

Assessment of population awareness and preparedness level regarding the environmental emergency situations

¹Elisabeta-E. Kozma Kis, ¹Lucia-T. Deaconu, ¹Emil Roman,
¹Lucrina Ștefănescu, ¹Monika Meltzer, ²Cristian Pop, ¹Alexandru Ozunu

¹ Babeș-Bolyai University from Cluj-Napoca, Faculty of Environmental Science and Engineering, Research Centre for Disaster Management, Cluj-Napoca, Romania; ² Babeș-Bolyai University from Cluj-Napoca, Faculty of Sociology and Social Work, Cluj-Napoca, Romania. Corresponding author: E. E. Kozma Kis, erzsebet.kozma@ubbcluj.ro

Abstract. Constantly exposed to natural and technological disasters, community is increasingly considered a fundamental part of the emergency management system. The efficiency of an emergency response depends on how well the population is informed and prepared to respond to the demands of the authorities. In order to do so, education and risk communication are essential in preparing the population for an effective emergency response. The paper assesses the information and awareness level of a small Romanian community on emergency situations. This analysis was conducted using the social investigation methodology, namely the questionnaire. The target group consisted of people of different social conditions with the minimum age of 18. The current research intends to highlight the significance of education and to develop an appropriate educational curriculum directed towards comprehension and acceptance of risks, towards prevention knowledge and development of response capacity.

Key Words: awareness, natural and technological disasters, risk communication.

Introduction. Disasters represent a constant threat to sustainable development and generate major casualties and material losses every year. The beginning of this millennium was characterized by a varied range of mega-disasters, supporting the assertion that natural and technological disasters are increasing both in number and severity (Coppola & Maloney 2009).

The Romanian legislation defines an emergency situation as “an exceptional, non-military event, which threatens, by its magnitude and intensity, the life and health of citizens, the environment, goods and cultural values, which requires normality restoration measures and urgent action, allocation of additional resources and unitary management of forces and resources” (EO 21 2004). The same legislative document identifies the following types of risks: “fires, earthquakes, floods, accidents, explosions, landslides and land collapse, mass diseases, collapse of buildings, equipment or facilities, failure and sinking of ships, falling objects from the atmosphere or from outer space, tornadoes, avalanches, failure of public utilities and other natural disasters, severe disasters or large public events caused or facilitated by specific risk factors” (EO 21 2004).

Risk represents the exposure of human society or its products, as well as of the environment (i.e. everything considered as valuable) to a hazard and it is calculated as the product between probability and damage (Smith 2004). Considering the risk as “mathematical product between hazard and vulnerability expressing the connections between an event and its consequences” (Slaymaker 1999), one needs also to define vulnerability in order to understand the concepts. Therefore, a person or group has certain features which influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. These features involving a combination of factors that determines how a person's life, a community, property and assets are subjected to risk of an identifiable event (or a series of events) in nature or society represent

vulnerability (Wisner et al 2004). A significant aspect of Wisner's definition of vulnerability is the comprehension of its measuring scale: vulnerability occurs differently in a single house than at national level, so the mitigation measurements should be developed and applied differently.

Community is nowadays increasingly considered a fundamental part of the emergency management structure. This approach, along with a better understanding of the phenomena, whatever their origin, decisively helps to develop strategies and actions for prevention, emergency response or restoration, thereby maximizing public safety.

The analysis of the role of education in preparing the population for environmental emergencies was accomplished by: identifying educational needs of vulnerable populations, analysing the current state of the national educational system in Romania and addressing relevant aspects of the Romanian National Strategy regarding Public Communication and Information in case of Emergencies. Education can be achieved also through effective communication. The purpose of an effective and competent risk communication is to keep the public informed and to educate them, without causing alarm and confusion (US HHS 2002). In order to do this, one should know the public very well: what are their fears, how well they know the hazard and what is the relationship between them and the risk communicators. In order to increase the effectiveness of the risk communication process, "authoritative and trustworthy sources" (Morgan et al 2002) are necessary. Also, to increase the efficiency of the risk communication process, the public needs to be involved in the communication process. The goal of risk communication in a democracy should be "to produce an informed, involved, interested, reasonable, thoughtful, solution-oriented, and collaborative public" (US EPA 1988). The one way communication model, so frequently used by the authorities, can fail (Grabill & Simmons 1998), due to lack or insufficiency of the feedback. Feedback is essential at many levels. First of all, the sender is able to estimate the effectiveness and impact of his message (Hargie 2011). He can then determine whether his risk communication strategy is successful or whether he has to find other ways and instruments in order to get through to his public. Secondly, seeking out the public's opinion makes them feel involved in the risk communication process, which increases their trust in authorities or other communicators. Consequently, a better way to increase public awareness through risk communication is to evoke a dialogue between the two parties: the authorities and the public, which should mainly be based on trust and understanding. In this regard, numerous strategies, laws, regulations and measures emphasize the need and importance of the population education for emergency situations preparedness, both at national and at international level.

A baseline research with the main objective to assess the public awareness on emergencies would be the first and compulsory step required to define an effective public communication and information strategy for emergencies. The article presents and comments some of the dimensions and indicators which might be developed and applied as part of a methodological kit designed for such assessments.

Material and Method. In order to achieve the proposed results, the paper uses the methodology of social investigation, namely the questionnaire. Current researches and surveys (Panić et al 2012; Morrissey 2007; King & Gurtner 2005; Ozunu et al 2011) show that the effectiveness of an emergency response depends on how well the population is informed and prepared to respond to the demands of the authorities. The education of the population can start at an early age. Usually, the necessary information is included in the school curricula. The children, who are informed on specific risks, and the correct way to respond to emergencies, tend to act correctly in case of a disaster (Panić et al 2012). Proper education among the adults should not be neglected, either. Efficient adults' training for emergency response requires the implementation of other methods of education. These alternative methods of education could include "complex presentations of natural hazards", "awareness-raising programs", "workshops", "trainings" along with other "less systematic methods of learning compared to those used in school" (Komac et al 2010). It is essential to find these ways of delivering messages and educating on disaster preparedness, because information and education of population are key

elements of the entire process of preparing the response actions during an event, and command of the critical situation. Another important set of factors to be considered for a baseline research methodology is mentioned in the Romanian National Strategy regarding Public Communication and Information in case of Emergencies: population awareness of the risks it is exposed to and of the necessity to develop response skills and self-supporting disaster, by national and local campaigns; development of a correct response behaviour in case of disaster through local campaigns based on the features of the existing risks; correct information and training of young people, by implementing an appropriate educational curriculum to all educational levels, focused on the understanding and acceptance of risks, knowledge of preventive measures, development of response capacity, self-support and first aid for the benefit of others, but also the importance of engaging in voluntary activities to support the interventions of authorities (GD 548 2008).

With all these data as a background framing, the survey method would be an appropriate tool to assess aspects such as: population awareness, before and after national or local communication campaigns were carried out; the population perception of the risks; opinions about the exposure to risks and the necessity to develop response skills and self-supporting modalities to mitigate the disaster consequences; the most effective modalities to be used in order to develop appropriate response behaviour in case of disaster; access to and acknowledgement of proper and accurate information related to risk and emergency situations; training needs for young people; test of the possible components of an appropriate educational curriculum, such as the understanding and acceptance of risks, as well as the acknowledgement of the preventive measures, development of response capacity, self-support and first aid for the benefit of others, and the importance of engaging in voluntary activities to support the interventions of authorities.

The questionnaire designed for the exploratory study has included indicators for only some of the above-mentioned aspects, specifically: subjective perception of risk factors, awareness of the emergency types; risk and danger awareness, trust in public administration and institutional actors responsible for emergency response; emergency preparedness; perception of vulnerability and risk exposure awareness; the development extent of correct response behaviour in case of disaster; preventive measures to reduce losses during and immediately after the event; the subjective perception of the role and adequacy of the school in educating and training the population for emergency situations; interest for the active involvement in mitigation actions.

As part of an exploratory approach focused on the development and testing of a research tool to be used in future standard baseline assessment methodology, the questionnaire was applied on a convenience sampling, consisting in respondents who agreed to be respondents in an on-line survey conducted between 10 May and 10 August 2012. The resulting sample (N=61) included people of various social backgrounds and different age groups. The distribution of respondents by age was: 18-30 years (33%), 30 - 50 years (53%), over 50 years (13%). The distribution of respondents by type of residence was the following: 90% urban and 10% rural. In terms of gender, 38% of the respondents were males, and 62% were females, while 58% of them were married, 38% were not married and 4% had other marital status. Of the total number of 61 respondents, 43% had children.

Results and Discussion. The results pointed out that 97% of the respondents are familiar with the term "emergency situation", most of them acknowledge that they are continuously vulnerable to risk factors, are aware of the hazards and possible losses and expect clear instructions regarding preventive and protective measures from the authorities (Figure 1). Radio and television were considered the most useful ways of receiving information on protective and preventive measures.

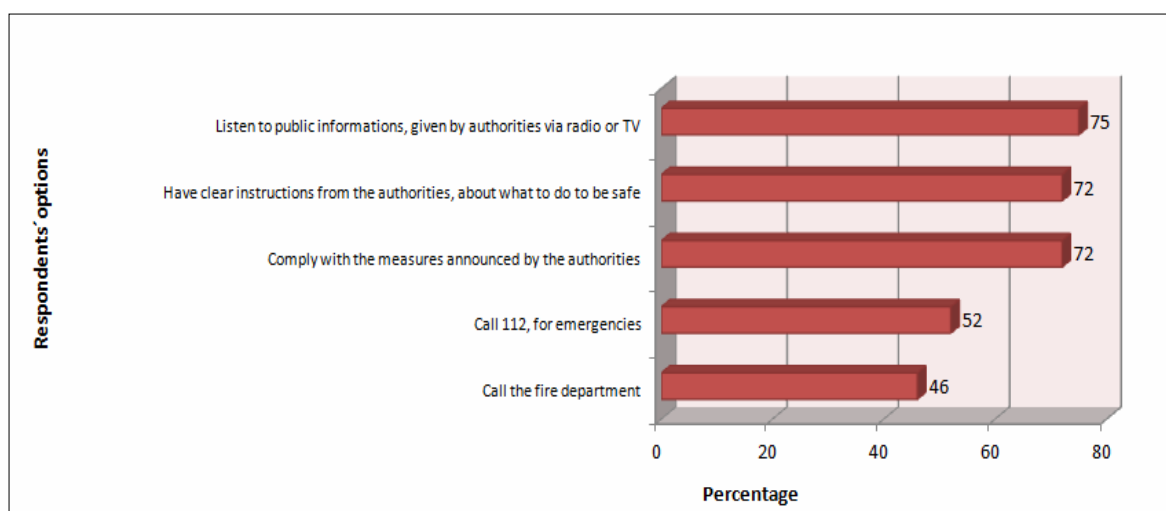


Figure 1. Actions considered most useful after a disaster.

Table 1 presents the results of the survey in terms of respondents ranking the most probable hazards they consider to be exposed to. Extreme temperatures were chosen by most of the respondents (76%), probably due to the period of the questionnaire application (summer). It is important to notice that industrial and nuclear accidents were considered the less probable.

Table 1

The ranking of risk factors affecting the respondents

<i>Affected by the following risk factors</i>	<i>Very likely/probably</i>
extreme temperatures	76%
fire	67%
tornadoes, storms	46%
flood	41%
earthquakes	35%
landslides	30%
nuclear accidents	25%
industrial accidents	23%

Regarding the effects on their properties, the respondents are aware of the possible losses due to fires (58%), tornados or storms (38%) and extreme temperatures (36%).

The development of correct response behaviour in case of disaster is under improvement, as most respondents are willing to grant time (up to 2 hours) for practical exercise trainings in case of natural disasters.

The lack of appropriate education in this field results from the large percentage of respondents (67%) stating that they did not learn in school what to do in case of an earthquake or flood. However, the population awareness level is improving, which is noticed from the 85% of total respondents who consented and 11% who partially agreed that schools should teach protective measures in case of a natural or technological disasters.

Figure 2 illustrates the effectiveness of the means of information for natural disaster preparedness. This was assessed by a multiple choice question starting from very efficient to least efficient. Consequently, the necessity of implementing emergency preparedness lessons in schools and kindergartens was acknowledged as very efficient and efficient by 94% of the respondents, while public exercises were considered very efficient and efficient by 88% of the target group. The activities conducted in disasters-prone communities were preferred by 82% of the respondents.

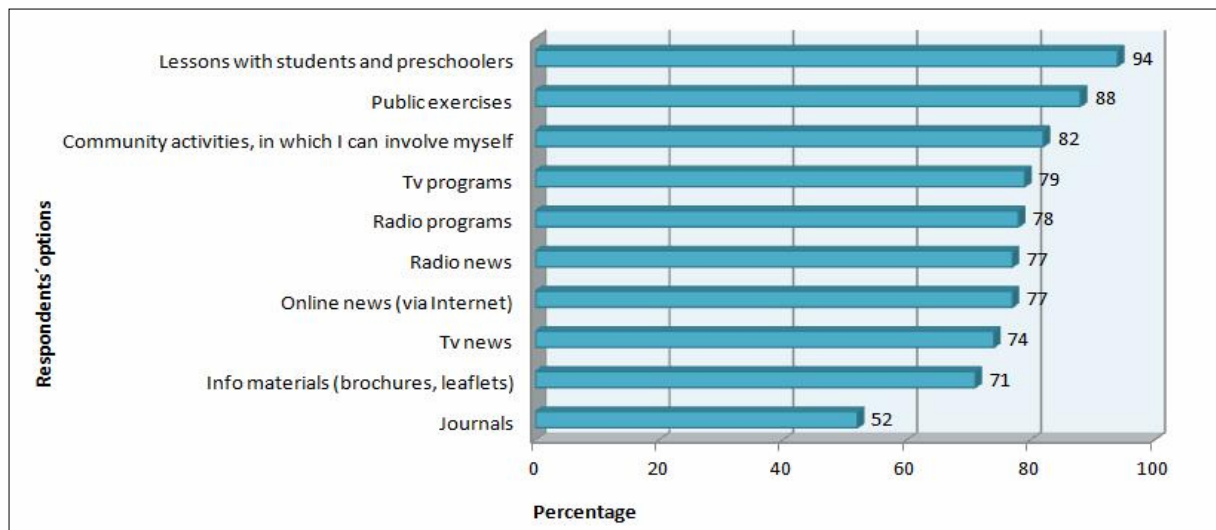


Figure 2. Means of information considered effective for natural disaster preparedness.

Mass-media in general is also considered an effective source when speaking of preparing for a natural disaster. As some of the main channels of transmitting relevant information about disasters and disaster preparedness, TV, radio programs and news are all considered helpful sources, although when it comes to ranking these sources from the institutional point of view, based on their credibility, people tend not to trust them blindly. The General Inspectorate for Emergency Situations was the most trustworthy of the institutions listed in the questionnaire (Figure 3).

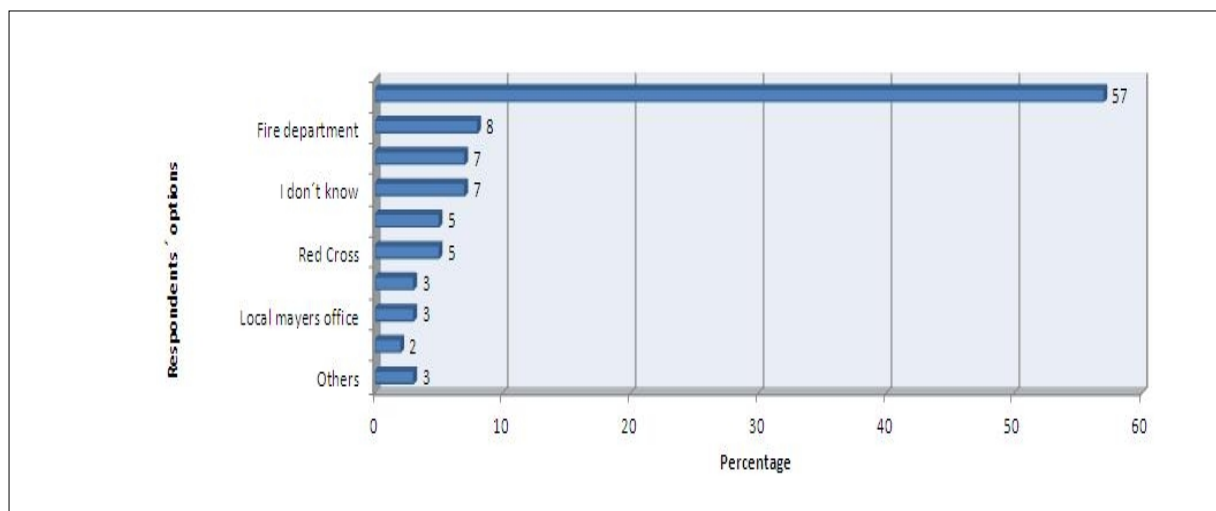


Figure 3. The credibility-based ranking of institutions that inform the population on the protective measures in case of disaster.

In terms of disaster preparedness activities, most of the respondents (66%) admitted that there have been no such activities in their community during the last 12 months. The collaboration between communities and authorities was considered to be poor by 42% of respondents, satisfactory by 28%, good by 13%, very poor 10%, while only 7% of the interviewed persons considered this collaboration to be very good.

The need to improve education and training was considered by the respondents to be the responsibility of schools (85% completely agree, 11% partially agree, 2% partially disagree and 2% completely disagree).

The analysis of results obtained herein enables the authors to identify some solutions to increase public awareness and preparedness in terms of emergency response. Therefore, training programs and on-going education in emergency management is necessary at all educational levels and for all age groups.

Training programs in emergency management. There is no doubt over the need of implementing an appropriate educational curriculum focused on understanding and accepting risks, knowledge of prevention measures, developing response capacity, self-support and first aid for the benefit of others. In addition, the importance of engaging in voluntary activities that support the authorities' intervention, together with the need to implement an effective and trustworthy risk communication framework is emphasized.

The paper proposes the implementation of a training programme for civil society in emergency management, which can be used by higher education institutions in cooperation with the competent authorities in the field (the Environmental Protection Agencies, the County Inspectorates for Emergency Situations, the Regional Training Centres for Civil Protection).

Measures to improve the education in this regard. The paper outlines the necessity to develop an academic field of study that fully deals with risk management for the achievement of the best level of awareness and preparedness. At present, there are some courses provided to students at bachelor or master degree in Romanian universities, but these should be preceded by a sound education in kindergartens, schools and high-schools and further be developed by cooperation with other universities programs used for information exchange.

New curricula on emergency management. Civic education in disaster management is a compulsory premise in order to develop a participative and responsible behaviour. The implementation of curricula in the field of emergency preparedness and management would enable also the alignment of Romanian educational system with European education and training and would contribute to the modernization of public education and education techniques. Therefore, integration of educational objectives with other major national targets such as national security, orientation towards sustainable development and European integration is a must to be achieved in the near future.

Conclusions. Vulnerability to disasters can be reduced only if conscious and organized communities and the public, in general, can put pressure on authorities so that their interests are not ignored when making decisions, planning strategies and regulating actions. For this, the participation of interested communities in all aspects of disaster risk management is essential. These interested communities have to be involved in the risk communication process, in order to express their feelings and ideas toward the vulnerability reduction methods, so that based on their feedback the authorities can elaborate an effective framework for disaster preparedness amongst the population.

Within vulnerability reduction methods, preparedness of the population for emergency events is of major importance. Preparedness of the population refers to the training and acquiring of emergency response methods aiming at protecting the population, its property and the environment. Unfortunately, despite the fact that, theoretically, such training is conducted, from an objective point of view it is insufficient and not completely assimilated by the population. This can be changed by implementing strategies and programs that have a financial basis and sufficient material resources to cover the entire population. Also, training should be conducted through practical and attractive exercises, in which the population is directly involved.

The authors emphasize the importance of education at all levels, the implementation of an appropriate educational curriculum focused on understanding and accepting risks, prevention knowledge, developing response capacity for self-support and first aid for the benefit of others, and the importance of engaging in voluntary activities to support the interventions of authorities. Research continues to develop effective emergency management subjects at university level, based on the results of these analyses.

The current research is only the first step in the development of a method for designing a curriculum focused on competence achievement. This questionnaire analysis demonstrated the significance of competence achievement in emergency situations. Further studies intend to pursue the following most important competences:

understanding and acceptance of risks, prevention knowledge, response capacity, self-sustaining and first aid for the benefit of others, and engaging in voluntary activities to support authorities during emergency response.

References

- Coppola D. P., Maloney E. K., 2009 Communicating emergency preparedness strategies for creating a disaster resilient public. Taylor and Francis Group, CRC Press, 254 pp.
- EO 21, 2004 Emergency Ordinance no. 21 of 15.04.2004 on the National System for Emergency Situations Management, published in Official Gazette no. 361 of 26 April 2004.
- GD 548, 2008 Governmental Decision on the approval of the National Strategy regarding Public Communication and Information for Emergencies, published in the Official Gazette no. 426 of 6 June 2008.
- Grabill J. T., Simmons M. W., 1998 Toward a critical rhetoric of risk communication: producing citizens and the role of technical communicator. *Technical Communication Quarterly* 7(4):415-441.
- Hargie O., 2011 Skilled interpersonal communication. 5th Edition, Routledge Taylor & Francis Group, England, USA and Canada. pp. 542.
- King D., Gurtner Y., 2005 After the wave: a wake up warning for Australian coastal locations. *The Australian Journal of Emergency Management* 20(1):4-9.
- Komac B., Ciglič R., Erhartič B., Gašperič P., Kozina J., Orožen Adamič M., Pavšek M., Pipan P., Volk M., Zorn M., 2010 Risk education and natural hazards. CapHaz-Net WP6 Report, Anton-Melik Geographical Institute of the Scientific Research Centre of the Slovenian Academy of Sciences and Arts: Ljubljana (available at: http://caphaz-net.org/outcomes-results/CapHazNet_WP6_Risk-Education).
- Morgan G. M., Fischhoff B., Bostrom A., Atman C. J., 2002 Risk communication, a mental models approach. Cambridge University Press, 351 pp.
- Morrissey M., 2007 Curriculum innovation for natural disaster reduction: lessons from the Commonwealth Caribbean. In: International perspectives on natural disasters: occurrence, mitigation, and consequences. Stoltman J. P., Lidstone J., Dechano L. M. (eds), Chapter 21, Dordrecht: Springer, pp. 385-396.
- Ozunu A., Gagiu A., Costan C., Nour E., 2011 Risk perception and social vulnerability in local communities: a case study for Băiuț area, Maramureș County. Romania. NATO Science for Peace and Security Series - E: Human and Societal Dynamics, Stimulus for Human and Societal Dynamics in the Prevention of Catastrophes, 80:3-13.
- Panić M., Kovačević-Majkić J., Miljanović D., Miletić R., 2012 Importance of natural disaster education – case study of the earthquake near the city of Kraljevo. *J Geogr Inst Cvijic* 1-13, UDC: 911.2:502.58(497.11), available online at www.gi.sanu.ac.rs.
- Slaymaker O., 1999 Natural hazards in British Columbia: an interdisciplinary and inter-institutional challenge. *Int Journ Earth Sciences* 88:317–324.
- Smith K., 2004 Environmental hazards - assessing risk and reducing disaster. Fourth edition, Routledge, Taylor and Francis Group Publishing House, London and New York, 306 pp.
- US EPA, 1988 US Environmental Protection Agency, Seven cardinal rules of risk communication. United States, Washington D.C.
- US HHS, 2002 Department of Health and Human Services, Communicating in a Crisis: Risk Communication Guidelines for Public Officials. Washington D.C., available <http://www.hhs.gov/od/documents/RiskCommunication.pdf>.
- Wisner B., Blaikie P., Cannon T., Davis I., 2004 At risk - natural disasters, people's vulnerability and disasters. Second edition, Routledge Taylor & Francis Group, London and New York, 447 pp.

Received: 20 February 2013. Accepted: 25 February 2013. Published online: 15 April 2013.

Authors:

Elisabeta-Edita Kozma Kis, Babeş-Bolyai University from Cluj-Napoca, Faculty of Environmental Science and Engineering, Research Centre for Disaster Management, 30 Fântânele Str., 400294, Cluj-Napoca, Romania, e-mail: erzsebet.kozma@ubbcluj.ro

Lucia-Timea Deaconu, Babeş-Bolyai University from Cluj-Napoca, Faculty of Environmental Science and Engineering, Research Centre for Disaster Management, 30 Fântânele Str., 400294, Cluj-Napoca, Romania, e-mail: lucy.deaconu7@yahoo.com

Emil Roman, Babeş-Bolyai University from Cluj-Napoca, Faculty of Environmental Science and Engineering, Research Centre for Disaster Management, 30 Fântânele Str., 400294, Cluj-Napoca, Romania, e-mail: romanemil@yahoo.com

Lucrina Ştefănescu, Babeş-Bolyai University from Cluj-Napoca, Faculty of Environmental Science and Engineering, Research Centre for Disaster Management, 30 Fântânele Str., 400294, Cluj-Napoca, Romania, e-mail: lucrina.stefanescu@ubbcluj.ro

Monika Meltzer, Babeş-Bolyai University from Cluj-Napoca, Faculty of Environmental Science and Engineering, Research Centre for Disaster Management, 30 Fântânele Str., 400294, Cluj-Napoca, Romania, e-mail: spiegeltröpf@yahoo.com

Cristian Pop, Babeş-Bolyai University from Cluj-Napoca, Faculty of Sociology and Social Work, 128-130 21 Decembrie 1989 Blvd., 400604 Cluj-Napoca, Romania, e-mail: cristi.pop86@gmail.com

Alexandru Ozunu, Babeş-Bolyai University from Cluj-Napoca, Faculty of Environmental Science and Engineering, Research Centre for Disaster Management, 30 Fântânele Str., 400294, Cluj-Napoca, Romania, e-mail: alexandru.ozunu@ubbcluj.ro

This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

How to cite this article:

Kozma Kis E.-E., Deaconu L.-T., Roman E., Ştefănescu L., Meltzer M., Pop C., Ozunu A., 2013 Assessment of population awareness and preparedness level regarding the environmental emergency situations. AES Bioflux 5(2): 158-165.