Report, 2024)

With that being said, there is a substantial amount of funds that can be leveraged to upskill women or provide economic and technical assistance in order to strengthen economic independence. These programs can be designed by NGOs already working on gender matters or by local governance, with state help.

Psychological support is also a program that should be considered, especially in the wake of natural disasters, to strengthen the effects economic independence will have.

## Informal Caregiving and community support

Women tend to be informal caregivers, and as we saw with the results of this research, they don't only have to care about children but also the elderly. This means that policies should be in place to assist the women who are already stressed. From community-organized children-watching to state nurses, it's important to keep advocating for this kind of support. And it's also important the local government sees out to it.

Challenging social norms and helping lift the weight that is holding women back from independence should also be a top priority when discussing policy. Women not only are held back but due to strict traditional norms don't even realize it. The least that can be offered is a choice, especially with how many women expressed in the descriptive statistics the need to do more things for themselves (71%, Figure 33 - Which of the following sentiments resonate with you?Figure 333).

## Future research

It would be worthwhile to discuss future research, by including men in the sample. A preliminary profile of how women perceive themselves as affected based on social, economic, and psychological factors was painted by this thesis, working on some hypotheses and having some insightful results. But this thesis cannot identify gender biases, due to men not being included as a control group. It can only shed some light in depth on women's factors.

It surely would be interesting to investigate men's factors as well. Because there is existing literature to hint at the disparities between genders when dealing with these disasters, men suffer as well, and in different manners, which can give insights into different policy measures for each gender, based on their needs.

While conducting the qualitative part of this thesis, I interviewed women who recognized gender bias and women who didn't recognize it as well. Specifically, one interviewee, from a very small agricultural village that was flooded in the Thessaly region (around <500 residents) disclosed that she was able to get an education growing up, and while she was back in the village helping around in the family agricultural units, and looking after the elderly in her family, she could also easily move to a nearby town and be employed, or find alternative jobs around the village. Her male counterpart, on the other hand, could not. He was not educated, and spent his life around agriculture, as were the norms for men. With the hit the agricultural sector took during this disaster, fields will not be ready for cultivation for 2-3 years, during that time, options for employment are limited, usually manual jobs working in factories, which takes a toll on a man's self-worth to provide for his family and independence.

This in turn does not only harm economic stability but also mental health. Men's mental health is truly overlooked, which can lead to higher numbers of suicides, due to the existing patriarchal stereotypes that a man can't be vulnerable or open, and also worsen the existing gender gap, with men becoming more aggressive due to this emotional bottling up, which can lead to increased violence, not only against women, but towards men as well.

These small effects should be examined in depth, to come up with effective policies, or increased understanding for community building to lessen the negative effects of future disasters. And that's the only certain part, that there will be more future disasters.

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