Internal Ex-Post Evaluation for Technical Cooperation Project

conducted by Europe Division, August 2019

Country Name	**Project for Risk Identification and Land-use Planning for Disaster Mitigation of Landslides and Floods in Croatia (SATREPS)[1]**
Republic of Croatia	

I. Project Outline

Background	Croatia has frequent earthquakes, landslides and flash floods caused by complexed and fragile geographical structure and large volume of annual rainfalls. High disaster risk areas are located in urban peripheries. In addition, since the population growth and the asset accumulation have been accelerated by disordered development in those areas, there has been a concern about expansion of damages by landslides and flash floods. Also, it has been anticipated that possible changes in rainfall pattern in the country caused by climate change would lead higher disaster risk in some areas. Therefore, researches on reliable risk assessment methodologies based on scientific understandings, development of hazard mapping, and researches on improvement of land use considering disaster risks were needed in the country.		
Objectives of the Project	Through development of methodologies risk assessment and landslide early warning system as well as flash flood and debris flow simulation models and early warning system in model sites, the project aimed at development of integrated landslides/flood hazard mapping technology and land use guidelines formulation methodologies for nationwide application in Croatia. 1. Overall Goal: N.A. 2. Project Purpose: Integrated landslides/flood hazard mapping technology and land-use guidelines formulation methodologies are developed for nation-wide application in Croatia.		
Activities of the Project	1. Project site: Zagreb, Rijeka and Split 2. Main activities: 1) Development of methodologies for landslide risk assessment and landslide early warning system in model sites, 2) Development of flash floods/debris flow simulation models and early warning system in model sites, 3) Development of integrated landslide/flood hazard mapping technology and formulation of land-use guidelines for disaster mitigation in the study areas 3. Inputs (to carry out above activities) Japanese Side 1) Experts: 19 persons 2) Trainees received: 18 persons 3) Equipment: Equipment for landslide monitoring, ArcGIS software, Polyworks software, Water level detector, Water level data logger, Water level pressure sensor, Portable Direct Shear Apparatus, etc. 4) Local cost: travel expenses, cost for local consultants, meeting expenses, cost for chemical analysis of groundwater, drilling, etc. Croatian Side 1) Staff allocated: 46 persons 2) Land and facilities: Office spaces for Japanese experts in University of Rijeka 3) Local cost: personnel cost for young researchers, shipment and installation cost for the equipment procured by the Japanese side		
Project Period	March 2009 – March 2014	Project Cost	(ex-ante) 390 million yen, (actual) 373 million yen
Implementing Agency	Ministry of Science, Education and Sport (MZOS), University of Zagreb (UZ), University of Rijeka (UR), University of Split (US), Croatian Water (CW), and Croatian Geological Survey Institute (CGSI)		
Cooperation Agency in Japan	Niigata University, Kyoto University, International Consortium on Landslides (ICL), Tohoku Gakuin University, Yamagata University		

II. Result of the Evaluation

< Special Perspectives Considered in the Ex-Post Evaluation >

[Verification of envisaged Overall Goals]

For this SATREPS project, since the Project Purpose was "development of integrated landslide/flood hazard map and land-use guideline for landslide/flood risk mitigation by local governments for nationwide application in Croatia", the envisaged Overall Goal can be "nationwide application of the manuals developed by the project for developing integrated landslide/flood hazard maps and the land-use guideline for landslide/flood risk mitigation " which can be verified as one of the expected positive impact by this ex-post evaluation. However, as mentioned below, there was difficulty to verify the status of application of the manuals developed by the SATREPS project in Croatia due to the limited contact with the related organizations in the country. Even within the target areas, since no similar hazard have occurred for the last four years, there was no case to extend the hazard mapping and no case to prepare a land use plan for mitigation of landslide/flood risk in other municipalities.

<Constraint against Evaluation>

In general, accordance with the JICA's evaluation operation policy on the SATREPS project, the ex-post evaluation on the SATREPS project is based on data and information to be collected through questionnaire surveys to the ex-counterpart research organizations participating in the SATREPS project. However, while conducting the Ex-Post Evaluation on this SATREPS project, available information and resources were limited for some reasons. One reason is that there is no overseas office of JICA in Croatia. As for another reason, Croatia became a member country of European Union in 2013 and was removed from the OECD (Organization for Economic Cooperation and Development) DAC (Development Assistance Committee) List of Official Development Assistance (ODA) Recipients. Since this project, no other JICA project and activity have been done in Croatia. Therefore, the evaluator has limited contact with the relevant organizations involved in the SATREPS project to be evaluated.

1 Relevance
<Consistency with the Development Policy of Croatia at the Time of Ex-Ante Evaluation and Project Completion>

[1] SATREPS stands for "Science and Technology Research Partnership for Sustainable Development".

The project was consistent with the Croatia's development policies to introduce modernized land use system and regulation on land development, such as "Strategic Development Framework" (2006-2013) and laws including the "Protection and Rescue Law" (Official Gazette 127/10) and the "Law on Protection from Natural Disasters" (Official Gazette 73/79).

<Consistency with the Development Needs of Croatia at the Time of Ex-Ante Evaluation and Project Completion >

The project was consistent with the Croatia's development needs to improve integrated hazard mapping technology for improving predictability of disasters and to prepare more effective mitigation strategy against rainfall disasters.

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

The project consistent with the Japan's ODA policy for Croatia prioritizing to support the areas of environment and enhancement of administrative institutions confirmed by the economic cooperation policy dialogue in March, 1997[2].

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the time of Project Completion>

The Project Purpose was achieved by the time of project completion. The Indicator 1 and 2 were achieved through development of the manual book for developing integrated landslide/flood hazard map and land-use guideline for mitigation.

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have been partially continued by the time of ex-post evaluation. The knowledges derived from the project have been utilized and some prevention measures have been taken by the local government in the target areas through utilization of the hazard map developed by the project. The simulation models developed by the project for landslide risk assessment and flash flood/debris flow prediction have been utilized for some pilot areas including Rijecina and Dubracina catchment areas. However, for other pilot areas such as Moscenika Draga, Duce and Omis, the simulation models have not been utilized due to specific hazard and environment or extreme variations of precipitations and water regime. In UZ, UR and US, the equipment provided by the project have been appropriately maintained and continuously used for their research and educational purposes. Also, according to UR, the landslide monitoring system in Grohovo has been used for monitoring on Rjecina catchment area, and the ring shear apparatus has been used for soil testing and landslide simulations in the Geotechnical Laboratory in UR.

<Status of Achievement for Envisaged Overall Goal at the time of Ex-post Evaluation>

The envisaged Overall Goal was not able to be verified at the time of ex-post evaluation. It was because there was no similar hazardous event in the target areas and no case to update the hazard map to cover the extended areas as well as to prepare a land use plan for risk mitigation for other site in the target areas. However, the research outputs by the project, such as the hazard map and the simulation models, have been utilized as mentioned above. In addition, as for utilization of research outcomes, the government of City of Rijeka prepared the "Report about protection and rescue system of City of Rijeka" in 2017 based on the research outputs by the SATREPS project. However, further activities, such as policy-making by using research outcomes, were not identified at the time of Ex-post Evaluation.

<Other Impacts at the time of Ex-post Evaluation>

There are some positive impacts of the project confirmed at the time of ex-post evaluation. Two Ph.D. theses and eight Ph.D. theses were produced at US and UR, respectively, by using the equipment provided by the project. The project played an important role on enhancing research capacity of young researchers in terms of dissemination of their ideas and research outcomes to local government and engineering society. After the project, 4 young researches were employed at the Faculty of Civil Engineering in UR. In addition, through the utilization of the hazard maps developed by the project, scientific publications in the field of landslide science increased in scientific journals and international/national conferences in the last year of the project and after the project. Furthermore, the researchers from UR and UZ established the Croatian Landslide Group, and it has been approved and entitled as World Centre of Excellence on Landslide Risk Reduction for the period of 2014-2017 and 2017-2020 from the International Consortium on Landslide. The Croatian Landslide Group established the Adriatic-Balkan Network under an umbrella of the International Consortium on Landslides with scientific organizations from neighboring countries[3] to share the knowledge in landslide science. UZ and UR also established the Regional Symposium on Landslides in Adriatic Balkan Region that was held in Zagreb in the frame of the project and in Belgrade (2015) and Ljubljana (2017),

<Evaluation Result>

Therefore, the effectiveness/impact of the project is fair.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results
(Project Purpose) Integrated landslides/flood hazard mapping technology and land-use guidelines formulation methodologies are developed for nation-wide application in Croatia.	(Indicator 1) Number of manual books to develop integrated landslide/flood hazard map (1 manual)	Status of the Achievement: Achieved (partially continued) (Project Completion) ● One manual book was developed for utilization of methodologies to assess landslide/flood risk though specific details were not covered due to different origin of hazard by each site. (Ex-post Evaluation) ● The knowledges derived from the project has been utilized and some prevention measures have been taken by using hazard map developed by the project and additional inspection after the project. ➢ City of Omis: receiving fund from the Ministry of Environment and FGAG (Faculty of Civil Engineering, Architecture and Geodesy, University of Split) to take adequate measures. ➢ Sutina Karakasica and Imotski: dealing with extreme variations in precipitation and water regime due to climate changes
	(Indicator 2) Number of manual books to develop land-use guideline for landslide/flood risk mitigation (1 manual)	

[2] Ministry of Foreign Affairs, "ODA Databook", 2008

[3] Slovenia, Serbia, Albania and Bosnia and Herzegovina

		➢ Civil Protection Office of the City of Rijeka: updating the evacuation plans for landslides
(Envisaged Overall Goal) Application of the manuals for developing integrated landslide/flood hazard map and land use guideline for landslide/flood risk mitigation.	(Indicator 1) The integrated landslide/flood hazard maps are prepared by applying the manual developed by the project for other high risk or fragile areas against landslide and/or flash floods after the project completion.	(Ex-post Evaluation) Not verified ● No similar hazardous events in the target areas limited extension of hazard mapping in the target area. ● No available information for the application status in the entire country.
	(Indicator 2) The land use guidelines or the land use plan for mitigation or landslide/flood risk mitigation by applying the manual developed by the project for other high risk or fragile areas against landslides and/or flash floods after the project.	(Ex-post Evaluation) Not verified ● No similar hazardous events in the target areas limited update of the land use plan in the pilot site and preparation of the land use plan in other municipalities in the target areas. ● No available information for the application status in the entire country.

Source：Terminal Evaluation Report, responses from US and UR for the questionnaire for the ex-post evaluation

3 Efficiency

Although the project cost was within the plan (the ratios against plan: 96%), the project period slightly exceeded the plan (the ratio against plan: 107%). The project outputs were produced as planned. Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

Although there is no specific policy to promote researches on disaster management, in particular on landslides and flash floods after the project completion, there was no change in the laws on disaster management and land use for disaster management.

<Institutional Aspect>

As mentioned above, the universities involved in the project have continued the related research activities on the hazard map and the simulation of landslides/flash floods, and continued to produce scientific publications. Namely, they have continuously assigned the research staff for these research activities. Also, it is reasonably indicated that the local governments of the pilot sites have sustained the organizational setting to take necessary actions and measures against the possible disasters of landslides/flash floods based on the hazard map developed by the project. However, the current status of some institutions related to the project was not confirmed by the ex-post evaluation.

<Technical Aspect>

US has continued researches related to the facilities/equipment in rockfall and flood as well as risk and resilience assessment. The Faculty of Civil Engineering in UR, Geotechnical Chair has a wide scientific cooperation with similar scientific groups involved in landslide science in Croatia, Italy, Slovenia, Austria and Serbia. After the project, the Geotechnical Chair was an active member inside 4 international projects. The Geotechnical Chair just started a project of Croatian Science Foundation. In addition, UR improved their skill through continuous education related to the research facilities/equipment installed by the project. Therefore, the researchers of the universities involved in the project have sustained the necessary research capacity.

<Financial Aspect>

There is no specific data on funds for the research activities. However, the research activities in this field have been quite active in Croatia and have been appropriately financed by the Government, although they have not been necessarily directly related to the project.

<Evaluation Result>

There is some unclearness for future prospect from the aspects of policy, institutional and financial aspects that is partly because of limited available data and information. Therefore, the sustainability of the effects through the project is fair.

5 Summary of the Evaluation

The project partially achieved the Project Purpose and the research outcome such as the hazard map and the simulation model have been partially utilized for mitigation measures against landslides/flash floods. The project contributed to enhancing the research capacity of the young researchers. As for sustainability, it was impossible to determine the degree of sustainability due to the limited information collected by the ex-post evaluation. As for efficiency, the project period slightly exceeded the plan.

Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

(for) all concerned Implementing Agencies,

In order to apply the outcome of the project to land-use guidelines and the policy-level, it is recommended to promote collaboration between Universities and Local government and to formulate institutional framework for contribution of the project to Croatian disaster management policy.

Lessons Learned for JICA:

- For accelerating practical use of the research outcome and reflection on policy-making, local government should be included in the events related to the project, such as JCC.
- In case where a project was implemented in a country with the limited experience in projects supported by JICA and no JICA's office, there were difficulties to collect data and information for ex-post evaluation in order to assess effects and impacts of the project as well as their sustainability for the post project period. The limited data and information constrained evaluation analysis for the ex-post evaluation. Therefore, at the planning stage, it is preferable to consider setting up a mechanism or making involvement some government institution which can be a focal point to monitor activities by stakeholders for utilization of research outputs/outcomes by SATREPS project for the post project period. For example, in addition to a responsible ministry for research institutes and university,

involvement of any government authority at central level which is in charge of disaster management may facilitate to follow up related activities for extension of hazard mapping and land use planning by application of the methodologies developed by the SATREPS project.

Soil Testing Equipment installed in University of Rijeka

Comprehensive Monitoring System on the Grohovo Landslide