Internal Ex-Post Evaluation for Technical Cooperation Project

conducted by Argentine office: March, 2013

Country Name	Regional Geologic Mapping with Advanced Satellite Sensors
Argentina	

I. Project Outline

Project Cost	584 million yen	
Project Period	March, 2001 – February, 2005	
Implementing Agency	- Argentine Geological Mining Service (SEGEMAR: Servicio Geologico Mineiro Argentina) - Institute of Geology and Mineral Resource (IGRM: Instituto Geologico y Recurso Mineral)	
Cooperation Agency in Japan	- Mineral and Natural Resource Division, Natural Resources and Fuel Department, the Agency for Natural Resources and Energy, the Ministry of Economy, Trade and Industry.	
Related Projects (if any)	Cooperation by Japan - Training on Remote Sensing using ASTER Data (Third Country Training, 2006-2011) Cooperation by other donor - None	
Background	Argentina has vast land with geological environment of prospects of mineral resources. However, the outputs of mineral resources of the country had been limited in contrast with the potentials due to less progress of exploration and development. Since one of the constraints was underdevelopment of basic geological information which are necessary for exploration and development of mineral resources, the necessity of efficient geological information development was pointed out. On the other hand, the geological surveys conducted by SEGEMAR under the Mining Agency could not make sufficient achievement due to the lack of human resource and equipment. Under those circumstances, the government of Argentina requested the government of Japan technical cooperation aiming at establishment streamlining process of geological mapping by introduction of technologies for advanced satellite data processing and analysis.	
Inputs	Japanese Side	Argentine Side
	1. Experts 5 experts of 4 areas for Long term, 24 experts of 7 areas for Short term 2. Trainees Received: 9 trainees 3. Equipments 130 million yen 4. Local Cost -	1. Counterpart: 52 persons 2. Land and facilities: Office spaces for the Project 3. Equipment: the existing equipment owned by IGRM 4. Local Cost: 0.32 million pesos
Project Objectives	Overall goal Geological maps and thematic maps for mineral exploration using advanced satellite data are prepared by IGRM.	
	Project Objectives IGRM is able to utilize advanced satellite data such as ASTER* and/or PALSAR** in order to make geological maps and thematic maps for mineral exploration. *ASTER: Advanced Spaceborne Thermal Emission and Reflection Radiometer. The sensor for mineral exploration jointly developed by the National Aeronautic and Space Administration (NASA) of USA and the Ministry of Economy, Trade and Industry (METI) of Japan. **PALSAR: Phased Array type L-band Aperture Rader. The microwave sensor using more advanced observation technologies such as multi polarized mode for resource exploration, environmental monitoring on earth and monitoring of natural disasters.	
	Outputs ・System for utilizing satellite data is established. ・Equipment and advanced satellite data are managed and maintained properly. ・IGRM geologists have enough technology to utilize advanced satellite data such as ASTER and/or PALSAR on geological and thematic mapping for mineral exploration. ・Usefulness of the remote sensing data is understood by the persons concerned and users through seminars and workshops.	

II. Result of the Evaluation

Summary of the Evaluation
The government of Argentina has been implementing “the National Program for Geological and Thematic Mapping” since 1993. In 1994, the Department of Remote Sensing and Geological Information System was established in order to utilize satellite image analysis (remote sensing) for efficient mapping works. However, it was needed to introduce advanced satellite data processing and analysis technology and necessary equipment and software since the lack of human resource and equipment were constraints.

The Project has achieved development of geological and thematic maps for mineral exploration using the ASTER data and improvement of efficiency and accuracy of mapping for the project purpose of utilization of advanced satellite data for geological and thematic mapping by IGRM. Also, it has achieved development of geological and thematic maps for mineral exploration and thematic maps for environment prevention and disaster management for 16 provinces for the overall goal. Furthermore, there are spillover effects, such as technical transfer to third country researchers through the third county training courses. As for sustainability, there was no problem observed in the project due to the sustaining importance and needs of geological and thematic mapping in the national policy, the maintained personnel and their technical capacity and the ensured budget for the mapping after the completion of the Project.

For relevance, the Project has been highly relevant with Argentina's development policy, development needs as well as Japan's ODA policy. For efficiency, the project cost exceeded the plan.

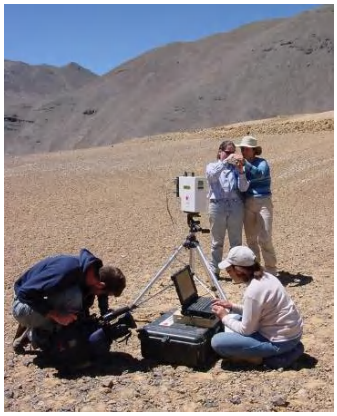
In the light of above, this project is evaluated to be highly satisfactory.

1 Relevance

This project has been highly relevant with Argentina's development policy of "promotion of mining and improvement of investment environment for the mining sector" by the amendment of the Mining Law and the establishment of the Federal Council of Mining (Consejo Federal de Minería), development needs of "geological and thematic mapping for mineral exploration and thematic mapping for disaster control", as well as Japan's ODA policy for Argentina to address "improvement of social gaps", at the time of both ex-ante evaluation and project completion. Therefore, relevance of this project is high.

2 Effectiveness/Impact

This project has largely achieved the project purpose of utilization of advanced satellite data for geological and thematic mapping for mineral exploration. At the time of the terminal evaluation in 2004, data of ASTER utilized for development of maps. In terms of geological map, 5 sheets were completed and 3 were in process against the target of 8 sheets. In terms of metallogenic maps, 1 sheet was completed and 1 was in process against the target of 2 sheets. The utilization of ASTER and PALSAR data improved quality of geological information as well as efficiency of geological mapping. Also, the overall goal has been achieved. The regions covered by geological maps have been expanded with development of various geological maps, topographic maps, image maps, and mosaic maps for 16 provinces, including Misiones and Buenos Aires. Also, the geological hazard maps were prepared for the provinces, including Entre Rios, Buenos Aires, Rio Negro, Neuquén and Chubu. In addition, more detailed rock distribution maps were developed.



Geological survey using the equipment provided by the Project

More than 10 provinces with prospects of mineral resources have needs for geological and thematic mapping using the ASTER data. The ASTER data have been utilized for activities such as ASTER image processing, field works, GPS measurement, and radiative measurement. In addition, the technical transfer to researchers from other South American countries has been promoted by the third country trainings supported by JICA. Also, the project for researchers of Cuba and Ecuador has been implemented under the international cooperation program organized by the Ministry of Foreign Affairs of Argentina. Besides that, more than 30 seminars were held for presenting research products by the researchers of SEGEMAR/IGRM. There is no negative impact on natural environment and no resettlement and land acquisition.

Therefore, its effectiveness/impact of this project is high.

Achievement of the Project Purpose and the Overall Goal

Outcomes	Indicators (Target)	Actual Achievement
Overall Goal Geological and thematic mapping for mineral exploration by IGRM	The area covered by the geological maps and thematic maps is expanded.	(At the time of ex-post evaluation in 2012) - Geological and thematic maps developed: ➢ Geological map of 1:250,000: 11 sheets for 6 provinces including Misiones ➢ Geological map of 1:100,000: 20 sheets of 8 provinces, including San Juan ➢ Topographic map of 1:100,000: 15 sheets ➢ ASTER map of 1:50,000: 2 sheets ➢ ASTER image map of 100,000: 16 sheets ➢ ASTER image map of 250,000: 2 sheets ➢ ASTER mosaic map of 50,000: 1 sheet
	The types of the thematic map increase.	- Geological hazard map of 1:100,000: Entre Rios, Buenos Aires, Rio Negro, Neuquén and Chubu.
Project Purpose Utilization of advanced satellite data for geological and thematic mapping for mineral exploration	8 sheets of 1:100,000 geological maps and 2 sheets of metallogenic maps are made using ASTER and/or PALSAR data	(At the time of project completion in 2004) - Geological map: 5 sheets completed, 3 sheets in process - Metallogenic map: 1 sheet completed, 1 sheet in process

	Quality of geological maps and thematic maps are improved by using ASTER and/or PALSAR data.	- Accuracy of geological maps was improved. Since the ASTER data is more accurate the LANDSAT data, geological information which has been unknown can be obtained through detailed geological mapping.
	Efficiency of geological mapping and thematic mapping are increased y using ASTER and/or PALSAR data.	- Utilization of DEM is effective to establish a streamlined process of geological mapping as well as selection of sample collection sites.

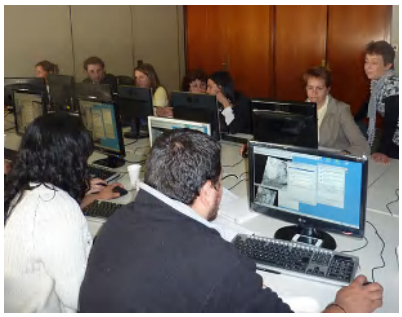
Source: Terminal Evaluation Report and interviews with the counterpart agencies.

3 Efficiency

While the inputs were appropriate for producing the outputs of the Project, and the project period within the plan (ratio against the plan: 100%), the project cost was higher than the plan (ratio against the plan: 142%) because the cost purchasing ASTER images, which were necessary for geological mapping, increased to obtain more number of ASTER images than the plan in order to cover more target regions than the plan. Therefore, efficiency of this project is fair.

4 Sustainability

In Argentina, the needs for geological and thematic mapping using the ASTER data due to the prioritized policy to promote mining for economic development as well as environmental conservation and disaster control. SEGEMAR/IGRM is operated by 17 staff working for the sections, including the Remote Sensing Center and the Digital Mapping and GIS Center. Except for a decrease in the number of personnel by 1 person from the project period, the assignment of personnel has been mostly maintained and is expected to have two more additional staff. The most of researchers, who were trained by the Project, were considered as competent to handle their works by themselves even during the project period. In addition, since they have been engaged in technical transfer to the researchers in other South American countries through the training programs, including the third country training project , it can be judged that they keeps high ability and skills. Although the budget data for geological and thematic mapping by SEGEMAR/IGRM were not obtained, it can be considered that there is no financial problem due to the continuous activities financed by their own financial source after the completion of the Project. Therefore, due to no problem in policy background, structural, technical and financial aspects of the implementing agencies, sustainability of the project effect is high.



Third Country Training

III. Recommendations & Lessons Learned

Lessons learned for JICA

- Since the counterpart agency of the Project is highly competent in Central and South America, they implemented the project of “Training on Remote Sensing using ASTER data” for the 5 year period from 2006 to 2011 and proactively engaged transferred technology in that area. Besides the third country training program by JICA, they also have been engaged in technical transfer to Cuba and Ecuador through the framework of international cooperation by the Ministry of Foreign Affairs of Argentina. Therefore, technical transfer to counterpart organization with high level of capability can be effective for technical transfer to the third countries and further spillover effects.