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# SCIENCE FOR EARTHQUAKE AWARENESS IN ROMANIA: EXPERIENCE OF URBAN-INCERC AND ECBR

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## *Abstract*

ECBR – European Center for Buildings Rehabilitation is a specialized center within the European and Mediterranean Major Hazards Agreement (EUR-OPA), operated in URBAN-INCERC - National Institute for Research and Development in Constructions, Urban Planning and Sustainable Spatial Development. The ECBR Project "Public Awareness and Education Tools for Disaster Risk Reduction and Preparedness in Earthquake Crisis Situation, Including People with Disabilities" is devoted to the use of scientific approaches in creating and enhancing awareness. The deep Vrancea earthquakes of Romania are a source of trans-boundary impact, thus the EUR-OPA specialised centres ECMNR of Chisinau, R. Moldova, ECRP of Sofia, Bulgaria, TESEC of Kiev, Ukraine and ECPFE of Athens, Greece are partners in the project. The project reinforced national, local and regional actions in DRR, making available reliable knowledge and risk awareness materials.

In Romania, URBAN-INCERC and ECBR are concerned about the causal connection between the vulnerability of some categories of buildings and the risk perception and awareness of building owners. The main risk is related to Vrancea source earthquakes and pre-1940 high-rise buildings in Bucharest, some hundreds to thousands, erected without seismic design. Since 1994, these structures are labelled for seismic risk, but until 2016 only a number of 73 high-rise buildings are strengthened. In fact, many owners do not act for more strengthenings, and they are living at risk. In February 2016, there were still unstrengthened 181 buildings in first class of seismic risk and public danger and other 174 buildings in first class of seismic risk (high risk of collapse under design earthquake of Code P100-3/2008). Some hundreds to thousands buildings are in other classes of risk. A new program and budget will start strengthening of 80 buildings in 2016. There is a need to increase the speed of strengthening works in Bucharest, but owners must be convinced to do it.

Awareness is related also to other seismic activity. URBAN-INCERC and ECBR studied the damage of buildings in villages Izvoarele and Schela during the September 2013 when a swarm of small and shallow (crustal) earthquakes occurred in Galati County. Some TV interviews contributed to a better information transmitted to population. Seismologists concluded that a small local fault was a source of shocks; in November 2013, the swarm decreased and eventually ceased. National research projects, as ROEDUSEIS, SEISMOCODE, URBASRISK, BIGSEES and E-Pres Project co-funded by the European Commission, contribute to the professional awareness and guidance of engineers and architects, using seismic simulators, e-learning platforms and other new data. Based on WCDRR 2015 - Sendai Framework for Disaster Risk Reduction 2015-2030, URBAN-INCERC and ECBR will provide inclusive risk-informed decision making based on the open exchange and dissemination of research results, available at regional scale in South-East of Europe.

*Keywords: Romania; earthquake awareness; URBAN-INCERC; ECBR;*

## 1. Introduction

In terms of dictionaries, awareness is the ability of a person to directly know and perceive, to feel, or to be conscious of events, things etc. or have the public or common knowledge or understanding about an issue. In case of earthquakes, the continuous living in a seismic prone country ensures a minimum learning and knowledge about the probability of shaking, sometimes, somewhere. Advanced civilizations proved to reach a "local seismic culture" in terms of protective actions [1].

For a today's mobile and information society, the awareness data can be even more detailed, and family, school or media play this role. The natural and built environment where persons go and live is under permanent change, therefore awareness knowledge must be constantly updated through interactions and lessons in actual events. Earthquakes are not so frequent and this can be a source of lack of awareness or of biased perceptions. In such a case, what is not well addressed, or is ill addressed, is the understanding of factors that are governing the risks they can be exposed. Much more, a person cannot be aware about the means of getting a better protection, especially when such a decision is costly and a long-term.

The impact of recent earthquakes, even in countries with pertinent codes and practices (Italy, 2009 and 2012; Chile, 2010; New Zealand, 2010 and 2011; Spain 2011; Japan, 2011), had shown that the risk reduction considering current approaches is still behind the targets. Citizens and communities seldom are invited as partners in risk evaluation or in post-disaster plans and actions. Authorities rely mostly on the administrative control of laws and codes enforcement. Thus, when disasters strike, buildings sustain damage and people is evacuated, being thus unable to participate in the recovery of their own neighborhood. The identified gaps indicate a need to develop an action-oriented framework by relevant stakeholders, with practical instruments and case studies.

The advancement of earthquake engineering codes is of paramount importance, and it was proved in earthquake history of Romania (1977), Japan (1923, 1995, 2011), Chile (1939, 1960, 1985, 2010), USA (1906, 1971, 1994). What is permanently changing is the human being and his power to transform awareness in decisions. Building Resilience of Nations and Communities to Disasters was a UNO program launched in Hyogo Framework (2005) [2] for a decade. The Rockefeller campaign "100 Resilient cities" of 2013 [3] and the Bloomberg Competition on resilient cities of 2014 [4] are challenging examples of new global practical approaches.

The resilience to disasters for sustainable development was a more powerful keyword in the Sendai Framework for Disaster Risk Reduction on a longer period, 2015-2030 [5]. The Sendai Framework emphasized the science role, authorities role for policies and codes and community role for resilience. The final document and the framework of action for reducing the disaster risk has 4 priorities:

- understanding the disaster risk;
- enhancing the governance of disaster risk, to manage it;
- to invest in disaster risk reduction, for resilience;
- a greater anticipated disaster preparedness for an efficient response and "To build back better".

The UNISDR Geneva Conference [6] was especially dedicated to the role of science in DRR, and delegates of URBAN-INCERC / ECBR attended it. We concluded that in Romania, the DRR legal and technical framework exists, but the damage extent and life safety of communities to multiple threats is not evaluated, because large data bases, sophisticated DRR risk assessment software and budgets are necessary. The need of building an enhanced awareness is obvious and the people and communities must be part of the solution, as UNESCO and IPRED have shown [7]. This is what URBAN-INCERC and ECBR did and is going to be presented.

## 2. Seismic setting and earthquake engineering evolution in Romania

Romania is exposed to a seismicity dominated by the Vrancea intermediate source. The relevant damaging earthquakes of the past century are November 10, 1940 ($M_{G-R}$=7.4; Mw = 7.7) and March 4, 1977 ($M_{G-R}$=7.2; Mw = 7.4…7.5) [8, 9, 10]. The casualties and damage in the 1940 Vrancea earthquake lead to seismic design guidelines for public buildings in 1941 and a compulsory code in 1963. The Vrancea earthquake of March 4, 1977 caused a damage of over 2 bln. US Dollars and heavy casualties, mostly because of pre-1940 structures that were not designed to withstand earthquakes.

The unique INCERC Bucharest record of 1977 [8, 9, 10, 11] proved the action of long-period motions and shear-walls provided a better control of lateral displacements, especially in precast panel structures. Chile and Romania, since the 1960's until the 2010's, were amongst the few seismic countries using extensively shear walls structures. Some shortcomings of the cast-in-place shear walls were alarming, since in Bucharest there was a collapse of a building section (OD-16), caused by failure of wall end flanges [8, 9, 10, 12, 13]. The shearwalls positive evolution in Chile and some shortcomings remarked in 2010 [14, 15] have been evaluated and findings were useful to structural designers in Romania.

In 1978 it was endorsed a new seismic code P-100/1978, revised in 1981 and the IPCT Guidelines P-101/1978 for precast buildings, also the 1975 edition of ICB/UTCB Guidelines for shear walls design P-85 was revised in 1982, and again in 1996, 2005. and 2013. The 1986 ($M_w$=7.1), May 30, 1990 ($M_{G-R}$ = 6.7; $M_w$=7.0-7.1) and May 31, 1990 ($M_{G-R}$ = 6.1; $M_w$=6.4), Vrancea earthquakes did not produce structural damages. The Earthquake Design Code P-100-1/2013 and the Code for design of constructions with reinforced concrete structural walls CR 2-1-1.1/2013 include improved provisions for monolithic and precast walls structures, considering the local and worldwide experience.

Romania is a country exposed to multi-hazard impacts, where the Vrancea area intermediate earthquakes are most damaging on more that half of the territory, but high magnitude events have longer recurrence intervals. The larger time intervals between strong earthquakes lead to a rather scarce experience of new generations in terms of experience and behavior during shaking. In order to compensate this gap, a National Program of Earthquake Education was launched after 1990's. The JICA Technical Cooperation Project on the Reduction of Seismic Risk for Buildings and Structures (2002-2008) [16] was beneficial in this respect and some didactic seismic simulators were donated and are used in earthquake preparedness in URBAN-INCERC [17, 18, 19]. Bcause most new generations lack their own experience, Disaster Risk Reduction activities must provide knowledge and training with scientific and technical background and URBAN-INCERC is a trusted institute with over 65 years experience able to act in this direction.

## 3. Owners awareness vs. the legacy of past earthquakes

Romania enforced since 1994 the Law No. 20/1994 on Seismic Risk Reduction. In this framework there is a govermnent funding for the mitigation of the seismic risk of existing buildings. The system of subsidies includes a compulsory state-sponsored assessment of resistance and long-term loans for design and strengthening works, without interest, and with some free-cost works for low-income families.

Each owner is notified by the Municipal Office to comply the law and sign the documents for strengthening and mortaging for crediting. The buildings in seismic risk class I are labelled with a placard – Red Dot – with this specification. Buildings erected before 1940 and having more that 5 stories are a priority. But in fact, even if the large majority of citizens recognize the risk, a number of relatively few owners were able to delay or stop the strengthening, when there is a lack of consensus and they are reluctant to sign for subsidized loans on some 20 years. Therefore, until 2016, a number of 73 high-rise buildings were strengthened. In February 2016, there were 181 buildings in first class of seismic risk and public danger and other 174 buildings in first class of seismic risk (high risk of collapse under design earthquake of Code P100-3/2008). Other 308 buildings are in class II, 91 in class III and 6 in class IV of seismic risk, while 1590 were classified by another old code and 146 does not have risk class [20].

In November 2015 a new law provided for the ceasing of public activities in „Red Dot" buildings (cinemas, restaurants, bars, banks, public institutions), although the residents continue to live there. This

decision is applied also to some very old low-rise masonry buildings of the historical center of Bucharest which were used with a high degree of occupancy, although they are in precarious state. There is a new program and budget to start strengthening of 80 buildings in 2016. For 29 buildings in Bucharest and 4 in other towns, the projects are ready. For other 33 in Bucharest and 14 in other places, the design of intervention will be started. There is a need to increase dramatically the speed and number of strengthening works per year in Bucharest, with a group of some 350 buildings in first 5 years and some 10-15 years for others, but only owners and possibly courts can decide it, and awareness is a key factor.

## 4. The false predictions and the crustal earthquakes occurred in Galati County in 2013

Almost in each year there are some false predictions about a "Big One", triggered by some small Vrancea earthquakes, and mass-media is conveying unreliable news about an imminent great earthquake, but owners do not act, as they are somehow living with that risk.. We need a door-to-door approach to convince all owners.

Starting with September 2013, a swarm of small and shallow (crustal) earthquakes occurred in Galati County area, near epicentral Vrancea source, and disturbed the life of several villages. Since the number of small shocks reached over 300, and some Vrancea intermediate depth earthquakes occurred randomly, the crisis increased, media coverage aggravated the crisis. As it became a government issue, the specialized research institutions, including URBAN-INCERC and ECBR studied the damage of buildings in villages Izvoarele and Schela and it was concluded that a small local fault was a source of shocks; in November 2013, the swarm decreased and eventually ceased. Some TV interviews and seismic motion demonstrations contributed to a better information and education transmitted to population. The crisis situation of Galati County has shown that the scientists and authorities must jointly address the earthquake awareness and protection, and minor seismicity must be addressed too

## 5. The ECBR activity

ECBR – EUROPEAN CENTER FOR BUILDINGS REHABILITATION is a specialised center included in URBAN-INCERC, within The European and Mediterranean Major Hazards Agreement (EUR-OPA) [21, 22]. The National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development, “URBAN-INCERC” is performing Disaster Risk Reduction research in five branches,18 research and testing laboratories.

In Romania, ECBR and URBAN-INCERC are concerned about the causal connection that exist between the vulnerability of some categories of buildings and the need to rehabilitate them and the risk perception of persons that live in such buildings. The recognized scientific quality and the number of activities for earthquake education of school students and citizens must overcome the negative impact of mass-media coverage with catastrophic content. Earthquake education and disaster mitigation strategies are based on:

- earthquake design of new buildings according to codes in force;
- repair, strengthening and fixing of buildings and equipments;
- personal and/or family - group preparedness;
- protection and rational reaction in case of earthquake and disasters.

Education includes – information – training – long-term education and aims at:

- learning to live and to survive in seismic zones;
- behaving in a rational and efficient way in case of seismic shaking, to not believe in rumors;
- preventing disasters and cooperate to recovery after such events.

## 6. ECBR Project on public earthquake awareness (2014-2015)

The ECBR project (2014-2015) [22] was dedicated to “Public awareness and education tools for disaster risk reduction and preparedness in earthquake crisis situation, including people with disabilities”. As specific objectives, the project reinforce national, local and regional actions in DRR, to promote workshops,

publications, multi-media information and website addressed to the specific and general public, making available reliable knowledge and risk awareness materials for local authorities and most vulnerable populations and included:

- study of crisis situation and scenarios impact in case of deep Vrancea earthquakes and shallow earthquakes of other sources, considering the trans-boundary impacts;
- proposals and delivery of knowledge transfer and training, using new earthquake education tools for public employees and population;
- delivering a number of 20 technical presentations and demonstrations by ECBR team members in schools and URBAN-INCERC Laboratory, for providing earthquake preparedness knowledge, using didactic seismic simulators, other presentations in universities;
- holding a seminar on ECBR Project: Public awareness and education tools for disaster risk reduction and preparedness in earthquake situation, including people with disabilities (coordinator: ECBR), on 15-16 October 2015 in Bucharest.

## 7. Issues related to transboundary impact of Vrancea earthquakes

ECBR cooperated with EUR-OPA Specialized centers of R. Moldova, Bulgaria, Ukraine, as countries that are exposed to trans-boundary seismic impacts from Romania and Greece – a country with a rich experience and each center provided valuable issues.

ECMNR - European Centre for Mitigation of Natural Risks, Chisinau, R. Moldova presented its Contribution on Mitigation of Natural Risks in R. Moldova (Bantus, 2015). R. Moldova is largely exposed to the same deep seismic source of Vrancea, Romania, and its territory was badly damaged in earthquakes of 1940, 1977 and especially in 1986 [23]. From experience of ECMNR, it results that in R. Moldova there is a need of tools for adjustment of anti-risk education to pupil's personality, of timely transparency and notification of all the persons concerned (pupils, parents, teachers, students, technical staff, etc.) concerning the seismic risks. Also, the use of different strategies and technologies concerning the development of an appropriate behaviour to pupils, students, teachers, technical staff in the event of an earthquake is necessary. The promotion of the seismic risk prevention culture is possible by implementing educational activities on seismic risk management in schools. Dissemination of knowledge about the nature of earthquakes and methodical support for didactic staff training and development of skills for appropriate behavior in situations of seismic risk;

ECRP, European Centre for Risk Prevention, Sofia, Bulgaria [24] pointed out that training in risk prevention in Bulgaria is based on the Disaster Protection Act. This Act regulates the provision of public health protection and protection of the environment and property in the event of disaster, that are implemented trough: preventive activities (before), protective activities (during) support and relief work (after). According to the Disaster Protection Act, training in disaster protection and giving first aid is provided in the public education system and in higher education institutions. The Act provides for the acquisition of basic knowledge on disaster risks and ways of behavior and action in primary education and in secondary and higher education – knowledge on protection corresponding to the profile and specialty. According to the Crisis Management Act, when a "disaster situation" is declared, children and people in disadvantaged position shall be protected. The training in schools is performed from first to twelfth grade as a separate school subject "Disaster Protection" or by including specifics topics and educative points in other school subjects.

In order to meet the requirements of the disaster Protection Act, a programming system "Hello School!" has been developed, for the formation of safe behavior in the event of disasters, in methodological coherence with basic educational content. In the areas of the country where there is a real constant threat of earthquakes, Ministry of Interior has established Training and Methodological Centre's, whose main purpose is to train teachers from schools in protection issues and to develop and disseminate teaching materials for the region specific hazards. Announcement and information of the population about the measures undertaken in crisis (including earthquake) is implemented in accordance with the Crisis Management Act.

ECPFE, Athens, Greece [25] presented a contribution on "Greek's Earthquake Protection Policy for People with disabilities". As axis of policy, EPPO and ECPF consider: Protection of Monuments, Forecasting and

Prevention, Education – Information, Reduction of Vulnerability and Protection Measures against Earthquakes for people with disabilities. The level of knowledge of people with disabilities for earthquakes and protection measures was studied in a survey carried out by EPPO, in the Framework of the Project POLITEIA (March 2008). A textbook addresses people with disabilities and the textbook has been translated to Braille language by E.P.P.O, & the Organization: "Lighthouse of the Greek blinds". Many earthquake drills took place, for each type of disability, while a questionnaire for an e-learning application in Greek and in English has been created, so as to educate and inform People with Disabilities. An e-learning platform was designed to host this educational material. In Greece, the Biennium 2014-2015 is devoted to "Development of informative Material concerning Earthquake Protection Measures, for People with disabilities with the implementation of "Easy to Read" language " and the augmentative alternative communication "MAKATON", coordinator ECPFE.

TESEC - European Centre of Technological Safety, Kiev, Ukraine presented a Contribution on Mitigation of Natural Risks in Ukraine [26]. Seismic regions area of Ukraine is about 120 thousand of square kilometres, or about 20% of all territory. The earthquake intensity may reach from 6 to 9 degrees on the MSK-64 scale. About 10.9 millions people live in earthquake-prone areas or about 22% of the total population of the country, including in the areas of the 6-point seismic activity — 7.98 million (15.5%), 7-point — 2.16 million (4 , 2%), 8-9-point — 0.79 million (1.5%). Given the importance of the problem in Ukraine, the Interdepartmental Committee on Scientific and Technological Safety under the National Council of Security and Defence of the President of Ukraine in April 3, 2008 and May 19, 2009 considered the "Status of seismic security and development problems of earthquake engineering in Ukraine." The Commission noted the growth of negative degradation technical state construction projects in Ukraine and increased wear and tear of fixed assets in different sectors of the economy. To solve these situations, the Cabinet of Ministers of Ukraine was encouraged to ensure the development of concepts and programs "Protecting people and buildings from seismic hazard". A list of dangerous objects and housing and public facilities, a National Engineering and seismic service of Ukraine in the Ministry of Regional Development and Construction of Ukraine, with its logistics and staffing was set. Within the need of protection against the Vrancea source earthquakes trans-boundary earthquakes, TESEC is concerned about the possible Na-Tech disaster – earthquake and nuclear risks.

## 8. The ECBR Project for 2016-2017

The future ECBR Project "Collective action for social resilience: earthquake training and preparedness of citizens, school students and volunteers from communities" aims to foster the resilience of societies as a whole by preparedness of citizens, school students and community volunteers for personal, family and group protection and to create stakeholders for earthquake preparedness. Specifically it will deal with organizing short time free-field seminars directly with citizens in 2 communities and training of 20 students, citizen and volunteers from 2 communities with seismic risk in specialized seminars. Expected results are to provide practical knowledge and create positive risk reduction perception for citizens and increase resilience and pro-active behaviour of citizens in risky communities. Some activities will be performed in centers and other in the heart of communities ("living labs" - in free field). EUR-OPA Specialized Centers from R. Moldova, Bulgaria, Greece and Ukraine will be partners. Besides fostering official duties of Civil Protection (IGSU) and attracting some NGO's to be partners of IGSU and ECBR in multiplicating the risk reduction effect in communities, each partner center will set targets according to its local situation.

## 9. Earthquake awareness, education, preparedness, hazard assessment and risk management activities in other projects of URBAN-INCERC

Other ongoing Projects of URBAN-INCERC as partner in consortia with universities and R-D institutes are:

The ROEDUSEIS Project - Romanian Educational Seismological Network, is a model of educational initiative in the field of earth sciences and with reference also to the engineering seismology and earthquake engineering [26, 27, 28]. In this framework, new disaster prevention educational materials on earth and

environmental sciences, adapted on the school levels are developed, an educational network with seismographs in 10 schools is organized and an e-learning platform is installed etc.The project partners are NIRD NIEP-Magurele, NIRD URBAN-INCERC, University Babes-Bolyai of Cluj-Napoca and the BETA IT Company.

Both earthquake education and awareness play a role in the individual development of safety, but in some cases there is a lack of proactive approach, a discrepancy between intent and action for disaster preparedness being observed. Preparedness involves organized disaster prevention activities and should become an integral part of everyday life. The project has educational, scientific and social objectives to raise seismic awareness, emphasize the gathering and use of seismic data by students, understanding of buildings behavior, to maintain high levels of scientific accuracy, while employing best educational practices. The project efficiency aims at facilitating a proactive interaction between students from elementary and high schools of the network, as part of the scientific work, with teachers and scientists making both teaching and research activity, up to a more practical level. By learning about seismology, then creating building models and making experiments in order to explain the behavior of engineering structures, under Romanian seismic conditions, the students realize that almost all territory is strongly seismic and they should became self-confident because of participation and self-involvement.

A SeismoLab III was created within ROEDUSEIS project in NIRD URBAN-INCERC, to access the research infrastructure and didactic simulators dedicated to the monitoring and evaluation of seismic events with effects on natural or built environment and population etc. The ROEDUSEIS Website and FaceBook page, associated with the future e-learning platform provide additional data and images about the historical and recent seismic events of each region, and students can download posters.

The SEISMOCODE Project - Platform and tools for an active assimilation by the professional community of the Romanian seismic code P100-1/2013, harmonized with the European standards [29, 30]. One of the most significant challenges for the civil engineering profession in Romania is adapting to the new European harmonized national regulations, enforced in the process of accession of the country to EU. For structural design codes and related norms, preparation started with more than one decade before the accession date, January 1, 2007. The content and the structure of the resulting harmonized regulations followed quite closely, in most cases, that of the Eurocodes, including, additionally, adaptations to the national context.

Consequently, structural engineers had to cope with radical code changes and, simultaneously with the pressure of an expanding construction activity. For Romania, as an earthquake-prone country, one of the highest impact changes was that of the code for the seismic design of buildings. Issued first in 2006 and revised seven years after, the P100-1/2013 code poses, until today, several assimilation problems to structural engineers. The SEISMOCODE e-learning platform is developed in the framework of a complex collaborative research and development project, by a consortium led by the Technical University of Civil Engineering Bucharest, and in which INCD “URBAN-INCERC” and the Institute for Computers, ITC S.A. are partners.

The platform is aimed to support the upgrading of the professional community, facilitating the assimilation of the new code, with focus on provisions for reinforced concrete buildings. SEISMOCODE incorporates contributions of reputed specialists in the field, including the authors of the code. Also it is meant to provide structural engineers with a variety of resources, organized according to the main steps of the design process: a body of knowledge, a *wiki* system, questionnaires and quizzes for (self-) evaluation, a collection of multimedia resources and a professional discussion forum. Planned to be completed in 2017, the platform will support life-long learning programmes, as well as graduate and post-graduate university courses.

Other relevant projects that include components of awareness building, are:

- URBASRISK - study of a urban protected area, exposed to earthquakes, floods, landslides, terrorist attacks, explosions etc, for resilience and a performant urban/territorial risk management, for protection and preparedness of an urban community and citizens in Bucharest [31];.
- BIGSEES - Bridging the gap between seismology and earthquake engineering, for a refined implementation of seismic action in design of buildings, according to Eurocode 8 - EN1998-1 [32]
- E-PRES - Monitoring and evaluation of natural hazards preparedness in schools, co-funded by the European Commission, a project coordinated by Greece [33].

URBAN-INCERC and ECBR provided consultancy to National Committee for Emergency Situations, by IGSU-General Inspectorate for Emergency Situations, for checking the concept and practical realization of video-spots movies and cartoons of earthquake protection for schools, home and public institutions, to be presented in public television programs „I do not tremble at quake"– June – December 2014. ECBR was consultant also for preparation of Romanian Report on HFA-Hyogo Framework of Action, with IGSU, in view of 2015 WCDR, Sendai, Japan.

## 10. Conclusions

URBAN-INCERC and ECBR Projects used scientific knowledge as bridge from earthquake engineering to earthquake awareness. This is a manifold approach, since it is based of sound engineering background of laws and codes and it is addressed both to professional communities and to population exposed to risk. Citizen and young generations are sensitive to sincere explanations and use of didactic seismic simulators from Japan.

Learning from earthquakes and from countries where the code enforcement is observed and large strong motion networks are maintained, like Chile, will be a current approach [14].

Based on WCDRR 2015 - Sendai Framework for Disaster Risk Reduction 2015-2030, URBAN-INCERC and ECBR will provide inclusive risk-informed decision making based on the open exchange and dissemination of research results from public funds. Within URBAN-INCERC and ECBR, the Sendai priorities will be addressed as follows:

- for "Understanding the disaster risk" - the activities will convey the research results in a manner easy to be understood by public institutions, authorities and citizens, respecting the scientific content;
- for "Enhancing the governance of disaster risk, to manage it" – the results of scientific research will be provided to authorities with guidelines of how to use them;
- for " To invest in disaster risk reduction, for resilience", direct activities in communities will be organized, to advise building owners to invest in structural strengthening;
- for "A greater anticipated disaster preparedness for an efficient response and "To build back better", URBAN-INCERC will participate in national and regional DRR strategies and the ECBR Project 2016-2017 is aimed at providing training of volunteers and community citizens.

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