



**UNIVERSITY  
OF CRETE**

## **Empowering Resilience: Community-Based Exercises for Adolescent Preparedness in Climate-Related Disasters**

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# THEORETICAL MODEL

*Resilience is a multisystem process*



*When adolescents are supported by trusted adults, clear communication, practical exercises, and emotional regulation skills, they experience less anxiety, make better decisions, act effectively, and contribute to stronger, more resilient communities.*



**REFERENCES:** Kivi et al. (2023); Masten & Motti-Stefanidi (2021); Kohli et al. (2025); Dimitropoulou et al. (n.d.).

# WHY FOCUS ON ADOLESCENTS?

*Adolescents are not only vulnerable—  
they are resilience builders.*

## TRADITIONAL VIEW

Children need  
protection during  
disasters.



## CURRENT EVIDENCE (2021–2025)

- ✓ Adolescents actively contribute to preparedness.
- ✓ They influence peers, families and communities.
- ✓ Schools provide an ideal setting for building resilience.
- ✓ Preparedness is a developmental opportunity.



## TAKE-HOME MESSAGE

Adolescents are active agents of resilience rather than  
passive recipients of protection.



**REFERENCES:** Bessaha et al. (2021); Kivi et al. (2023); Zahri et al. (2025); Fu & Zhang (2024).

# COMMUNITY-BASED EXERCISES (CBEx)

*Innovative participatory method to strengthen public preparedness and resilience across all phases of disaster risk management*



**BASED ON EXERCISE-CYCLE STANDARDS**  
Designed using exercise-cycle standards, adapted for non-professional audiences.



**INCLUSIVE & PARTICIPATORY**  
Citizen-focused exercises that bring communities together.



**HOLISTIC APPROACH**  
Addresses psychological, social and organisational aspects.



**STRONGER TOGETHER**  
Building safer, more resilient communities for the future.

# WHY COMMUNITY-BASED EXERCISES (CBEx)?

*CBEx promotes resilience through:*



**Preparedness is not only learning what to do—  
it is learning to remain calm, trust others and act together.**



**REFERENCES:** Zahri et al. (2025); Orengo-Aguayo et al. (2024); Kivi et al. (2023); James et al. (2020).



# MAESTRO at a Glance

- ❑ Integrated Crisis & Incident Management Platform
- ❑ Real-Time Situational Awareness Across Agencies
- ❑ From Early Warning to Field Operations
- ❑ Built for Authorities, Responders & Communities
- ❑ Turning Data into Coordinated Action

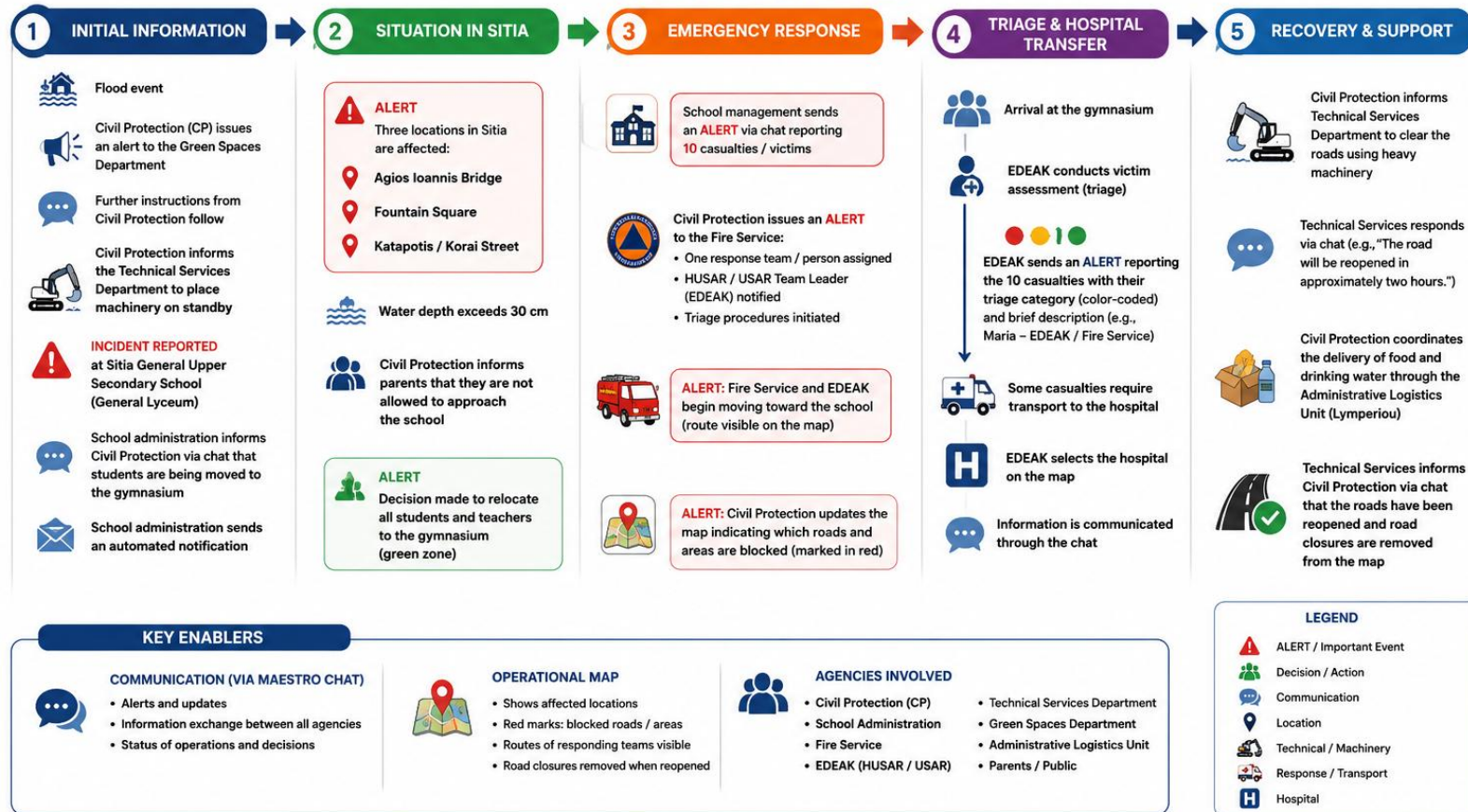


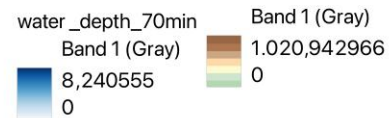
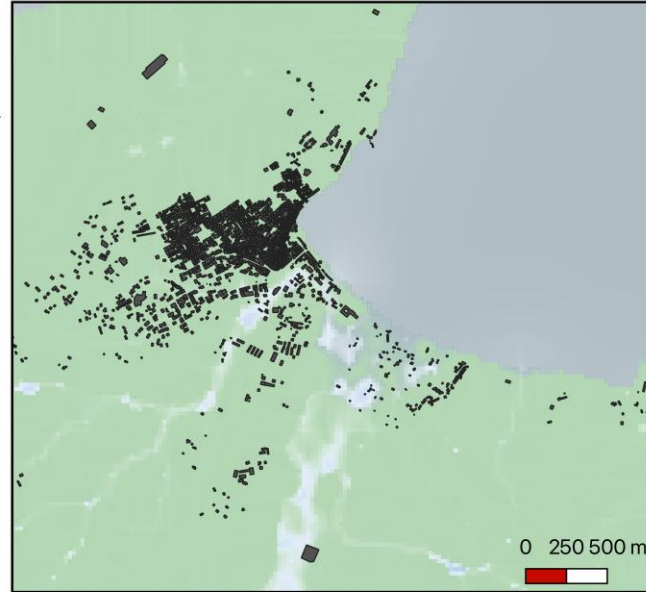
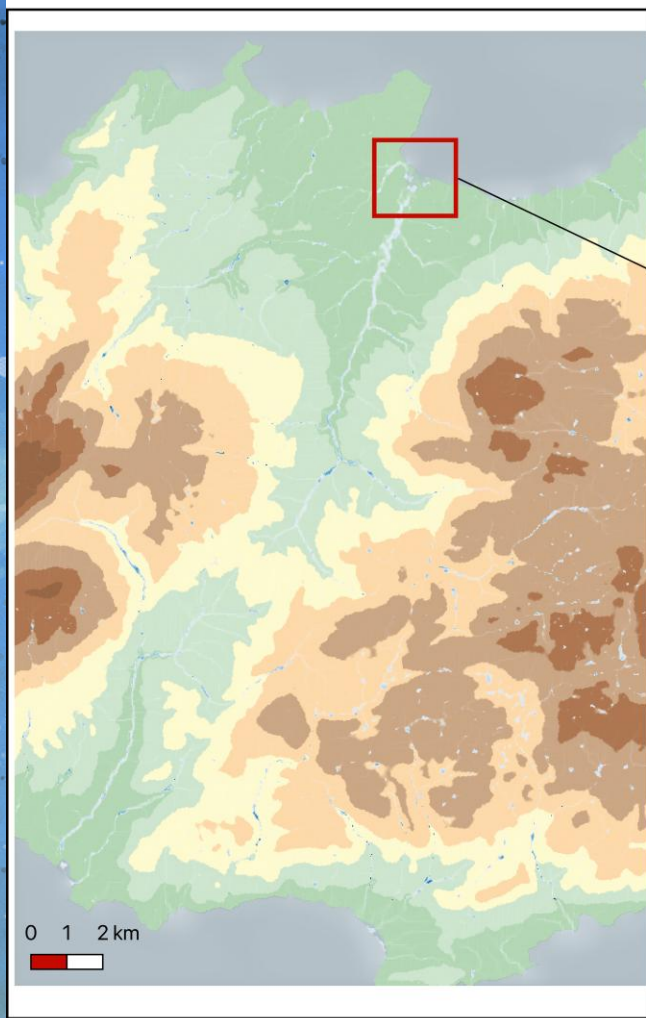
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*MAESTRO is the next-generation C2I solution that empowers homeland security agencies, and civil protection teams with real-time operational awareness, mission coordination, and decision superiority.*

# MAESTRO SCHOOL FLOOD SCENARIO – SITIA

## Operational Workflow

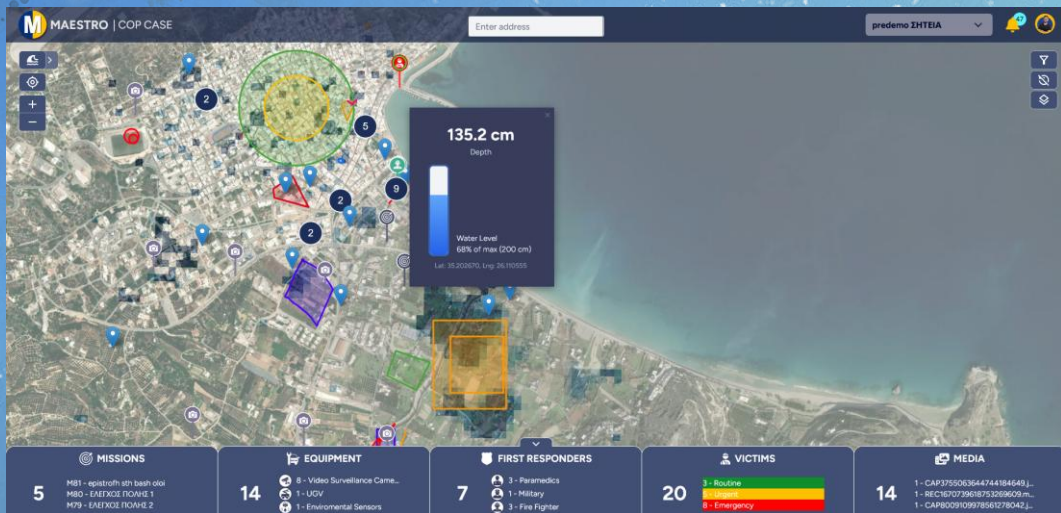
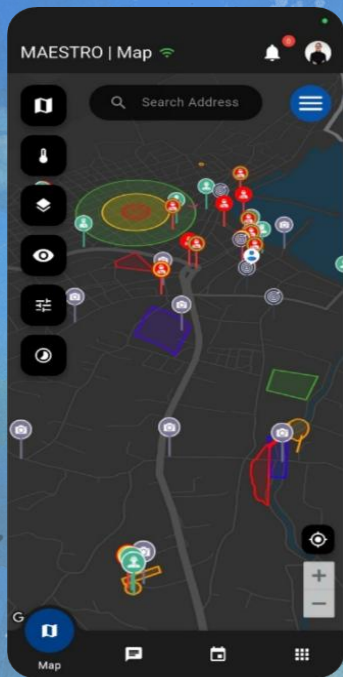






# Flood Simulation

## Mobile App



## Sitia, Crete Demo

## Command and Control





## STUDENT QUESTIONNAIRE – GENERAL HIGH SCHOOL OF SITIA (AGES 15–18)

### A. TO BE COMPLETED BEFORE THE EXERCISE (PART A)

First, some questions to create a profile of the participant

1. What is your age?

☐ 15 ☐ 16 ☐ 17 ☐ 18 ☐ Other

2. What grade are you in?

☐ 1st Grade (A' Lykeiou) ☐ 2nd Grade (B' Lykeiou) ☐ 3rd Grade (G' Lykeiou)

The following questions relate to your previous education in Civil Protection topics.

3. Do you consider that you have been trained in the following areas? (More than one answer is allowed)

- A. ☐ First aid  
B. ☐ Fire protection / preparedness  
C. ☐ Earthquake protection / preparedness  
D. ☐ Flood protection / preparedness  
E. ☐ Other natural hazards  
F. ☐ No training  
G. ☐ I have been trained, but I do not remember

4. Where did your training take place? (Select all that apply)

- A. ☐ From your school teachers  
B. ☐ From official Civil Protection authorities  
C. ☐ From volunteer rescuers  
D. ☐ On your own initiative at an external training organization  
E. ☐ From the Fire Service / Police / Ambulance (EKAB)

5. During your free time, how much time do you spend each month being informed about actions during natural phenomena?

- A. ☐ Approximately 1–4 hours  
B. ☐ Approximately 5–10 hours  
C. ☐ More than 10 hours  
D. ☐ None at all

6. Which event worries you the most?

(Please rate from 01 (Not at all) to 05 (Quite a lot))

| Event                        | 01 (Not at all) | 02 | 03 | 04 | 05 (Quite a lot) |
|------------------------------|-----------------|----|----|----|------------------|
| Earthquake                   |                 |    |    |    |                  |
| Fire                         |                 |    |    |    |                  |
| Flood                        |                 |    |    |    |                  |
| Storm                        |                 |    |    |    |                  |
| Landslides                   |                 |    |    |    |                  |
| Incident with injured people |                 |    |    |    |                  |

7. Have you experienced any of the following incidents in the past? (Select all that apply)

- A. ☐ Earthquake  
B. ☐ Floods  
C. ☐ Traffic accident  
D. ☐ Fire  
E. ☐ Landslides  
F. ☐ No incident

8. If you answered Question 7, what feelings did you experience? (Select all that apply)

- ☐ I felt tension  
☐ I felt anxiety  
☐ I knew exactly what to do  
☐ I had support from an adult (parents/relatives/teachers)  
☐ I still remember the incident with stress

How do you feel when you see someone in uniform (e.g., rescuer, police)?

\_\_\_\_\_

9. In the past, have you participated in drills with your school?

- A. ☐ NO  
B. ☐ YES

If your answer is YES, do you think that: (Select all that apply)

- ☐ Drills are effective and enhance your training  
☐ Drills do not have any effect  
☐ Drills should be conducted more frequently  
☐ Drills lack realism  
☐ Drills should be conducted after prior information

### During drills or an incident

10. Is it allowed to keep mobile phones in the classroom?

- A. ☐ YES B. ☐ NO

11. Do you consider that mobile phones are an important means of information about an incident and for communication/information?

- A. ☐ YES B. ☐ NO

## STUDENT QUESTIONNAIRE – GENERAL HIGH SCHOOL OF SITIA (AGES 15–18)

### A. TO BE COMPLETED BEFORE THE EXERCISE (PART A) – CONTINUED

12. Please read the statements below and indicate your answer.

|                                                                 | Always true | Some-times | Never |                                                           | Always true | Some-times | Never |
|-----------------------------------------------------------------|-------------|------------|-------|-----------------------------------------------------------|-------------|------------|-------|
| The school bell in an incident makes me anxious.                |             |            |       | I get disoriented in situations with many people.         |             |            |       |
| Teachers, as first responders, guide us in the incident.        |             |            |       | In the event of an incident, I think about my loved ones. |             |            |       |
| The instructions given by teachers/rescuers are understandable. |             |            |       | I feel safer when I have my mobile phone with me.         |             |            |       |
| Injured people scare me.                                        |             |            |       | I would have more self-confidence if I had more training. |             |            |       |
| I "freeze" during an incident.                                  |             |            |       | I believe more drills are required at school.             |             |            |       |
| I cannot act in situations of pressure.                         |             |            |       |                                                           |             |            |       |

13. Read each statement and select how much it applies to you.

|                                                       | Does not apply at all | Applies a little | Applies a lot |                                              | Does not apply at all | Applies a little | Applies a lot |
|-------------------------------------------------------|-----------------------|------------------|---------------|----------------------------------------------|-----------------------|------------------|---------------|
| I often feel sad or worried.                          |                       |                  |               | I follow rules – I do what I am asked to do. |                       |                  |               |
| I have difficulty concentrating in class.             |                       |                  |               | People my age like me.                       |                       |                  |               |
| I try to help others when they are in need.           |                       |                  |               | I am good with younger children.             |                       |                  |               |
| I get angry easily and have difficulty calming down.  |                       |                  |               | I get along better with adults.              |                       |                  |               |
| I have few or no close friends.                       |                       |                  |               | I have many fears, I get scared easily.      |                       |                  |               |
| I worry about events that might happen (e.g., flood). |                       |                  |               | I can control my behavior when I'm angry.    |                       |                  |               |
| I feel nervous in new situations.                     |                       |                  |               | I think before I do something.               |                       |                  |               |

# FROM PREPAREDNESS TO RESILIENCE: WHAT WE MEASURED



**During Drills or  
an Incident  
(QUESTION 12)**

- Operational preparedness
- Communication
- Trust
- Safety perception
- Ability to act



**Personal Feelings &  
Social Skills  
(QUESTION 13)**

- Emotional well-being
- Self-regulation
- Prosocial behaviour
- Social connectedness
- Peer relationships



**TOGETHER THEY DESCRIBE  
ADOLESCENT DISASTER RESILIENCE**



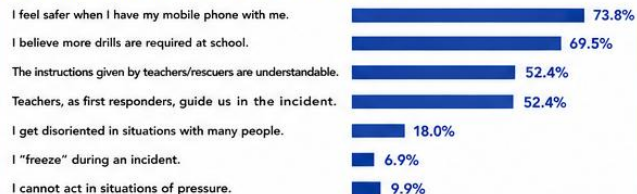
**REFERENCES:** Dimitropoulou et al. (n.d.); Zahri et al. (2025); Kohli et al. (2025).

# ADVANCED STATISTICAL ANALYSIS – QUESTIONS 12 & 13

(N = 233 students)

## QUESTION 12 – DURING DRILLS OR AN INCIDENT

### A. OVERALL PATTERNS (Percent who answered "Always True")



Students feel safer with mobile phones and ask for more drills, but many experience anxiety, confusion and feel unable to act under pressure.

### B. DISTRIBUTION ACROSS THE RESPONSE SCALE (%)

|                                          | Always True | Sometimes True | Never | Mean (1–3) | SD   | Top-2 Box (Always+Sometimes) |
|------------------------------------------|-------------|----------------|-------|------------|------|------------------------------|
| The school bell makes me anxious.        | 11.2        | 36.1           | 40.1  | 1.71       | 0.78 | 47.3%                        |
| Teachers guide us in the incident.       | 52.4        | 29.2           | 5.6   | 2.47       | 0.63 | 81.6%                        |
| Instructions are understandable.         | 53.2        | 27.5           | 6.0   | 2.47       | 0.65 | 80.7%                        |
| Injured people scare me.                 | 30.9        | 33.5           | 22.3  | 2.09       | 0.82 | 64.4%                        |
| I "freeze" during an incident.           | 6.9         | 29.2           | 50.9  | 1.56       | 0.75 | 36.1%                        |
| I cannot act under pressure.             | 9.9         | 32.3           | 44.8  | 1.65       | 0.78 | 42.2%                        |
| Disoriented in crowds.                   | 18.0        | 36.1           | 32.6  | 1.85       | 0.78 | 54.1%                        |
| Safer with mobile phone.                 | 73.8        | 9.4            | 3.4   | 2.70       | 0.54 | 83.2%                        |
| More self-confidence with more training. | 55.4        | 22.3           | 9.0   | 2.46       | 0.72 | 77.7%                        |
| More drills are required at school.      | 69.5        | 14.2           | 2.1   | 2.67       | 0.53 | 83.7%                        |

### C. KEY CORRELATIONS (Spearman's $\rho$ )

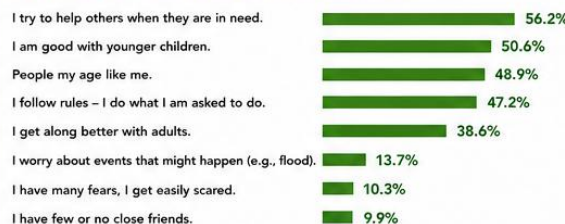
|                                 | 1       | 2       | 3       | 4       | 5       | 6       | 7 |
|---------------------------------|---------|---------|---------|---------|---------|---------|---|
| 1. Trust in teachers (guide)    | –       |         |         |         |         |         |   |
| 2. Instructions understandable  | 0.62**  | –       |         |         |         |         |   |
| 3. Feel safer with mobile phone | 0.31**  | 0.28**  | –       |         |         |         |   |
| 4. Disoriented in crowds        | -0.41** | -0.38** | -0.26** | –       |         |         |   |
| 5. I "freeze" during incident   | -0.48** | -0.45** | -0.29** | 0.63**  | –       |         |   |
| 6. Cannot act under pressure    | -0.52** | -0.46** | -0.30** | 0.61**  | 0.72**  | –       |   |
| 7. More drills required         | 0.35**  | 0.30**  | 0.22**  | -0.25** | -0.30** | -0.28** | – |

**Interpretation**  
Greater trust in teachers and clear instructions are strongly linked to lower confusion, less "freezing" and greater ability to act under pressure. Students who feel safer, also ask for more drills.

\*\*  $p < .01$

## QUESTION 13 – PERSONAL FEELINGS & SOCIAL SKILLS

### A. OVERALL PATTERNS (Percent who answered "Applies a lot")



Students show prosocial behavior and rule-following, but many report worries and emotional difficulties, with a notable lack of close friendships.

### B. DISTRIBUTION ACROSS THE RESPONSE SCALE (%)

|                                                      | Does not apply at all | Applies a little | Applies a lot | Mean (1–3) | SD   | Top-2 Box (Little + A lot) |
|------------------------------------------------------|-----------------------|------------------|---------------|------------|------|----------------------------|
| I often feel sad or worried.                         | 28.0                  | 42.9             | 13.7          | 1.86       | 0.74 | 55.8%                      |
| I have difficulty concentrating in class.            | 21.5                  | 42.9             | 20.2          | 1.99       | 0.71 | 63.1%                      |
| I try to help others in need.                        | 6.9                   | 21.0             | 56.2          | 2.49       | 0.66 | 77.3%                      |
| I get angry easily and have difficulty calming down. | 23.2                  | 39.9             | 21.0          | 1.98       | 0.74 | 60.9%                      |
| I have few or no close friends.                      | 59.9                  | 15.5             | 9.9           | 1.51       | 0.74 | 25.4%                      |
| I worry about events (e.g., flood).                  | 20.6                  | 50.6             | 13.7          | 1.93       | 0.66 | 64.3%                      |
| I feel nervous in new situations.                    | 31.3                  | 37.3             | 15.9          | 1.85       | 0.77 | 53.2%                      |

### C. KEY CORRELATIONS (Spearman's $\rho$ )

|                               | 1       | 2       | 3       | 4       | 5      | 6      | 7      | 8 |
|-------------------------------|---------|---------|---------|---------|--------|--------|--------|---|
| 1. Helping others             | –       |         |         |         |        |        |        |   |
| 2. Follow rules               | 0.41**  | –       |         |         |        |        |        |   |
| 3. Liked by peers             | 0.38**  | 0.36**  | –       |         |        |        |        |   |
| 4. Good with younger children | 0.34**  | 0.30**  | 0.41**  | –       |        |        |        |   |
| 5. Many fears                 | -0.33** | -0.28** | -0.35** | -0.26** | –      |        |        |   |
| 6. Sad or worried             | -0.29** | -0.22** | -0.33** | -0.29** | 0.54** | –      |        |   |
| 7. Difficulties concentrating | -0.26** | -0.19*  | -0.28** | -0.22** | 0.48** | 0.63** | –      |   |
| 8. Few or no close friends    | -0.47** | -0.38** | -0.22** | -0.41** | 0.42** | 0.49** | 0.44** | – |

\*  $p < .05$ , \*\*  $p < .01$

**Interpretation**  
Helping behavior, rule-following and positive relationships are interconnected and linked with lower worry, fewer fears and better concentration. Lack of close friendships is strongly related to more emotional difficulties.

# SITIA FLOOD PREPAREDNESS EXERCISE – STUDENT QUESTIONNAIRE (AGES 15–18)

## OVERALL KEY TAKEAWAYS (QUESTIONS 12 & 13)

### OVERALL KEY TAKEAWAYS



#### **Students trust and rely on adults, especially teachers.**

More than half trust teachers to guide and instruct them effectively during incidents. Clear, understandable instructions from teachers are highly valued.



#### **Mobile phones increase feelings of safety, but school policies restrict their use.**

A large majority feel safer when they have their mobile phone with them, yet most are not allowed to keep it in the classroom.



#### **Students want more and more realistic drills and training.**

Most believe more drills are needed at school and that additional training would increase their self-confidence and preparedness.



#### **Anxiety, fear and confusion are common during incidents.**

Many students feel anxious because of the school bell and “freeze” during an incident. A significant proportion get disoriented in crowded situations or cannot act under pressure.



#### **Students show strong prosocial behavior and positive social relationships.**

Most try to help others, follow rules, and get along well with peers, younger children and adults. These are important protective factors that can support crisis management.



#### **Emotional well-being and social connectedness need attention.**

High levels of worry, sadness and fears are reported, and more than half have few or no close friends. Emotional self-regulation skills can be improved for many students.



#### **Effective communication and realistic preparation are essential.**

Clear procedures, realistic scenarios, timely information and communication with first responders are crucial to reduce anxiety and increase students’ sense of control and safety.

### IN SUMMARY



Students demonstrate **positive attitudes** towards preparedness: they trust adults, want more training, and are willing to help and follow rules. At the same time, they experience **considerable anxiety, confusion and emotional difficulties**, and many lack close friendships. Strengthening realistic drills, emotional support, social connectedness and clear communication will help students feel **safer, more confident and better prepared** for emergencies.

# CONCEPTUAL INTERPRETATION

*A relational and multisystem process*



Our findings support recent resilience literature showing that preparedness is a relational process.



Students who **trust** adults, **understand** instructions, **feel socially connected**, and **regulate their emotions** are more likely to **remain calm** and **respond effectively** during disasters.



Trust + clarity  
→ less anxiety



Peer connection  
→ less worry



Emotional regulation  
→ better control



More drills →  
greater self-confidence



**Stronger Adolescent  
Disaster Resilience**



**REFERENCES:** Dimitropoulou et al. (n.d.); Kivi et al. (2023);  
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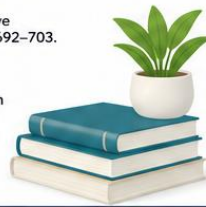
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These studies highlight the importance of trust, social connection, emotional regulation, education, and community-based approaches in strengthening adolescents' resilience during disasters and climate-related crises.



# Thank You!



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