

# An Integrated Approach to Child Care Earthquake Preparedness through “Telemachus” Project

A. Kourou, S. Kyriakopoulos, N. Anyfanti

**Abstract**—A lot of children under the age of five spend their daytime hours away from their home, in a kindergarten. Caring for children is a serious subject, and their safety in case of earthquake is the first priority. Being aware of earthquakes helps to prioritize the needs and take the appropriate actions to limit the effects. Earthquakes occurring anywhere at any time require emergency planning. Earthquake planning is a cooperative effort and childcare providers have unique roles and responsibilities. Greece has high seismicity and Ionian Islands Region has the highest seismic activity of the country. Earthquake Planning and Protection Organization (EPPO) is a national organization in Greece. The mission of EPPO is the seismic risk reduction by designing an earthquake management program of mitigation and preparedness. Among other actions EPPO has analyzed the needs and requirements of kindergartens on earthquake protection issues and has designed specific activities to familiarize the day care centers staff being prepared for earthquakes. This research presents the results of a survey that detects the level of earthquake preparedness of kindergartens in all over the country and Ionian Islands too. A closed-form questionnaire of 20 main questions was developed for the survey in order to detect the aspects of participants concerning the earthquake preparedness actions at individual, family and day care environment level. 2668 questionnaires were gathered from March 2014 to May 2019, and analyzed by EPPO's Department of Education. Moreover, this paper presents the EPPO's educational activities targeted to the Ionian Islands Region that implemented in the framework of “Telemachus” Project. To provide safe environment for children to learn, and staff to work is the foremost goal of any State, community and kindergarten. This project is funded under the Priority Axis “Environmental Protection and Sustainable Development” of Operational Plan “Ionian Islands 2014-2020”. It is increasingly accepted that emergency preparedness should be thought of as an ongoing process rather than a one-time activity. Creating an earthquake safe daycare environment that facilitates learning is a challenging task. Training, drills, and update of emergency plan should take place throughout the year at kindergartens to identify any gaps and to ensure the emergency procedures. EPPO will continue to work closely with regional and local authorities to actively address the needs of children and kindergartens before, during and after earthquakes.

**Keywords**—Child care centers, education on earthquake issues, emergency planning, Ionian Islands Region of Greece, kindergartens, preparedness.

## I. INTRODUCTION

WORLDWIDE, one of the challenges is to better understand the incentives for disaster risk reduction.

Dr A. Kourou is with the Earthquake Planning and Protection Organization, Athens, 15451 Greece (e-mail: akourou@oasp.gr).

S. Kyriakopoulos and N. Anyfanti are students at Faculty of Geology and Geoenvironment of the National and Kapodistrian University of Athens, Greece (e-mail: spiliotis377@gmail.com).

Earthquakes are felt by people somewhere on the globe just about hourly. In the last decades, international commitments to disaster risk reduction were made, mainly targeted to development policy and planning. The possibility of a hazard to become a disaster is related to the vulnerability of the individuals and agencies and the ability to respond effectively [1]. The level of vulnerability an individual or a community depends on mitigation and preparedness actions that have been taken. Children consist of approximately 25% of the population and they are often most vulnerable and therefore the worst affected.

Child development in the early years is critical for overall human development and depends on effective care, stable and loving relationships, and adequate stimulation [2]. The child center-based services have a variety of different structures, philosophies and affiliations, and are known by many different names such as, early learning centers, childcare centers, kindergartens, preschools, etc. It is very important for states, local agencies and families, the child care centers to be adequately prepared for disasters. An emergency could happen anywhere and at any time. Thus, emergencies and disasters could happen during the pre-school day.

Kindergartens are places of learning and support and have an important role to play in helping children in case of emergency, such as an earthquake. One critical consideration is that to be disasters-aware and prepared has a lot of benefits for community and family level too. At this point of view the role of children in the FEMA strategy for Disaster Risk Reduction is defined such as:

- “Children are positive influencers and can effectively bring the message of disaster preparedness to their families.
- Children can become leaders. The care centers preparedness programs can empower the children to become leaders at home and local community.
- Children who are prepared are more confident in case of disaster” [3].

Greece is prone to various disasters, most notably the earthquakes. State has taken a proactive approach to disaster risk reduction, particularly at the national/regional level. Based on this, the overarching policy objective is to support institutional structures and promote the necessity of planning. Educational methods and awareness approaches help decision makers, planners and specific target groups involved in developing, approving, and implementing earthquake-related measures in public and private sectors to adopt structured processes for planning and risk management activities.

In Greece the coverage of children in preschool education

and care is free of charge in public kindergartens for those parents that work. The majority of public ones are under the supervision of Municipalities. There are fewer private kindergartens as well. Concerning the awareness of educators

and support staff in child care environments, it should be mentioned that they are often insufficiently trained for emergencies.

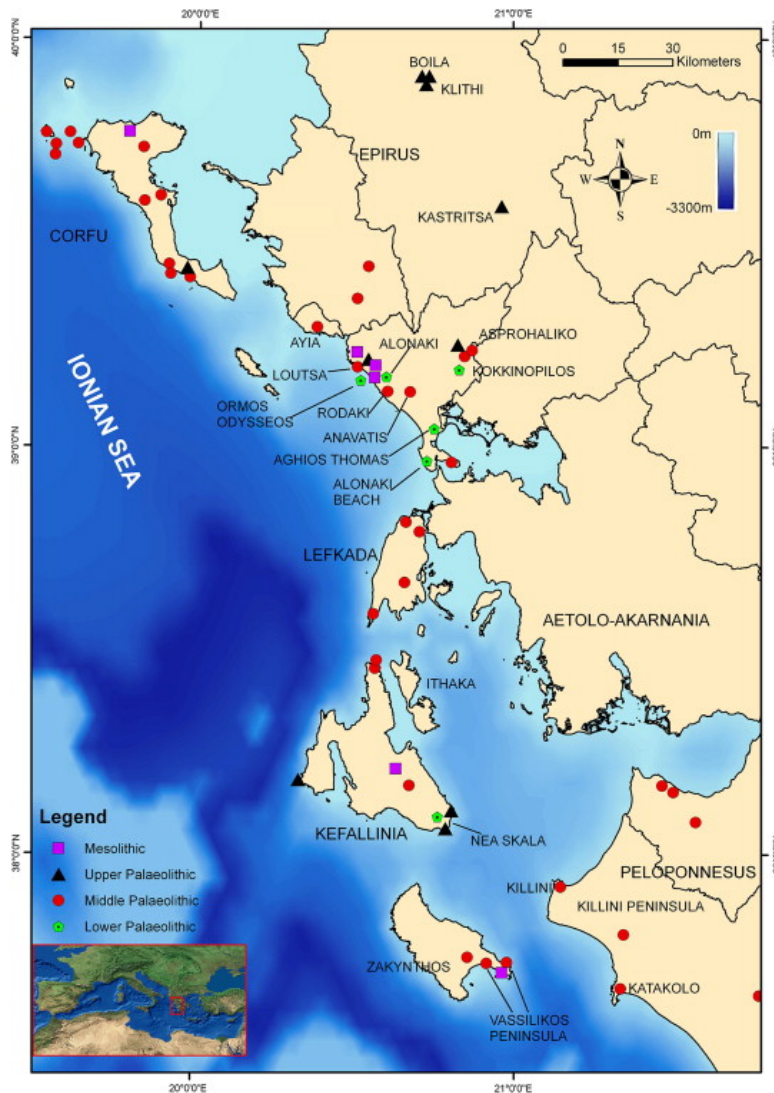


Fig. 1 The seismicity of Ionian Islands

EPPO is a National Organization and the competent authority in Greece to process and design the national policy on earthquake protection issues [4]. EPPO uses a lot of educational methods to train the population on effective decision-making and emergency management at workplaces issues. Key mitigation activities are EPPO's Earthquake Awareness Initiatives for different target groups. One of these Initiatives is focused on the unique needs of child care centers. More specifically, in the last five years EPPO and Municipalities worked hand in hand to support one another's efforts, building earthquake preparedness culture at child care centers. The seismic risk reduction efforts rarely show quick or highly visible results, so EPPO in regular basis implements

seminars and develops specific training material for child care environments. A primary goal of EPPO Earthquake Initiative is to develop early childhood programs that enforce kindergartens' preparedness and support children's healthy growth. It reflects the EPPO increasing priority accords to seismic risk management, because the child care centers are critical human services needed to protect the safety of children in case of earthquake and support the stabilization of families after the disaster. It is an ongoing work to develop, evaluate and update the abovementioned Initiative that has three main axes:

- a. Development of Emergency Plan Template. In 2017 EPPO prepared and published a Handbook on Child Care

Centers Earthquake Emergency Planning. This Handbook is written for teachers and support staff of kindergartens. It has been revised in 2019 and outlines the roles and responsibilities of personnel to support the children in case of earthquake. The overall goal of the Handbook is to reduce the risk of injury, loss, and destruction for children and staff [5].

- b. Implementation of training courses at prefecture or municipality level, in order to be appropriately educated and trained the kindergartens' staff on earthquake planning issues. The aim of these courses is increasing the participants' knowledge and understanding of the disaster phenomenon and to ensure skills and ability to design, implement and evaluate actions on disasters' management at kindergartens.
- c. Publication of Educational Material addressed to teachers and children (leaflets, posters, educational kit) to provide with the necessary knowledge on earthquake issues.

Besides the above-mentioned educational actions, EPPO participates to "Telemachus" Project as well. The aim of this paper is providing more effective mechanisms on earthquake management by integrating disaster preparedness measures in the Ionian Islands Region.

The Ionian Islands are a group of many small islands and seven principal ones in Greece that are very popular tourist destinations. These Islands constitute one of the 13 Greek Regions most affected by natural disasters, mainly by earthquakes (Fig. 1). The most disastrous earthquake of Ionian Region the last seven decades is the Great Kefallonia Earthquake. This earthquake struck the southern Ionian Islands in Greece on August 12, 1953. Hundreds of people were killed. Widespread damage has been caused in the buildings of Kefallonia and Zakynthos.

## II. OBJECTIVE-METHODOLOGY

The basic objectives of this paper are to investigate the earthquake risk perception of kindergartens' personnel and their level of earthquake preparedness both at family and workplace. A structured, closed-form anonymous questionnaire was developed for the survey to assess: a) the knowledge of self-protection actions in case of earthquake; b) the self-protective behavior during previous experience with earthquakes; c) the existence of emergency planning at home and workplace; d) the responders' earthquake risk perceptions.

As part of the study, 2668 questionnaires have been answered by staff of kindergartens, mainly public ones, from all over the country during 65 seminars. As well, 93 questionnaires have been answered by personnel of the above-mentioned centers in Ionian Islands. The data were collected and analyzed from March 2014 to May 2019. The questionnaire was distributed during the training program "Seismic Risk Management at Child Care Centers" that was implemented by the Education Department of EPPO. The aim of this project is to help the staff to have a common understanding on seismic risk and to acquire the needed personnel skills on seismic risk management.

The participants of the survey were from 25 to 65 years old, from 29 Municipalities of Attica Region and from 31 populous Municipalities of other regions of the country. The responders of the survey filled in the questionnaire voluntarily before the beginning of EPPO seminars.

## III. RESULTS

### A. Knowledge of Earthquake Protection Measures

According to the results, the significant majority of the responders reported having experience of an earthquake which is quite normal because Greece is ranked first in terms of seismicity in Europe and sixth worldwide. It is noticed that despite the fact that most people in Greece have experienced of earthquakes, only a relatively small portion of them (about 1/3) claimed that have experienced earthquake at work, see Fig. 2.

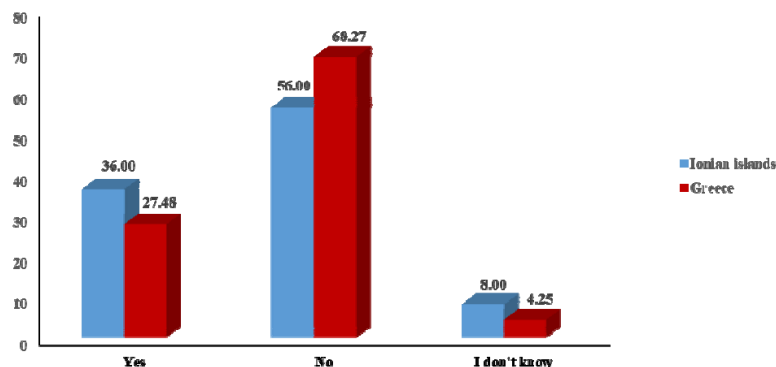


Fig. 2 Have you ever experienced earthquake at workplace? (%)

Concerning participants' personal perception on their knowledge on earthquake self-protection measures, it is worth

noting that the kindergartens' staff in Ionian Islands seems to be more familiar with the proper actions than the other

workers, as shown in Fig. 3. Additionally, the protective actions during an earthquake were assessed through a multiple-choice question. Several behavior options were presented: a) cover under an interior door frame in a reinforced concrete building; b) drop to the ground, cover the head and neck with the arms; c) exit outside; d) go to the closest window to see outside; e) take cover under a table; f) stay still; g) move to another room with a table.

The survey's results concerning the protection measures during the earthquake show that there is not a sufficient deviation between the answers in Ionian Islands and other regions of the country. More specifically, the majority of responders (91.40% and 88.98%) were reported being familiar with the “drop, cover under a table and hold on” in case of an earthquake, while a very big percentage (75.27% and 73.84%) is familiar with the “drop to the ground, cover the head and neck with arms”, see Fig. 4.

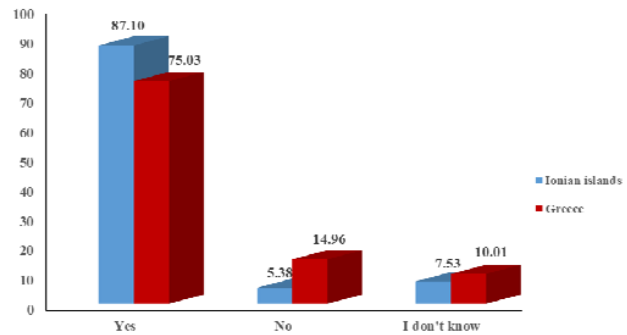


Fig. 3 Are you familiar with the earthquake self-protection measures? (%)

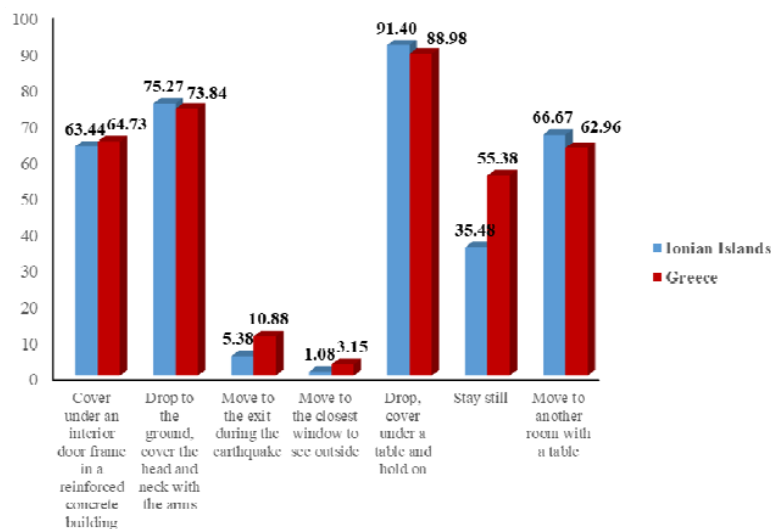


Fig. 4 Which are the recommended proper self-protection actions during an earthquake? (%)

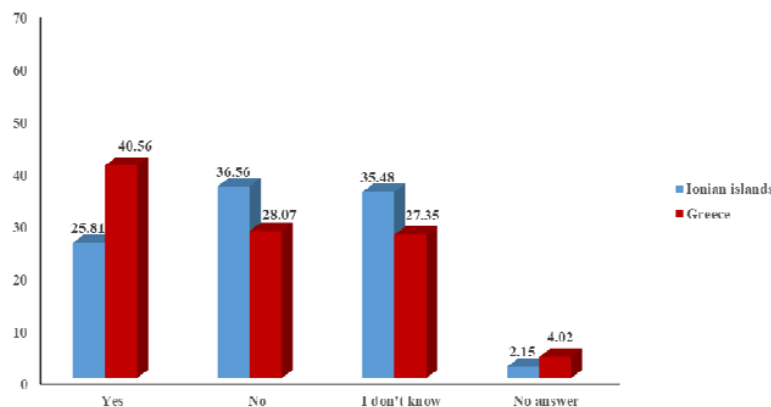


Fig. 5 Does your workplace have an earthquake plan? (%)

#### B. Earthquake Planning at Kindergartens

As societies have been developed and knowledge about seismic events has been improved over the years, the task of

engaging governmental authorities and communities to reduce risk and vulnerability of specific target groups has made variable progress. The last years, the communities have been

moved towards a “culture of risk prevention”, meaning that the focus of activities has moved from response and recovery towards prevention and mitigation [6]. Child care centers need to develop their own earthquake plan to deal with a strong event that occurs, so that the staff will know how to react appropriately, in time. Regarding the emergency planning at responders' workplace, results collected are not very promising, as shown in Fig. 5.

Concerning the existence of earthquake emergency plan at kindergartens, it is noticed that only the 25.81% in Ionian Islands replied affirmatively, while the 36.56% choose the “no answer” and the 35.48% the “I don't know” option. On the other hand, the 40.56% of kindergartens' staff of the other regions of Greece choose the option “yes”. The abovementioned results are not compatible with the existing legal framework. It is well known that according to the Hellenic and European legal framework the workplace's emergency planning is mandatory [7], [8].

Preventive Measures at Workplace	Ionian Islands (%)	Greece (%)
Fasten tall and heavy furniture on the wall	61.29	71.49
Place heavy objects at low shelves	72.04	81.94
Storage of flammable and dangerous substances in closed cabinets	73.12	79.34
Provision of Emergency Supplies	24.73	36.57
Existence of emergency lighting and proper signs indoors	23.66	33.05
Identification of potential hazards	27.96	33.50
Posting the evacuation plan in each work area	13.98	29.44
Training of staff on first aid issues and on fire extinguishers' use	55.91	57.87
Information of parents on kindergarten emergency planning	37.63	26.70

Fig. 6 Earthquake Preventive Measures at Kindergartens

The adoption of necessary preventive measures is of fundamental importance in order to eliminate or reduce the hazards. The specific measures listed above must be applied by the employer to the safety and health of workers, as shown in Fig. 6. To effectively manage risks, the employer must regularly control the efficiency of measures and procedures at workplace. It is worth mentioning the majority of responders claimed that the evacuation plan has not been posted in their workplace areas.

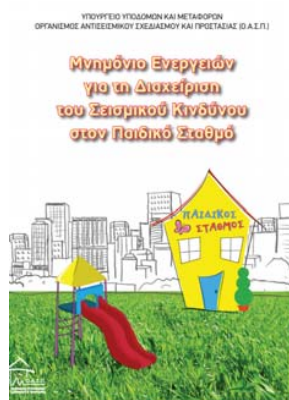


Fig. 7 EPPO's Handbook on Child Care Centers Earthquake Planning

As already mentioned, EPPO has developed a Handbook on Child Care Centers Earthquake Planning in order to build a

disaster safety culture, see Fig. 7. The aim of the Handbook is to help child care centers to comply with national regulations, to ensure that all staff has a common understanding on seismic risk reduction, and to empower kindergartens to improve their preparedness through a collaborative approach.

The earthquake plan identifying 'who', 'what', and 'when' in relation to needs and requirements of specific target groups should be undertaken each year. This written plan should include at least the evacuation procedure for the premises, a list of emergency supplies, the roles and responsibilities of staff, and a communication plan for families and support services [9].

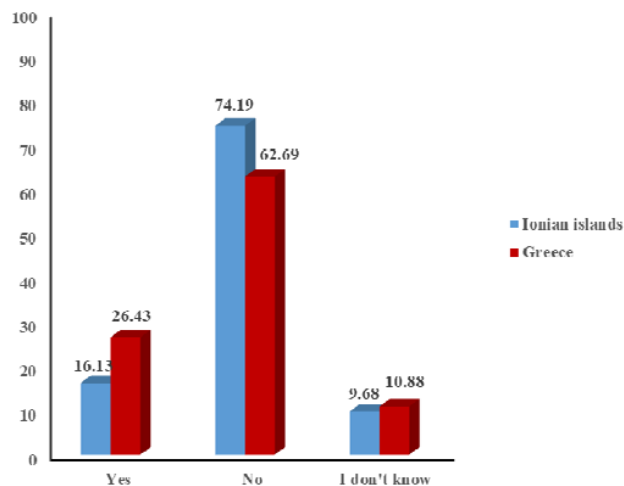


Fig. 8 Does your workplace hold earthquake drill every year? (%)

A very practical and realistic way of engaging kindergartens' staff on emergency planning issues and training them about the need to prepare themselves and their students is through regularly practiced drills. Even if the legal framework defines that the workplaces should hold earthquake drills on regular basis, the majority of kindergarten's personnel claim that they do not hold earthquake drills, see Fig. 8. It is well known that the earthquake drills aim to uphold the safety of child care centers by ensuring that the staff have the necessary skills to deal with seismic situations and the kids are familiar with responding in case of earthquake according to emergency plan. Furthermore, the drills help the planners to test the emergency predefined procedures and to review the emergency plan.

Finally, the responders' personal attitude on earthquake preparedness status at their workplace was explored by the question “Do you feel that you are prepared to face the consequences of a severe seismic event at your workplace?”. The significant majority of both groups of responders said that they do not feel prepared, as shown in Fig. 9.

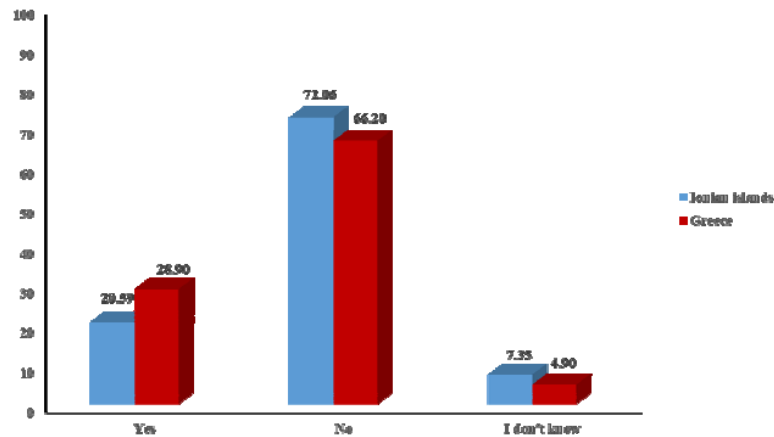


Fig. 9 Do you feel prepared to face a seismic emergency situation? (%)

#### IV. "TELEMACHUS" PROJECT

EPPO, besides its other regular awareness initiatives, participates as a partner to "Telemachus - Innovative Operational System for Ionian Islands Region Seismic Risk Management" Project. "Telemachus" is an innovative operational project that aims to become a valuable tool for earthquake management, helping to decisions making and finding the best solution in case of an earthquake. This project is funded under the Priority Axis "Environmental Protection and Sustainable Development" of Operational Plan "Ionian Islands 2014-2020" (ESPA 2014-2020).

"Telemachus" partnership is coordinated by the Region of Ionian Islands. The other partners are: EPPO, Geodynamic Institute, National and Kapodistrian University of Athens and Ionian University.

In the framework of "Telemachus" project, EPPO implemented training courses for kindergartens' staff of Ionian Islands to have the necessary skills, knowledge and experience to deal with emergency situations.

#### V. CONCLUSIONS

All regions of Greece are vulnerable to the hazards of earthquakes and Ionian Islands Region is at very high to medium seismic risk. Most adults and children in case of earthquake have a feeling of helplessness. Especially if they have never experienced an earthquake before and do not know what will happen next.

Seismically safe kindergartens have been recognized as a basic human right. In response to this need, the adults providing care to children should prepare them to recognize an earthquake and to know what to do if an earthquake occurs. The knowledge, attitudes, and skills of providing care personnel and children will help to cope with the disturbed environment and their emotional reactions.

In Greece, EPPO has a systematic approach to improve preschools' seismic safety and works towards more effective dialogue on seismic risk with the kindergartens' stakeholders. It is worth mentioning that the focus on children's earthquake preparedness in Greece is in line with recent thinking at global

level on the prevention and mitigation.

In the framework of this study is identified the level of knowledge and preparedness of employees in child care centers of Ionian Islands Region, and other regions of Greece. According to the results of the survey, the majority of the participants were not prepared for an earthquake event at workplaces. An urgent and preliminary task is to define a set of life-safety standards that could be adopted at national, regional and local level. To achieve this, EPPO works closely with regional and local authorities to recognize and satisfy the needs and requirements of children and families before, during and after disasters. The educational actions of Telemachus Project aim to contribute to understanding the seismic risk and building the resilience of Ionian Islands' communities.

Undoubtedly, the fact that EPPO is supporting a wide range of safety-related initiatives is encouraging, but a more systematic problem-solving approach may be required to ensure a common understanding of seismic risk and to empower the preparedness of childcare facilities.

#### REFERENCES

- [1] DFID (2006), "Reducing the Risk of Disasters – Helping to Achieve Sustainable Poverty Reduction in a Vulnerable World: A DFID policy paper", [https://www.preventionweb.net/files/2067\\_VL108502.pdf](https://www.preventionweb.net/files/2067_VL108502.pdf)
- [2] UNICEF (2009), "Early Childhood Development and Education in Emergencies", <https://www.issa.nl/sites/default/files/pdf/Publications/equity/Unicef-country-profiles-final.pdf>
- [3] FEMA (2014), "National Mass Care Strategy - Integrating Children's Disaster Related Needs into Disaster Planning, Preparedness, Response and Recovery", <https://www.iaem.org/portals/25/documents/Children-and-Disasters-Integrated-Approach-Webinar-28April2014.pdf>
- [4] E.P.P.O. (2018), "Earthquake Protection and Planning Organization Activities 2018", 74p (in Greek).
- [5] E.P.P.O. (2017), "Handbook on Child Care Centers Earthquake Emergency Planning", 28p (in Greek).
- [6] Ministry of Education of New Zealand (2018). "Licensing Criteria for Early Childhood Education & Care Services 2008 and Early Childhood Education Curriculum Framework", 40p <https://www.education.govt.nz/assets/Documents/Early-Childhood/Licensing-criteria/ECE-Licensing-Booklet-Early-Childhood-Aug2018.pdf>
- [7] Hellenic Law 3850, "Legal Framework of Health and Safety of Workers," FEK 84/2-6-2010 (in Greek).
- [8] EU OSHA, "The Role of Management in Safety and Health issues at Workplaces", European Agency for Safety and Health at Work, 2012, 22p.

- [9] Experts' Group Meeting on Earthquake Safety in Schools (2004).  
"Keeping Schools Safe in Earthquakes", 243p,  
[https://www.preventionweb.net/files/8205\\_keepingschoolsafeinearthquake.pdf](https://www.preventionweb.net/files/8205_keepingschoolsafeinearthquake.pdf)