



SEISMIC DISASTER PREPAREDNESS POLICY IN RISK MANAGEMENT PLANNING - GREECE

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ABSTRACT

This paper presents the up-to-date measures and actions taken in Greece about the earthquake preparedness policy, especially in the field of seismic risk management planning. Greece, as it is well known, is one of the most earthquake-prone countries in the world. For this reason, Earthquake Planning and Protection Organization (E.P.P.O.) was founded in 1983, as the state responsible authority for planning and monitoring the implementation of the earthquake policy at all levels (Law. 1349/1983).

The recent restructuring of the administrative structure of Greece ("Kallikratis", Law 3852/2010) has created new standards in emergency planning for earthquake management, ranging from roles and responsibilities (spatial, institutional) to capacity resources (manpower and means) of the involved bodies with minimum previous contingency planning experience.

Working towards a sustainable disaster mitigation policy, in the 30 - operating years of E.P.P.O., a successful shifting from a disaster-resistant community to a resilient community has been achieved (UN/ISDR, 2005 & Laurie, 2003). The most recent actions are focusing on: a) processes linking environment, development and disaster, b) vulnerability of people, infrastructures and environment and c) capacity building and its consistency. Thus, one of the main strategic E.P.P.O.'s actions aims to plan a consistent, build bottom - up and comprehensive earthquake preparedness policy based at seismic risk management planning approach.

Although the assessment of preparedness level, as it has been estimated, overpassed the expectations, the lack of experience in risk management planning especially at local level, designated institutional gaps and discontinuities in emergency planning process remain the basic obstacles for achieving E.P.P.O.'s goals regarding the earthquake preparedness policy.

INTRODUCTION

Earthquakes are very common in frequency in Greece and the consequences of the extremely strong events are very unpleasant and costly. The peculiarities of this phenomenon (unpredictability in sort period time, the secondary effects, etc.) drive to a very advanced management and especially in the mitigation stage and not only in response and recovery. Earthquake Planning and Protection Organization as state responsible authority is dealing with the planning and processing the earthquake

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policy for the whole country. Very briefly, the mitigation policy can be delineated by the following main priority actions:

- Strengthening seismic capacity of structures through seismic design codes
- Seismic risk and seismic hazard assessment including the development of National Seismological Network & Accelerometric Network, publication of the Neotectonic Maps etc.)
- Planning earthquake preparedness measures
- Collaborating with involved parties in case of destructive earthquake by giving technical and scientific support in the field of seismic disaster management.
- Supporting the applied earthquake research (funding scientific projects with subjects relevant to the earthquake risk, participating in projects, etc.).

In the framework of this project, the preparedness policy is going to be analyzed and more focusing to the area of contingency planning and risk management. According to E.P.P.O. Board’s decisions (2011 – 2014), the main strategic actions related to strict preparedness policy are two: the risk management planning for seismic disaster and the earthquake educational policy (Fig.1). Both actions have a common aim. The aim is to strengthening the resilience of the earthquake affected systems (communities, people, institutions, etc.) and be capable to cope and recover efficiently from the impact of a disastrous event, enhancing risk assessments by individualization of the policy and trying to build a seismic culture based on the bottom-up approach with a degree of flexibility, decentralized actions and public participation (DG ECHO EU, 2013). The earthquake school safety that is formulated by the school emergency plans and earthquake drills at schools, and the earthquake training and informative programs in several target groups, among them teachers, educators, pupils, tourists, volunteers, people with disabilities, etc. are the basic initiatives for the earthquake educational policy (Gountromichou et al., 2013, Karakostas et al., 2013, Kourou et al., 2010). The earthquake educational policy has been very well developed in Greece the last decades and a great number of informative materials have been produced accordingly.

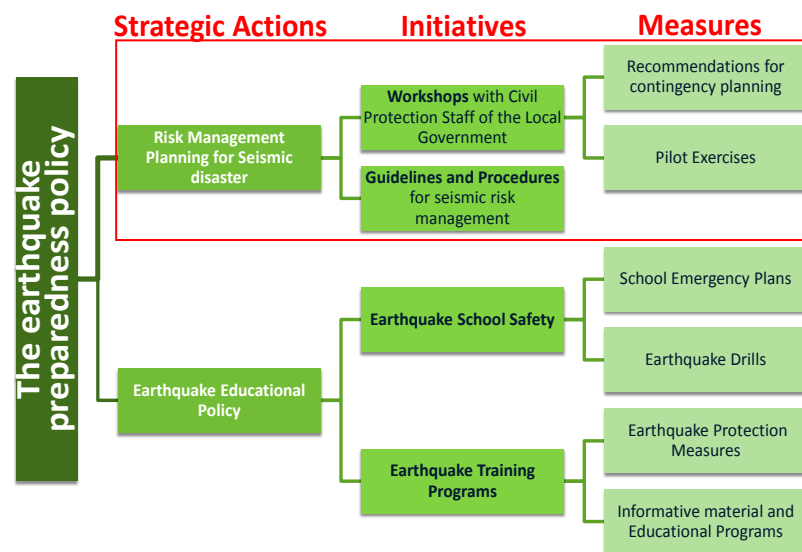


Figure 1. Diagram shows the two main strategic actions of the earthquake preparedness policy in Greece, the involved initiatives and measures. The red framework marks the strategic action that this paper is dealing with.

Regarding the seismic risk management planning, many initiatives have been completed in the past and most of them are related to guidelines, models, forms and pilot databases as tools for the authorities to prepare their operational plans in case of earthquake. However, since 2010, the E.P.P.O.’s efforts can be considered as segmented and isolated.

The recent administrative structure in Greece, which applied by the “Kallikratis” Project (2010), has created new standards to earthquake risk management and consequently to the earthquake preparedness policy. The country is divided into three major administrative levels: Ministries and

Central Authorities at governmental – ministerial level (national level), seven (7) Decentralized Administrations (regional level) and thirteen (13) Regions and three hundred twenty five (325) Municipalities, first and second degree of Local Administration respectively (local level). Accordingly, a rearrangement of responsibilities and means has applied. Small municipalities have merged, some were fused to each other, and in any case they gained extra resources (manpower and means) as well as more responsibilities. At that framework the whole seismic management planning had to be rearranged. The participatory approach to seismic risk analysis has selected as the most appropriate and efficient to risk management. E.P.P.O. acts as facilitator that guides and allows the community to choose the options that best meet their needs. This method has a better chance of acceptance and implementation by the community and more importantly involves different stakeholders that it is given useful perspectives on who is at highest risk and how this can be reduced.

The implementation of E.P.P.O's strategy for seismic risk management planning decided to be as a national program which is divided into two phases. Phase "A" that addressed to Regions including their Regional Units (smaller structures as parts and under the control of the Regions) and Phase "B" concentrated to Municipalities with their smaller communities. The objectives of the whole program are: improvement of interoperability in disaster management at procedures, common language among involved stakeholders, legislation and systems as well as a rational management of the consequences for ensuring effectiveness, efficiency and coherent response to the disaster.

EARTHQUAKE PREPAREDNESS POLICY - SEISMIC RISK MANAGEMENT PLANNING

The seismic disaster preparedness policy in Greece has been planned for enhancing local organizational capacities, capabilities, coordination, participation, consistency and accountability. This policy contributes efficiently to an interoperable system in managing the disaster after an earthquake and its side effects. It improves the national, regional and local preparedness and response procedures. It can be characterized as a sequential, continuous process based on the needs analysis and feedback. Among the main initiatives for implementing and controlling the effectiveness of this policy are the following (Fig.2):

- organizing periodical earthquake planning workshops and meetings at local and regional level with the responsible stakeholders covering specialized earthquake management related issues,
- planning pilot simulation exercises (table-top and field) at all administrative levels and
- updating or producing guidelines and procedures for emergency management taking into account the accumulative experience, aftermaths and best practices of past events in Greece (Dandoulaki 1992, Mousteraki et al., 2009).

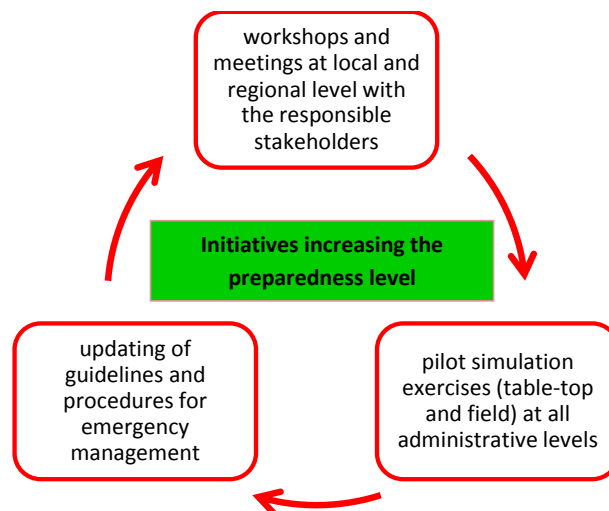


Figure 2. Schematic diagram showing the main E.P.P.O.'s initiatives concerning the seismic risk management planning in Greece.

E.P.P.O.’s Decision of the Board of Directors (Decision, 2011) is referring to the activation of certain initiatives related to the implementation of workshops and meetings in order to update and strengthen the seismic risk management at local level. Thus, it has been planned an earthquake preparedness program in two main Phases “A” and “B” which addressed to Regions and Municipalities respectively.

Phase “A” has already been completed (Table.1). It was constituted of workshops and meetings with the responsible persons of each Region where the main actions of the earthquake preparedness policy had been presented to 359 executive persons in civil protection issues. These actions are: a) convention of the appropriate coordination bodies of civil Protection (SOPP) every year for monitoring their earthquake preparedness level, b) seismic risk assessment at the local area (Kranis et al., 2004), c) monitoring and implementing of “The rapid visual screening” Program which is a pre-seismic control of public buildings and public welfare institutions, d) designation of appropriate shelter and settlement areas in case of an earthquake according to E.P.P.O.’s specifications, e) arising the public knowledge about seismic risk in their area and related to that issues, f) programming earthquake exercises, g) clarification of the roles and responsibilities among the involved stakeholders and h) predefined procedures for coping in the emergencies after an earthquake.

Table 1. Showing all the Regions in Greece, the dates as well the number of the responsible stakeholders attended the E.P.P.O.’s meetings / workshops with the theme “Prevention and Preparedness action as part of seismic risk mitigation policy” (Sept 2011 – Dec 2012)

Regions – Date	Number of participants
Western Greece – Sept 2011	17
Hpirus– Oct 2011	17
Crete– Nov 2011	31
North Aegean–Nov 2011	33
South Aegean– Mar 2012	33
Central Greece– Apr 2012	17
Ionian Islands– May 2012	17
Central Macedonia– Jul 2012	31
East Macedonia and Thrace- Jul 2012	24
Peloponnese – Sep 2012	21
Thessaly- Sep 2012	41
West Macedonia- Oct 2012	15
Attica-Dec 2012	62
	Sum: 359

The current Phase is “B” and consists of Earthquake Planning Workshops as training session (Table 2). Through these workshops an active participation and an adaptation of the earthquake preparedness policy to the seismic characteristics of the local communities are attempted. Using a prioritization method these workshops have already been implemented in 125 Municipalities (starting in September 2013 – 2013) covering the 38% of the total number of the Municipalities in the country (Fig.3). The plan is that this project is going to be completed by the end of 2014.

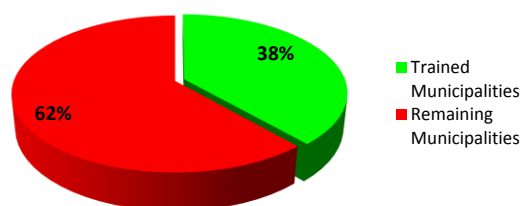


Figure 3. Schematic diagram showing the main E.P.P.O.’s initiatives concerning the seismic risk management planning in Greece

Table 2. Municipalities and E.P.P.O.'s preparedness action as being implemented the earthquake planning workshops tailored made for local community (Sept 2012 – 2013)

Municipalities – Date	Number of Participants
Lesvos Island – Nov 2011	33
Kalamata – Dec 2011	136
West Athens – Apr 2012	66
Rhodes – Apr 2012 & Nov 2013 (15 Municipalities of Dodecanese Region)	87+34
Corfu Island – May 2012	33
Piraeus – May 2012	27
Larissa – Sept 2012	17
Limnos Island – Jan 2013 & Dec 2013 (9 Municipalities of North Aegean Region)	26+27
Heraklion, Crete – 24 Municipalities of Crete Island – Nov 2012	54
Kamena Vourla – 25 Municipalities of Central Greece Region – Oct 2013	60
Patra – 26 Municipalities of West Greece Region & Ionian Islands – Oct 2013	65
Tripoli – 26 Municipalities of Peloponnese Region – Oct 2013	51
	Sum: 716

By describing how these workshops are organized the emphasis to bottom-up approach (DG ECHO EU, 2013) to seismic risk planning becomes obvious. These daily-earthquake planning workshops consist of three parts, two of them contain very short presentations for critical thematic units and the last part a pilot table top exercise is conducted, for each local area. The target groups are responsible persons as civil protection personnel at local level, mayors, deputy mayors responsible by the law in civil protection issues, representatives of all the local emergency state authorities (officers of fire brigade, police, coastal guard, etc.) and other involved parties.

The main topics presented are:

- Seismic risk assessment of the examined area, as the base line of risk management planning (Lekkas et al., 2010, 1998).
- Guidelines and applications for defining the appropriate shelter and settlement areas in case of an earthquake (OCHA, 2006 & UNDRO, 1982).
- Exercises in groups to consolidate the risk management issues working in real maps from the local area.
- Procedures related to emergency management issues (post-seismic inspection of the buildings – public and private, relocation of critical infrastructures, organized evacuation process, external provisions, etc.).
- Active participation in a short table - top exercise tailored made for the seismic regime of the area, as a pilot exercise.
- Assessment and evaluation process of the exercise and of the whole workshop.

As regards the E.P.P.O.'s guidelines for procedures related to seismic risk management planning any updating or enrichment of existing guidelines assessed as essential step forward. E.P.P.O. has published in the past years guidelines for several operational topics and management issues, such as "Search and rescue operations in earthquakes", "Risk elements removal, temporal support and propping", "Emergency Evacuation of the population in case of earthquake" and "Prevention & Mitigation of the Psychological Consequences of earthquake". Many of these are considered generic and they must be more specified. Responsible to define appropriate shelter areas for the population are the civil protection services at the municipalities. The civil protection departments of the Regional Units are responsible to coordinate and organize the designation of settlement areas after a disastrous event, in close cooperation with the relevant municipalities (G.S.C.P., 2012). Both assignments have to be based on the E.P.P.O.'s related guidelines. For that reason and in order to respond efficiently on the demand for defining specifications, E.P.P.O. convened special committee in order to examine such specifications and update the existing ones (Ministerial Degree, 2014).

EARTHQUAKE PREPAREDNESS POLICY ASSESSMENT

E.P.P.O. is monitoring continuously through research the preparedness level of the communities and attempts to improve it, in the sense of sustainable seismic mitigation framework. A milestone for assessing and evaluating the preparedness policy was a debriefing meeting in March 2013, at the headquarters of E.P.P.O. in Athens. It has been proposed to be held on an annual basis, in order for the governmental responsible authority in a joint effort with the Executives of Civil Protection of the 7 Decentralized Administrations and of the 13 Regions of the country, to formulate and develop the appropriate measures for the implementation of the earthquake preparedness policy in the whole country. The debriefing meeting focused on measures implemented according to E.P.P.O.'s guidelines and illustrated the level of the earthquake preparedness in regional and local level (especially in the second degree of the local level – the Regions and their Units) in the country. Three were the main fields of discussion: the operational issues and seismic risk management planning, the communication strategy and the institutional issues and obstacles. The aim of the meeting was to enhance the interoperability in managing earthquake risk, to develop the framework of seismic policy and to jointly develop actions towards its implementation.

On what degree the earthquake preparedness policy measures at regional and local level have been implemented and have fulfilled the initial purpose it has been assessed in a basis of an extended questionnaire. Main and indicative points from this research, held in March 2013 by the 7 Decentralized Administrations and the 13 Regions, are the following:

- 73% held Coordinating Bodies of Civil Protection (SOPP) on earthquakes at Regional Unit's level (according to E.P.P.O.'s Document 198/20-01-2012, which contains recommendations for monitoring and increasing the earthquake preparedness) (Fig.4),
- 89% have compiled nominal lists of operational ready resources (manpower and means) while 5% does not have updated them (Fig.4),
- 79% have appointed committees (according to E.P.P.O.'s recommendations) to carry out "The rapid visual screening" Program – Pre-seismic Control of Public Buildings and Public Welfare Institutions, i.e. critical infrastructures such as, schools, hospitals, bridges, lifelines, monuments etc.. The aim of this program is to record and assess the seismic capacity of buildings at the national level in order to identify priorities for further measures. E.P.P.O. provides specific guidelines for its implementation and has the responsibility to calibrate the results. According to those guidelines every public authority is recommended to implement the rapid visual screening for their buildings. For that reason, a unit (department, service, office) has to be designated as responsible of gathering the forms and sending them to E.P.P.O. 68% have designated that service but still the program is ongoing.
- 84% have defined places for emergency shelters and settlements in case of an earthquake, in accordance with the related specifications (Fig.2) and 68% have designated relocation areas for their critical services,
- 58% have designated unit responsible for coordinating and providing materials for immediate temporary housing,
- 21% have signed a cooperation protocol, a memorandum with the local authorities or other bodies (volunteers, individuals, private companies, etc.) in order to be realized in emergency (Fig.4),
- 21% have planned to execute operational exercises in case of earthquake, and 11% have implemented such exercises,
- 53% have implemented informative actions for the public on earthquake protection measures (Fig.4) and the rest (47%) have already planned relative actions.

A remarkable point is the very low percentage in executing or planning operational exercises for earthquake, even table-top type that they are almost costless. The main reasons are supposed to be the lack of experience to such actions and the minimum degree of coordination especially in local level. The multidisciplinary operational exercises on earthquakes as preparedness action are essential and considered the key point for maximizing the effectiveness of response and reducing the negative impacts of a strong earthquake by acting properly. Moreover an unexpected result is the 21% in predefined memorandum amongst the different involved parties. A constant procedure in pre-seismic phase that is missing might be helpful for the clarification of the roles and for reducing or eliminating the duplicated actions.

Another point for improvement is the communication strategy as it has been defined in our research. It has been split in the communication planning among different services within the state authority (either Regions or Municipalities or others parties), the communication strategy with the central responsible authorities (E.P.P.O., General Secretariat for Civil Protection, involved Ministries) and the communication strategy regarding the population and media. As it is illustrating in figure 4, only few authorities – Regions & Regional Units - (of about 15%) have pre-defined a safe place for the relocation of the operational center and almost the same percentage is for those that determined a communication protocol amongst them. On the other hand, very encouraging is the briefing of the existing contingency plans that has been completed to the most of the areas. The use of communication systems is not a common procedure as well as the determination of a communication protocol in case of an emergency. All these gaps in the communication may cause serious problem in the consistency of the response system. Probably the strong interpersonal relations between local actors, followed by confusion in terms of the necessity of communication protocols but also in terms of the type of cooperation after an earthquake.

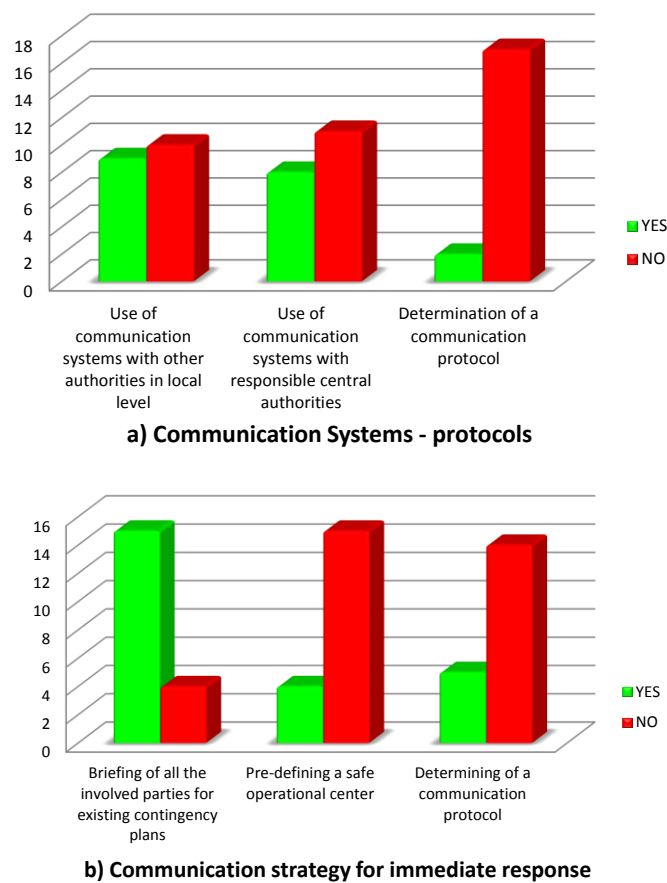
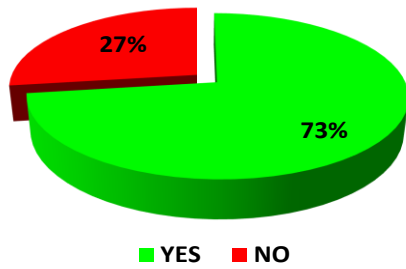
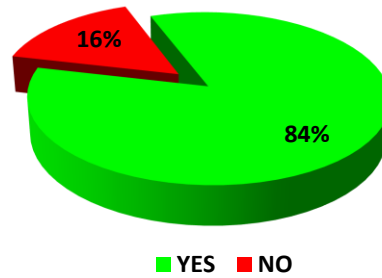


Figure 4. Communication strategy in local level (Regions and Regional Units) a) use of communication systems and necessity of protocols, b) communication strategy for immediate response

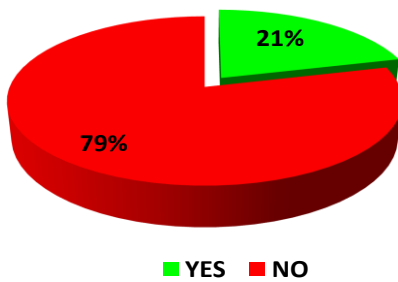
The Phase “B” that is addressed to 325 Municipalities of the country is assessed by a different questionnaire. The questions are oriented to assess the local needs, level of knowledge of the seismic risk, predefined procedures related to seismic disaster management, previous experience in earthquake preparedness measures, exercises, clarification of the roles and responsibilities of the involved stakeholders. Remarkable result revealed by assessing the previous experience in earthquake exercises that only 23% of the responsible of the involved authorities at local level had been executed exercises. The lack of previous experience in exercises and in earthquake planning issues has been explained as an inheritance of the previous administrative structure in Greece. Additional to that, 72% of the participants have clarified after the workshop, the procedures related to procedures of the mobilization of the civil protection mechanism, i.e. roles and responsibilities (Fig.6).



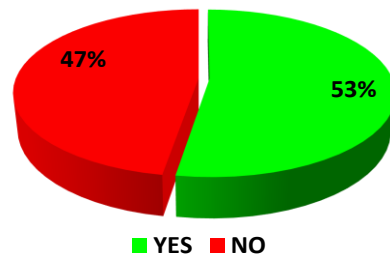
a) Convention of Coordinating Bodies (SOPP) on earthquakes



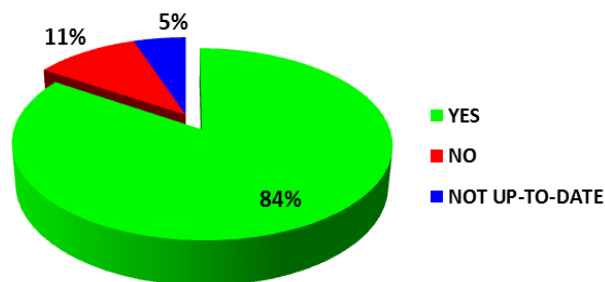
b) Designation of shelters



c) Signing of cooperation protocols

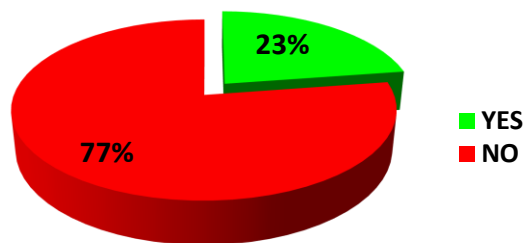


d) Implementation of informative actions



e) Nominal Lists of Operational ready RESOURCES (manpower and means)

Figure 5. Indicative diagrams of the earthquake preparedness level in Regions and Municipalities, in the year 2012 - Greece a) Convention of Coordinating Bodies of Civil Protection on earthquakes at Regional Unit's level - year 2012, b) Designated shelters, in accordance with the E.P.P.O.'s specifications, c) Signing of cooperation protocols with the first degree of local authorities or other bodies, d) Implementation of informative actions for the public on earthquake protection issues, e) lists of operational ready resources



a) Previous experience in Exercises

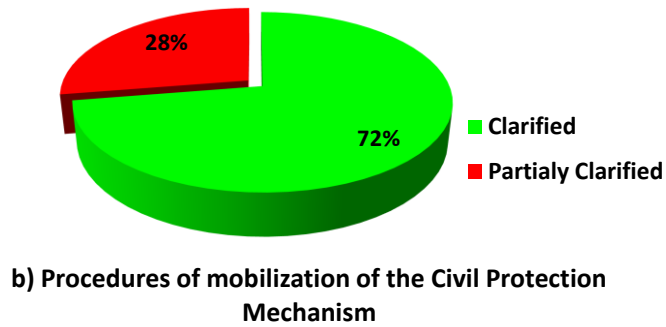


Figure 6. Seismic operational exercises assessment as part of the E.P.P.O.'s earthquake planning workshops for the municipalities 2013-2014, in Greece a) Previous experience in such exercises, b) Clarification level of the procedures of mobilization of the civil protection mechanism

One of the most interesting indexes for evaluating the E.P.P.O.'s action is the degree of active participation during the earthquake planning workshop and the available time for exchanging techniques and experiences among each other. 94% of the participants evaluated this index as "excellent" to "very good". E.P.P.O.'s efforts to improve it with more group work, simulation of realistic problems and circumstances, discussion of the best and worse practices in seismic disaster management (national and international level), etc., has proved successful. The action itself, the earthquake-planning workshop, has been evaluated as "very good" to "excellent". Though the evaluation can be considered as good enough, it allows space for improvements in some specific points. E.P.P.O. distributes supportive material related to the seismic disaster management planning. Although the informative pack has been planned to be brief, flexible and useful, it might need more additions accordingly to some proposals and remarks of the participants (Fig.7).

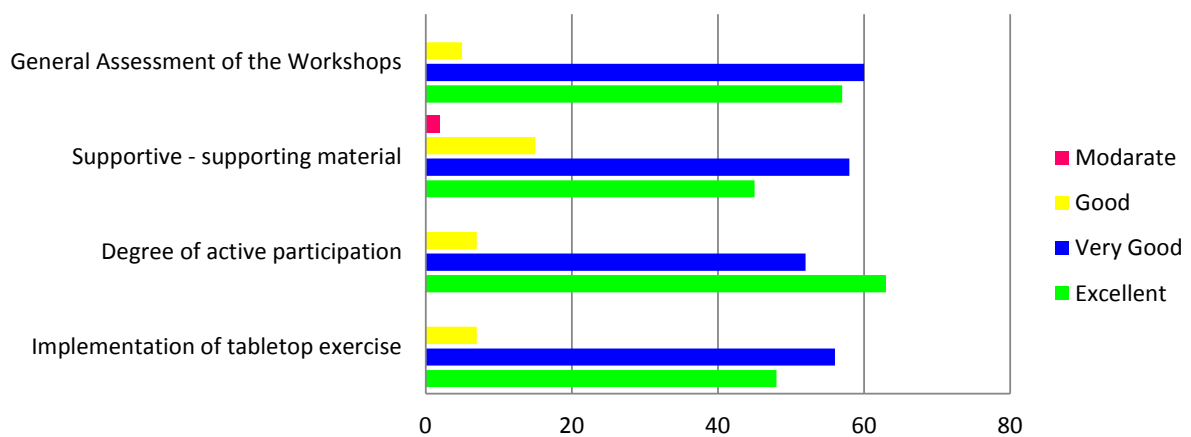


Figure 7. Evaluation of the E.P.P.O.'s earthquake planning workshops of the 125 municipalities (291 participants) since the end of 2013

DISCUSSION

Implementing the aforementioned priorities actions in the entire country (at regional and local level), which is under progress, E.P.P.O. is able to comment on three major topics: a) Seismic risk Management Planning, b) Communication Planning – Strategy and c) Institutional Issues.

It is essential for the risk management planning to convene Coordination Bodies of Civil Protection issues (at local level) on earthquakes on a regular basis - once per year (E.P.P.O., 2012 & 2014). During this process, multiple goals are accomplished, such as the community participation is highlighted, an effective and efficient coordination system is formulated, an annual reviewing and

monitoring of the applied seismic preparedness measures is in place and the continuity of planning is ensured.

Another issue under discussion is collaborations amongst stakeholders including Protocols - Memoranda on actions (in private sector, voluntary organizations, etc). It was observed that lack of previous experience, strong interpersonal relations between local actors, followed by confusion in terms of the necessity of protocols characterized the local authorities.

The local communities are not much familiarized with the appropriate procedures related to transitional shelters. Moreover, the fact that many regions are located far from storage centers (10 centers in the whole country) allows the locals to rely on the immediate external assistance and not on the reinforcement of volunteerism, whereas the isolation in many areas, such as island areas, remains always a great issue. It is proposed that related procedures to transitional shelters should be incorporated into exercises (based on estimated number of homeless people of previous seismic events in the region, assessment of the beneficiaries, etc.). Additionally, in cases where identification of shelter areas has been implemented, this information has not reached the final recipient (the citizen), in the majority of cases (Kreimer, 1990). E.P.P.O. encourages the conduct of exercises for earthquakes considering that they contribute positively to preparedness and interoperability in earthquake crisis management.

As regards communication planning and strategy, it has been noticed that there is no clear communication strategy for seismic crisis management within the institution and among other stakeholders. Since the function and composition of operational crisis management center at the level of Regions, as well as at the level of Decentralized Administrations, is not supported by the current institutional framework (Law 3013/2002 & Ministerial Decree 1299/2003), a lack of coordination and communication in the affected area with long delays for the response of competent bodies might be observed.

Moreover, it is remarkable that “Kallikratis” Law does not designate clearly the roles and responsibilities of the civil protection actors. E.P.P.O. has proposed through these actions a clear coordination scheme including the new administrative bodies (Municipalities, Regional Unit - Region and Decentralized Administration) with emphasis of resolving the co-responsibilities and clarifying the thresholds as regards to the time of undertaking activities per level of management.

The Phase “B” oriented to earthquake emergency management planning for municipalities has revealed the great gap in planning procedure and the low preparedness level. Though the action is under progress the so far reports have identified a demand for acquiring knowledge and practicing in exercises for testing their capabilities and their existing plans (in many cases) related to earthquake emergency management. E.P.P.O.’s specific objective for the local communities’ inclusivity to planning procedures seems to be fulfilled so far, as lots of the municipalities have proceed to a field exercise encouraging citizens to take part and of course by extending the E.P.P.O.’s pilot exercise in the workshops. The continuity of this training process is under discussion because it depends on either by the earthquake itself that might happen to the area or by the E.P.P.O.’s actions in local level in regular basis. However, for ensuring the desired level of earthquake preparedness the only way is by achieving the continuity of the risk management planning (Lekkas, 2000).

CONCLUSIONS

Risk management planning for seismic disaster is an integral part E.P.P.O.’s policies aiming at creating a resilient community. Specifically, certain initiatives have been undertaken in order to increase the local communities’ preparedness level (updating of guidelines and procedures for emergency management, workshops and meeting at local and regional level with the responsible stakeholders, pilot exercises (table top and field) at all administration levels). All these initiatives aim at preparing the local and regional bodies for the increased role in the realm of civil protection designated to them by “Kallikratis” Law.

The implementation of the aforementioned actions all over Greece has resulted in an arising of the awareness as well as the preparedness level strengthening of the local communities. As shown by the assessment of the program, participants were characterized by a previous lack of experience

regarding the earthquake preparedness. The assessment undertaken also showed that the actions themselves had a high value added for the local communities.

As highlighted in Discussion session, there are still several issues to be solved in the way towards a resilient community. Most of these issues are related to institutional dysfunctions, such as the non-clear designation of roles and responsibilities to the relevant actors by the “Kallikratis” Law. Furthermore, the current institutional framework does not facilitate communications planning and strategy. Significant problems in seismic disaster management may arise as a result of more practical issues, such as the lack of signed protocols with shareholders or the location of the tent - storage centers that are few in the country and only in big cities, meaning that the need of immediate housing may not be covered especially in island areas.

Although there are still some issues to be solved, great steps forward have been made by E.P.P.O. in the whole country, especially in the last years. The updating of the emergency planning procedures specialized to local level, the reactivation of many processes related to earthquake preparedness, the actions for arising the awareness of all the involved parties in earthquake management issues and the applied bottom – up approach in drawing the national policy for the earthquake risk management are some basic steps in order to achieve a consistent and continuous planning procedure for an effective and efficient response system.

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