Romania

Ex-Post Evaluation of Japanese Technical Cooperation Project
"Project on Reduction of Seismic Risk for Buildings and Structures"

External Evaluator: Ishimori Koichiro, Value Frontier Co., Ltd.

0. Summary

This project aimed to apply the new codes of seismic techniques, elaborated by the project itself and endorsed by the Romanian government, to both new and existing buildings, and thereby to contribute to strengthening measures against earthquakes in Romania. Since the project purpose was in line with the development policies of Romania and Japan, as well as with the development needs in Romania, relevance of this project is high. While the project elaborated the new codes as planned, some were not endorsed by the Romanian government by the end of the project. Thus, the project purpose was achieved at a limited level. In terms of impact, the code for new buildings has been applied to many buildings newly built, but the codes for existing buildings have not been much applied. Though the Romanian stakeholders are satisfied with these impacts, the Japanese stakeholders are not, and the overall goal has not been fully achieved. Thus, the effectiveness/impact of this project is fair. Efficiency of this project is fair because both the project cost and period exceeded the original plan. The counterpart agency, the National Center for Seismic Risk Reduction (NCSRR), was absorbed by the National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development (URBAN-INCERC) together with other related research institutions in 2010 by "Ordinance 16 (2010)". However, in 2014, the Research Center for Seismic Risk Assessment (RCSRA), which specialized in interdisciplinary research and education on seismic risks, was established by Technical University of Civil Engineering of Bucharest (UTCB) under the initiative of the Minister of Education. The Minister endorsed the establishment and transferred the function of the former NCSRR, which had been carried out by URBAN-INCERC, to RCSRA. This process of restructuring contributed to the enhancement of research and education systems of RCSRA. Since RCSRA has no major problem in institutional, technical, and financial aspects, sustainability is high.

In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project Location

Structural Testing Facility

1.1 Background

Romania is located in Eastern Europe and frequently experiences large-scale earthquakes. In 1940 and 1977, respectively, Romania experienced large-scale earthquakes registered with a magnitude of over seven, and whose epicenters were in the Vrancea region, located 150km north of the capital Bucharest. In 1977, the large-scale earthquake registered at a magnitude of 7.5 killed 1,578 people (1,424 in Bucharest). It caused economic losses of approximately US$30 billion (US$20 billion in Bucharest) due to the collapses of buildings. After the earthquake, the public demanded that preventative measures should be taken against earthquakes. This outcry grew louder when it was forecasted that a large-scale earthquake would occur in a cycle of 30 years. However, the Romanian government did not have sufficient seismic techniques to address these issues. As a result, they requested a technical cooperation project with Japan, who also experienced frequent large-scale earthquakes and had developed the techniques to respond. The goal of the cooperation project was to improve the seismic techniques and strengthen measures against earthquakes in Romania.

1.2 Project Outline

Overall Goal		Measures against earthquakes are strengthened in Romania.
Project Purpose		Improvement and dissemination of techniques for reducing damages by collapses of buildings in case of a large-scale earthquake are achieved.
Output(s)	Output 1	Effective and low-cost retrofit techniques are developed by NCSRR and acquired by structural engineers
	Output 2	Codes for both new buildings and existing ones are improved by NCSRR.
	Output 3	Post-earthquake assessment techniques of the damaged buildings are developed by NCSRR and acquired by structural engineers.
	Output 4	Education on measures against earthquakes for the citizens is improved by NCSRR.
	Output 5	Conditions necessary to apply the techniques developed by NCSRR are set up
Inputs		[Japanese Side] 1. Experts: 7 for Long-Term, 44 for Short-Term 2. 30 Trainees received 3. 6 trainees for Third-Country Training Programs 4. Equipment: 167 million yen 5. Local Cost: 44 million yen [Romanian Side] 1. 39 Counterparts 2. Project Office
Total cost		873 million yen
Period of Cooperation		October 2002— March 2008 (Original Period) October 2002 — September 2007 (Extended Period) October 2007 — March 2008
Implementing Agency		Ministry of Public Works, Transports and Housing (July 2003~ Ministry of Transports, Constructions and Tourism, April 2007~ Ministry of Development, Public Works and Dwellings)

	National Center for Seismic Risk Reduction (NCSRR)
Cooperation Agency in Japan	Ministry of Land, Infrastructure and Transport, Building Research Institute
Related Projects	None

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement of Project Purpose at the time of the Terminal Evaluation

The indicators of the project purpose are explained as such: "By the end of the project period, techniques introduced by NCSRR will be incorporated into the detailed design of retrofitting for more than one building built before and after 1940, respectively"; and "By the end of the project period, technical manuals and guidelines for seismic design of new buildings, and assessment and retrofitting design of existing buildings, will be endorsed by the Romanian authorities." The terminal evaluation concluded that both of the two indicators would be satisfied by the end of the project and it was highly possible for the project purpose to be achieved.

1.3.2 Achievement of Overall Goal at the time of the Terminal Evaluation

The overall goal is as such: "Within 5 years after the completion of the project, the number of existing buildings assessed and retrofitted, as well as new buildings using the outcomes of the project, will increase to such an extent that is satisfactory to stakeholders." However, it was expected that the number of existing buildings retrofitted would not substantially increase because residents were reluctant to accept retrofitting works due to financial reasons and the inconveniences stemming from temporary relocation during the work. Thus, it was evaluated that the possibility of overall goal achievement was not high.

1.3.3 Recommendations at the time of the Terminal Evaluation

The terminal evaluation confirmed that the improvement of seismic design and techniques of NCSRR was a great achievement and also stressed the importance of the quality control in the process of construction and/or retrofitting works by constructing companies.

Additionally, in order to achieve the overall goal, the evaluation highlighted the importance of taking necessary measures, such as educational activities for disaster risk management for the public, and implementing these measures to promote retrofitting works.

2. Outline of the Evaluation Study

2.1 External Evaluator

Ishimori Koichiro, Value Frontier Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: August 2013 to September 2014

Duration of the Field Study: 4 to 15 November 2013 and 9 to 14 March 2014

3. Results of the Evaluation (Overall Rating: B[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance to the Development Plan of Romania

The national development policy of Romania at the time of the ex-ante evaluation study, the "National Development Plan 2001-2005 (1999)," aimed to promote measures against earthquakes and reduce damages. Further, "Ordinance 54 (2002)" established NCSRR under the jurisdiction of the Minister of Public Works, Transports and Housing, as a core center for research and education of seismic measures.

The national development policy at the time of project completion, "National Development Plan 2007-2012 (2005)", promoted the renewal of deteriorating infrastructures in order to avoid the increased level of destruction risk of earthquakes and achieve social stability in one of six pillars: "Reducing the regional gaps." Further, "Ordinance 54 (2002)" was still valid at the time of project completion.

Thus, it can be judged that this project, which aimed to strengthen the seismic techniques for the Romanian government, was consistent with Romanian policies both at the time of the ex-ante evaluation study and the project completion.

3.1.2 Relevance to the Development Needs of Romania

At the time of the ex-ante evaluation study, 548 buildings were considered to be in danger of collapses if a large-scale earthquake occurred. Of the 548, 341 buildings (more than 60%) were concentrated in Bucharest, which had suffered substantial human and economic damages by the large-scale earthquake in 1977. Specifically, 122 buildings higher than five stories were at a greater risk of collapse and required immediate seismic retrofitting. Therefore, this project is judged to be in line with the development needs in Romania at the time of the ex-ante evaluation study.

At the time of project completion, there had been no large-scale earthquake since 1977. However, according to the paper published in an academic science journal, "Earth, Planets and Space", it is forecasted that the probability of an earthquake with a magnitude of seven or greater was approximately 40%[3] between 2008 and 2013.

Thus, this project was consistent with the development needs in Romania both at the time of the ex-ante evaluation study and the project completion.

3.1.3 Relevance to Japan's ODA Policy

At the time of the ex-ante evaluation study, "the former Charter on ODA (1992)"

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[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[2] ③: High, ② Fair, ① Low

[3] Masajiro Imoto and Nobuo Hurukawa, "Assessing potential seismic activity in Vrancea, Romania, using a stress- release model."

highlighted the importance of providing research cooperation that would lead to the building of technical capabilities in developing countries in research and development. The application of this cooperation would fulfill one of the project's five priorities: "encouraging efforts to build technical capabilities, including human resources development and research." Moreover, "the former Mid-Term Policy on ODA (1999)" highlighted that support for national land conservation and disaster prevention that utilizes Japanese experiences of responding to such disasters as earthquakes, is one of its seven priorities: "Conflicts, Disasters, and Development." Further, the "Economic Cooperation Policy Dialogue with Romania (1997)" emphasized the importance of infrastructure development in one of its three priorities: "Supporting Transition to the Market Economy."

Thus, this project was in line with the Japanese ODA policy at the time of the ex-ante evaluation study.

In conclusion, this project has been highly relevant to the development plan and development needs of Romania, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Effectiveness and Impact[4] (Rating: ②)

3.2.1 Effectiveness

3.2.1.1 Project Output

1) Output 1: Effective and low-cost retrofit techniques are developed by NCSRR and acquired by structural engineers[5]

①Not less than one technical manual on effective and low-cost retrofit techniques are developed, e.g. a manual on retrofitting works.

In September 2006, "Manual on Retrofitting Techniques" was developed by the project experts and the counterpart of NCSRR. NCSRR was able to independently operate the structural testing facilities[6] that had been utilized in the process of developing the manual, without support from the project experts. In addition, it became capable of revising the manual when additional tests were conducted. Thus, it is judged that NCSRR attained a level that allows them to perform the project activities independently.

Structural Test

②Not less than eight seminars on effective and low-cost retrofit techniques are held and not less than 400 structural engineers participate.

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[4] Sub-rating for Effectiveness is to be put with consideration of Impact.

[5] According to the terminal evaluation, the term "acquired" means for the counterparts "attained the level that allows them to perform the project activities independently" and for structural engineers who attended the seminars "got acquainted with the techniques", respectively.

[6] For example, they are the facilities that measure a damaged condition of testing samples, e.g. pillars.

By the end of the project, 14 seminars on retrofit techniques were held (175% of the target), and 304 structural engineers (76% of the target) participated in the seminars.

③ Not less than 80% of participants in the seminars are satisfied

304 participants acquired the techniques, and 85.9% of respondents to the questionnaire answered "understood" or "understood well" to the contents of the seminars.

The achievement of Indicator ① (development of the technical manuals) contributed to the "effective and low-cost retrofit techniques developed by NCSRR." The achievement of Indicators ② and ③ (participation of the seminars and understanding the contents) led to "effective and low-cost retrofit techniques acquired by structural engineers." Thus, Output 1 ("effective and low-cost retrofit techniques are developed by RCSRR and acquired by structural engineers") is judged to be achieved.

2) Output 2: Codes for both new buildings and existing ones are improved by NCSRR.

①Not less than four technical manuals on earthquake resistant design are developed by NCSRR, including 1) code for seismic design for new buildings; 2) code for assessment of existing buildings; 3) code for retrofitting design for existing buildings; and 4) code for seismic input ground motion.

All four manuals - "Code for seismic design for new buildings (July 2006)," "Code for retrofitting design for existing buildings (September 2006)," "Code for assessment of existing buildings (July 2007)," and "Code for seismic input ground motion (September 2007)" - were developed by the project experts and NCSRR. Counterparts became able to independently operate the structural testing facilities and the soil testing facilities that had been utilized in the process of developing the codes, without support from the project experts. Moreover, counterparts became capable of revising the manuals in accordance with construction management of retrofitting design by Output 5 described later. Thus, it is judged that NCSRR attained a level that allows them to perform the project activities independently.

Survey on the conditions of soil and ground

②Not less than four seminars on manuals are held and not less than 200 structural engineers participate.

By the end of the project, 21 seminars (525% of the target) were held and 551 structural engineers (275% of the target) participated in the seminars.

③Not less than 80% of participants in the seminar are satisfied.

551 participants acquired new techniques, and 86.1% of respondents to the questionnaire answered "understood" or "understood well" to the contents of the seminars.

As discussed above, the achievement of Indicator ① (development of the technical manuals) contributed to the improvement of the codes on both new and existing buildings. Thus, Output 2 is regarded to be achieved.

3） Output 3: Post–earthquake assessment techniques of the damaged buildings are developed by NCSRR and acquired by structural engineers[7]

①Not less than one technical manual on post-earthquake assessment techniques of the damaged buildings are developed, including the following subjects: 1) quick inspection of damages; and 2) assessment of the degree of damages.

This "Manual on post-earthquake assessment" was developed by the project experts and NCSRR in November 2006. Counterparts became able to independently conduct quick inspections of damages as well as assess the degree of damages without support from the project experts. Thus, it is judged that NCSRR attained a level that allows them to perform the project activities independently.

②Not less than five seminars on post-earthquake evaluation techniques of damaged buildings are held and not less than 250 structural engineers participate.

By the end of the project, five seminars (100% of the target) were held, and 215 structural engineers (86% of the target) participated in the seminars.

③ Not less than 80% of participants in the seminars are satisfied.

215 participants acquired the techniques of the seminar, and 93.8% of respondents to the questionnaire answered "understood" or "understood well" to the contents of the seminars.

The achievement of Indicator ① (development of the technical manuals) contributed to the success of "post–earthquake assessment techniques of the damaged buildings developed by NCSRR (Output 3)" The achievement of Indicators ② and ③ (participation in the seminars and understanding of the contents) led to "post–earthquake assessment techniques of the damaged buildings by structural engineers." Thus, Output 3 ("post–earthquake assessment techniques of the damaged buildings developed by NCSRR and acquired by structural engineers") is judged to be achieved.

7 See footnote 5.

4） Output 4: Disaster prevention education for the citizens is improved by NCSRR

①Not less than five seminars on earthquake disaster prevention are held and not less than 250 people participate.

By the end of the project, 16 seminars (320% of the target) were held, and 929 citizens (372% of the target) participated in the seminars.

②Not less than 80% of participants are satisfied.

929 participants acquired the information, and 89.9% of respondents to the questionnaire answered “understood” or “understood well” to the contents of the seminars.

③Not less than two printed leaflets on measures against earthquakes are published by NCSRR, including 1) measures against earthquakes for school children; and 2) legal incentives for retrofitting.

The “leaflet on measures against earthquakes (March 2007)” for school children and the “leaflet on government supporting schemes for retrofitting (July 2007)” for citizens were developed and published. Since the counterpart became able to revise the materials according to ages and targets, including a leaflet on measures against earthquake for school children, it is judged that NCSRR attained a level that allows them to perform the project activities independently.

④ Not less than 80% of citizens who read the printed leaflets are satisfied.

95.5% of respondents to the questionnaire answered “understood” or “understood well” to the contents of the materials.

The achievement of Indicators ①, ②, ③, and ④ (holding the seminars, publishing the materials, and promoting understanding) contributed to the achievement of “education on measures against earthquakes for the citizens (Output4), and hence, it is judged that Output 4 was achieved.

5） Output 5: Conditions necessary to apply the techniques developed by NCSRR are set up

① To select a target building for introducing new techniques.

One building, constructed before 1940 and deemed highly likely to collapse, and another building, constructed after 1940, were selected (as shown in the photos below).

Building constructed before 1940

Building constructed after 1940

② To make proposals for retrofitting the target buildings.

The project proposed retrofitting plans for the two buildings selected and Output 5 was achieved. However, the importance of training for and understanding the management of quality control on retrofitting were pointed out by the domestic supporting committee right before project completion. Therefore, tests using a model frame were newly added to the project activities. These tests were actually conducted as planned during the extended period.

To conclude, through the achievement of Indicator ① (target buildings to introduce new techniques) and Indicator ② (the introduction of techniques to the selected buildings), Output 5 (conditions necessary to apply the techniques developed by NCSRR; i.e., technical issues needed to introduce new techniques to the selected buildings were resolved) was achieved.

3.2.1.2 Achievement of Project Purpose

Project Purpose: Improvement and dissemination of techniques for reducing damages by collapse of buildings in case of a large-scale earthquake are achieved[8]

1) Indicator ①: By the end of the project period, techniques introduced by NCSRR will be incorporated into the detailed design of retrofitting for more than one building built before and after1940, respectively.

As discussed in Output 5②, the techniques acquired by NCSRR were proposed in retrofitting plans for the selected buildings (one was constructed before 1940 and the other was built after 1940) and actually introduced.

2) Indicator ②: By the end of the project period, technical manuals and guidelines for the seismic design of new buildings and the assessment and retrofitting design of existing buildings will be endorsed by the Romanian authorities.

The "Code for seismic design for new buildings (July 2006)" was endorsed at an exceptional speed by the Romanian government two months after the finalization of the code (September 2006). Though for the "Code for retrofitting design for existing buildings (September 2006)" and the "Code for assessment of existing buildings (July 2007)," it took 37 months and 27 months, respectively, to be endorsed by the Romanian government because of time required to obtain the approval from the Ministry in charge.

In conclusion, while Indicator ① was achieved, Indicator ② was not; due to both the "Code for retrofitting design for existing buildings (September 2006)" and the "Code for assessment of existing buildings (July 2006)" not being endorsed until after project completion. Their expectations to be endorsed by the end of the project was unrealistic.

[8] According to the terminal evaluation, "dissemination" means that "the techniques are introduced to structural engineers so that such techniques become available."

Thus, it is judged that the project purpose was achieved at a limited level.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

Overall Goal: Measures against earthquakes are strengthened in Romania.

Indicator: Within five years after the completion of the project, the number of existing buildings assessed and retrofitted (Class I-IV[9]), as well as new buildings using the outcomes of the project, will increase to such an extent that is satisfactory to stakeholders.[10]

Before conducting interviews, the following points were confirmed and shared with the stakeholders of the project: 1) the number of new buildings constructed in accordance with the "Code for seismic design for new buildings (July 2006)" over five years from 1 April 2008 (the next day of project completion); and 2) the number of existing buildings (class I-IV) that were retrofitted in accordance with the "Code for retrofitting design for existing buildings (September 2006)" over the same period.

[New buildings]

Between April 2008 and March 2013, 120,055 buildings were constructed in accordance with the code in Romania.

[Class I buildings]

Between April 2008 and March 2013, the number of Class I buildings in Bucharest that were retrofitted in accordance with the code was 6 out of 341. Among them, only four out of 122 Class I buildings higher than 5 stories were retrofitted, even though they were considered highly likely to collapse when a large-scale earthquake occurred. Since most of the Class I buildings are apartment houses, it is difficult to reach a consensus among residents for retrofitting work. Residents are reluctant to bear the cost of design and retrofitting and to relocate themselves temporarily during the work. Although the counterpart agency has emphasized the importance of retrofitting work since the project period, by utilizing materials developed during the project as well as TV marketing campaigns, and although Bucharest city has been encouraging citizens to complete retrofitting work by providing subsidies[11], these initiatives have made little progress.

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[9] Existing buildings are classified into four classes according to their resistance to earthquakes. Class I: Risk of collapse is high. Class II: Risk of collapse is low, but major retrofitting work is necessary. Class III: Risk of collapse is low, and minor retrofitting work is necessary. Class IV: Resistance is as high as the level required for new buildings.

[10] Despite the interviews of both Romanian and Japanese sides, there was no clear explanation as to "such an extent that is satisfactory to stakeholders." Thus, the external evaluator resorted to the results of individual interviews to project stakeholders in judging the degree of achievement of the overall goal.

[11] In case where the annual income of residents is lower than the national average, the government bears the

[Class II-IV buildings]

Since the data were not available in this ex-post evaluation study, there is no detailed information on these classes. However, according to stakeholders involved with the project, because the risk for buildings of Class II-IV to collapse was considered to be relatively low, it is assumed that few buildings have executed retrofitting work.

Based on the facts confirmed above, interviews on the Romanian side (stakeholders at the counterpart agency, other governmental agencies, and the university) were conducted to find out the degree to which the number of buildings retrofitted was satisfying. The result showed that the Romanian side was generally satisfied because the number of new buildings that have been constructed in accordance with the code is large enough to cover the small number of existing Class I buildings retrofitted. Though according to the results of interviews on the Japanese side (stakeholders involved in the project and JICA staff), satisfaction was less; due to dissatisfaction to meet original development needs to retrofit existing Class I buildings in Bucharest, even though the large number of new buildings constructed was appreciated. This discrepancy among stakeholders leads the external evaluator unable to conclude that the number of existing buildings assessed and retrofitted as well as new buildings using the outcomes of the project have increased to such an extent that is satisfactory to stakeholders. Thus, it is judged that the overall goal was partially achieved.

As for new buildings, the logic between project purpose and overall goal is reasonable. All new buildings must be constructed in accordance with the "Code for seismic design for new buildings (July 2006)" developed by this project, which illustrates the achievement of Indicator ② of the project purpose, i.e. endorsement of the code by the Romanian government. However, it is necessary for the project to have all residents accept retrofitting works for the 122 existing Class I buildings in Bucharest, especially because most of the Class I buildings are apartment buildings. However, no activity to make consensus among residents was included in the project design, and therefore there was no clear prospect of reaching a consensus. Thus, regarding existing buildings, it is concluded that there was a gap in logic between project purpose and overall goal.

3.2.2.2 Other Impacts

1) Impacts on the natural environment

None.

2) Relocation and land acquisition

None.

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cost of retrofitting on behalf of residents. In case where it is higher, however, residents have to bear it.

3） Other indirect impact

None.

In sum, this project has somewhat achieved its purpose and overall goal. Indicator ① was successfully achieved. Indicator ② was not achieved due to a delay in the endorsement of manuals and guidelines. The overall goal has been somewhat achieved because the Romanian side was satisfied with the achievement of the project, while the Japanese side was not. Therefore, effectiveness/impact of the project is fair.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

Inputs	Planned Inputs	Actual Inputs
＜Japanese Side＞		
(1) Experts	Total: 33 (3 for Long-Term,30 for Short-Term)	Total: 55 (7 for Long-Term,44 for Short-Term)
(2) Trainees received	Structural tests, Soil/Ground tests, etc. 20 trainees	Structural tests, Soil/Ground tests, etc. 30 trainees
(3) Third-Country Training Programs (Turkey)	－ 0	Structural tests 6 trainees
(4) Equipment	Structural testing facilities, Soil/Ground testing facilities, etc.	Structural testing facilities, Soil/Ground testing facilities, etc.
Total Project cost	808 million yen	873 million yen
＜Romanian Side＞		
(1) Counterparts	34 counterparts	39 counterparts
(2) Project Office	Office, chairs, desks, phone, etc.	Office, chairs, desks, phone, etc.
Total Local Cost	125 million yen	N/A

3.3.1.1 Elements of Inputs

＜Japanese Side＞

In the project activities related to Output 1-4, the number of Japanese experts and trainees from Romania exceeded the plan, and the activities related to Output 5 ②(implementation of tests using a model frame) were newly added to the original plan. Further, a third-country training program at Istanbul Technical University (Turkey) was also added. The university had received JICA's technical cooperation project (Project of Earthquake Disaster Prevention Research Center) from 1993 to 2000, which concerned similar topics, such as seismic structural research and development of earthquake observation system.

＜Romanian Side＞

Input from Romanian side was largely as planned. Since the information on the exact amount of local cost was not available, the comparison between planned and actual amount was impossible.

3.3.1.2 Project Cost

The actual cost was 873 million yen, which was greater than planned (108% of planned). This was due to the increase in the number of Japanese experts and trainees from Romania, the additional activities related to Output 5, and the additional third-country training.

3.3.1.3 Period of Cooperation

All of the activities and outputs planned were completed within the original project period (October 2002 to September 2007). However, since the additional activities related to Output 5 ②were added right before project completion, the project period was extended for 6 months. Hence, the actual project period was October 2002 to March 2008, which was 110% of the planned period.

In conclusion, since both the project cost and project period exceeded the plan, efficiency of the project is fair.

3.4 Sustainability (Rating: ③)

3.4.1 Related Policy towards the Project

"National Development Plan 2007-2013 (2005)" has not changed and remains valid. On the other hand, NCSRR, which was established by "National Building Research Institute (INCERC)" and Technical University of Civil Engineering of Bucharest (UTCB), merged into URBAN-INCERC[12] in August 2010, along with other related research institutions as part of restructuring the public sector, based on "Ordinance 16 (2010)". At the time of the merger, the counterparts who had worked for NCSRR returned to their original institutions: INCERC and UTCB. Since then, effective and efficient implementation of research and education activities that had been possible at NCSRR became difficult because the counterparts were separated into two different institutions. In October 2013, however, the transition of URBAN-INCERC from the Ministry of Regional Development and Public Administration to the Ministry of National Education took place, after the law putting all the public research institutions under the jurisdiction of the Ministry of National Education, the same as UTCB. The minister of education took the leadership in proposing the establishment of an independent center specializing in research and education on measures

[12] In 2009, INCERC, URBAN-PROIECT (National Institute for Research and Development in Urbanism and Territorial Development), and CDCAS (National Center for Research, Development and Documenting for Constructions, Architecture, Urbanism, and Territorial Planning) merged into URBAN-INCERC.

against earthquakes, and one that would align with the governmental policy to centralize the role in research and education in universities. Following his proposal, in January 2014, UTCB established RCSRA. It is interdisciplinary (dealing with four subjects,[13] of which the former NCSRR was in charge, as well as the fifth subject of risks of climate change) and advanced (cooperating with other leading universities or research institutions). Further, in March 2014, the minister of education declared the "Minister's Decision 126" and strengthened RCSRA's role in research and education by transferring the functions of the former NCSRR to RCSRA, including the equipment URBAN-INCERC took over from the former NCSRR. It is now conducting research and providing technical advice on earthquake engineering issues to the decision makers from national authorities, along with the National Institute for Earth Physics (INFP) and URBAN-INCERC. In this way, these three institutions provide a well-balanced and unbiased advisory framework in the field of seismic risk reduction for central and local authorities.

Thus, although the restructuring of the public sector in 2010, two years after the project completion, had some negative effects, the sustainability of the project from political and institutional aspects is judged as high, now that RCSRA that takes over the functions of the former NCSRR under the strong leadership of the minster of education.

3.4.2 Institutional Aspects of the Implementing Agency

The 5 research policies of RCSRA are based on the role of Division 1-4 of the former NCSRR. The first policy (Seismic assessment and retrofitting) corresponds to the former NCSRR's Division 1 (Seismic assessment and retrofitting), and in part Division 3 (Structural tests). The second policy (Seismic observation and Risk assessment) corresponds to Division 2 (Seismic observation). The third policy (Soil tests) corresponds to Division 3 (Soil tests). Finally, the fourth policy (Risk assessment and knowledge dissemination) is compatible with Division 4 of the former NCSRR (Education on measures against earthquakes). Moreover, RCSRA has a fifth policy (Risks of climate change).

The current director of RCSRA was the representative of the former NCSRR who worked as the project director for this project. He supervises 50 staff, more than the 34 during the implementation period of the project, and most are trained for this project. They all (except for one technical staff) possess a doctoral degree and are professors, assistant professors, or lecturers. The number of staff in each policy is as follows: 12 staff (of which nine took the training of this project) in Policy 1, 11 staff (of which seven took) in Policy 2, five staff (of which four took) in Policy 3, 10 staff (of which four took) in Policy 4, and 12 staff (of which six took) in Policy 5. Thus, there is no major problem in the institutional aspects of

[13] 1) Seismic assessment and retrofitting, 2) Seismic observation, Post-earthquake assessment of damages, and dissemination of techniques, 3) Soil and structural tests, and 4) Education on measures against earthquakes.

RCSRA.

3.4.3 Technical Aspects of the Implementing Agency

The director of RCSRA (the former project director) and other staff of RCSRA have accumulated the experience of research and education on seismic measures and have continued to make efforts to maintain and improve their technical capabilities. For example, they participated in a research and education project in the International Platform for Reducing Earthquake Disaster organized by UNESCO after the project completion. They also presented the result of their activities in the seminar, the New Initiative toward the Advancement of Strong Motion, Site Effect, and Risk Evaluation for Future Mega-Quakes, held at Kyoto University. As for the maintenance of the equipment provided by the project, no major problem is observed as most of the staff previously trained through the project and acquired the skills for operation and maintenance. Additionally, since the revision of manuals and trainings for new staff are also conducted, there is no problem in the technical aspects of RCSRA.

3.4.4 Financial Aspects of the Implementing Agency

Since RCSRA was recently established in January 2014, there is no financial statement at the time of the ex-post evaluation study[14]. The staff of RCSRA comprises professors, assistant professors, or lecturers, and they are paid[15] by the Ministry of National Education for their academic posts. The additional payroll for research and education at RCSRA is supposed to be covered by the budget of projects commissioned by other agencies. As of 2014, RCSRA does not face financial problems; it has taken over the project that has been commissioned to UTCB by the Ministry of National Education since 2012, and its contract lasts until 2016. Further, RCSRA is applying to several national and international projects. RCSRA plans to utilize equipment provided by this project in its projects mentioned above. Since the annual maintenance cost is estimated to be no more than 3,000 euro, the cost can be covered by the project cost without any problems. Thus, there is no problem with financial aspects of RCSRA.

In conclusion, no major problems have been observed in the policy background and the institutional, technical, and financial aspects of the implementing agency. Therefore, sustainability of the project effects is high.

[14] There was no information available on the budget in the fiscal year of 2014 at the time of the ex-post evaluation study.
[15] It is approximately 175,000 Euro per annum, equivalent to approximately 25 million Yen.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to apply the new codes of seismic techniques, elaborated by the project itself and endorsed by the Romanian government, to both new and existing buildings, and thereby to contribute to strengthening measures against earthquakes in Romania. Since the purpose of the project was in line with the development policies of Romania and Japan, as well as with the development needs in Romania, relevance of this project is high. While the project elaborated the new codes as planned, some were not endorsed by the Romanian government by the end of the project. Thus, the project purpose was achieved at a limited level. In terms of impact, the code for new buildings has been applied to many buildings newly built, but the codes for existing buildings have not been much applied. Though the Romanian stakeholders are satisfied with these impacts, the Japanese stakeholders are not, and the overall goal has not been fully achieved. Thus, the effectiveness/impact of this project is fair. Efficiency of this project is fair because both the project cost and period exceeded the original plan. The counterpart agency, NCSRR, was absorbed by URBAN-INCERC together with other related research institutions in 2010 by "Ordinance 16 (2010)". However, in 2014, RCSRA, which specialized in interdisciplinary research and education on seismic risks, was established by UTCB under the initiative of the Minister of Education. The Minister endorsed the establishment and transferred the function of the former NCSRR, which had been carried out by URBAN-INCERC, to RCSRA. This process of restructuring contributed to the enhancement of research and education systems of RCSRA. Since RCSRA has no major problem in institutional, technical, and financial aspects, sustainability is high.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

Aligning with the governmental policy to centralize the role in research and education in universities, the Minister of National Education took the leadership in proposing the establishment of an independent center specializing in research and education on measures against earthquakes. Following his proposal, UTCB established RCSRA, an interdisciplinary and advanced institution. By closely working with other related universities and institutions, it is recommended that RCSRA develop new retrofitting techniques that are less expensive and do not force residents to move out during retrofitting work. If this can be accomplished, it is expected that RCSRA can contribute to the overall goal of the project that measures against earthquakes are strengthened in Romania and expectations held by the Romanian government.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

[Importance of setting targets examining both contents and schedule]

One of the indicators of the Project Purpose was that technical manuals and guidelines will be endorsed by the Romanian authorities "by the end of the project period." However, considering the time required to complete necessary procedure and obtain endorsement by the Romanian government, this seems unrealistic. Thus, it is important to set more realistic targets and indicators by examining both the contents and the schedule of the project.

[Importance of setting objective and realistic targets considering the role and capacity of the counterpart agency.]

While "Retrofitting work of existing buildings" is included in the indicator of the overall goal, activities to make a consensus for retrofitting work among residents were not included in this project, and there was no clear prospect of reaching a consensus. Since there is a slight gap in logic between the project purpose and the overall goal, it is important to set realistic targets by examining the logic between the project purpose and the overall goal.

Further, the indicator of the overall goal, "the number of existing buildings assessed and retrofitted, as well as new buildings using the outcomes of the project, will increase to such an extent that is satisfactory to stakeholders," is a subjective and qualitative view of the project from stakeholders. Without a clear consensus among stakeholders on the satisfaction of the project, it is difficult to assess accurately. Thus, the indicator should be more objective and quantitative in order to properly manage the project.

(End)