

Case 9

Towards Sustainable Rainforest Conservation in the World: International Course on Rainforest Monitoring

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1. Introduction

Implemented in the framework of the Japan-Brazil Partnership Program, the International Course on Rainforest Monitoring aims to develop the capacity of satellite monitoring among countries with rainforests.

The main content of the course is based on the knowledge developed out of a bilateral technical cooperation project between Brazil and Japan “Utilization of ALOS Images to Support Protection of the Brazilian Amazon Forest and Combat against Illegal Deforestation.” Through this prior cooperation, Brazil has accumulated knowledge and practices on rainforest satellite monitoring, which it shares with the world as a country with the world’s largest rainforest and a leader in its conservation.

This paper gives a brief illustration of the process of Brazil’s capacity development in Rainforest conservation and how the country has been sharing its knowledge and capabilities with other countries.

2. Tropical Deforestation around the World and Brazil: The Process towards the Formulation of International Program

At one time, rainforests covered 12% of the earth’s land mass but have been rapidly disappearing or deteriorating since the beginning of the 20th century. According to the Global Forest Resources Assessment issued by the Food and Agriculture Organization (FAO), approximately 13 million hectares of forests disappeared annually between 2000 and 2010.¹

¹ FAO(2010)

Brazil's forest area is 520 million hectares, where primary forested area is estimated to be approximately 490 million hectares with 360 million hectares in the Amazon region, making Brazil the country with the largest rainforests in the world. At the same time, Brazil is also the country suffering from the severest depletion of forests in the world.

Recognizing the challenge, the government has made extensive efforts for preventing excessive deforestation, focusing on taking countermeasures for prevention of illegal deforestation in the Amazon. Measures taken include strengthening regulatory enforcement and monitoring using the remote sensing by earth observation satellites, closer collaboration within the administration, and increasing the awareness of agricultural and livestock farmers on forest conservation.

One of the big turning points in the Brazilian environment policy was the incorporation of environmental issues into the new federal constitution formulated in 1988. In the following year, four administrative organizations concerning natural conservation in Brazil were consolidated into an executive agency, the Brazilian Institute of Environment and Renewable Natural Resources, IBAMA. Also, the Environment Agency was upgraded to the Ministry of the Environment in 1992 and the environmental crime law was introduced in 1998. In this way, environmental policy, standards and regulations on the environment were instituted one after another, which formed the basis of the country's present environment conservation system. It is worth noting that these environmental protection regulations included provisions regarding the promotion of international cooperation in the field of environmental conservation. It points to Brazil's determination in taking the leadership in environmental conservation in the world.

In 2003, the "Action Plan for Protection and Control of Deforestation in the Amazon, (PPCDAM)" was formulated as a major policy and action plan. It aimed to reduce the deforestation ratio in the Amazon by the partnership of federal organizations, state governments, citizens groups, and private sectors through implementing the following approaches:²

- 1) Maintenance of territory and lands
- 2) Monitoring and environment management
- 3) Sustainable production activities
- 4) Infrastructure improvement.

² MOFA(2010)

In order to implement the action plan, the Brazilian government decided to adopt the latest technologies of the advanced countries while modifying them to meet actual conditions. It also implemented trainings for enhancing capacities of domestic institutions involved in conservation.

The rainforest monitoring system utilizing remote sensing technology³ by earth observation satellites is an extremely effective tool for creating a deforestation database. In Brazil, forest monitoring utilizing satellite images started in the 1970's for tackling illegal deforestation of the Amazon rainforest. The National Institute for Space Research, INPE, adopted this system in 1988. However, monitoring with this system was often impeded by heavy clouds during rainy seasons. To overcome this problem, in 2007, the Japan Aerospace Exploration Agency, JAXA, started providing Brazil with satellite images from the Japanese Advanced Land Observing Satellite, ALOS, called "*Daichi*" (a Japanese word meaning the earth). Brazil thus embarked on an attempt to introduce a rainforest monitoring and observation system from outer space to monitor rainforests from above the clouds.

Brazil had to build up technological capability to interpret the ALOS images which are different from the conventional satellite images Brazil had been using. Thus JICA started a technical cooperation project called "Utilization of ALOS Images to Support Protection of the Brazilian Amazon Forest and Combat against Illegal Deforestation" from June 2009 to June 2012 with the Brazilian Institute of Environment and Renewable Natural Resources, IBAMA, and the Brazilian Federal Police Department, DPF. From the Japanese side, the participating member organizations included the governmental and scientific institutions.

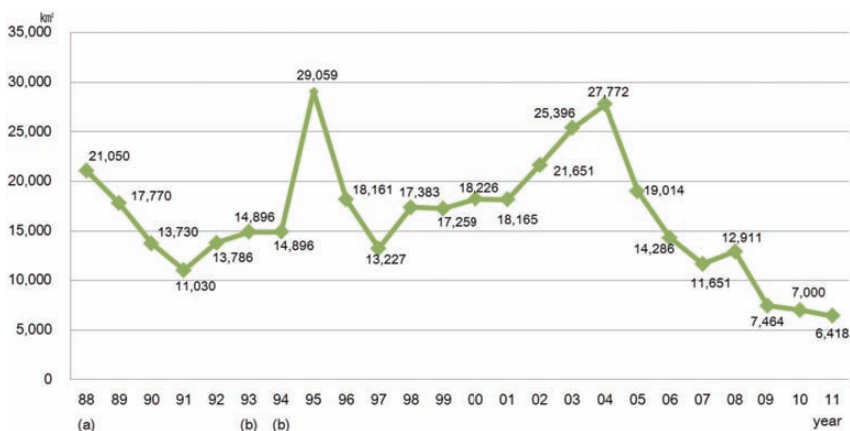
The aim of this project was to build a capacity and establish a system to utilize the images provided by the ALOS, to enforce conservation and management of rainforests in the Amazon. The monitoring systems established by the project have now become the Brazilian government's reference system of forest management, producing positive outcomes including the closer collaboration among public organizations concerned and enhanced the prompt enforcement of regulations. An expert involved in the project pointed out that in addition to enhanced

³ Features of remote sensing technology:
http://www.eorc.jaxa.jp/en/hatoyama/experience/rm_kiso/whats_feature_e.html

monitoring capacities, it has brought unintended positive effects; i.e., it has, helped by the wide press coverage, enhanced the citizen's awareness that illegal deforestation is being monitored and that committing such crimes would not go unpunished.

Thanks to these Brazil's continuing efforts on environment conservation, the trend of deforestation has been slowed gradually in recent years. The annual national average of deforestation was 3.09 million hectares between 2000 and 2005. Between 2005 and 2010 it was down to 2.19 million hectares.⁴ Figure 1 shows the result of Brazil's enhanced regulation against illegal deforestation in the Amazon. The figure indicates the annual loss of Amazon rainforest between 1988 and 2011, which was calculated and announced by INPE.⁵ The trend has declined since 2004 and reached record lows since 2009.

Figure1: Annual Deforestation Rate in the Amazon



Source: The graph created based on the data of INPE/MCT

http://www.obt.inpe.br/prodes/prodes_1988_2011.htm

Note: (a) average between 1977-1988 (b) average between 1993-1994

⁴ FAO(2010)

⁵ The data includes both legal and illegal cutting areas.

Current research collaboration among Brazil and Japan

A project called “Carbon Dynamics of Amazonian Forests,” was started in 2010, under the Science and Technology Research Partnership for Sustainable Development, SATREPS, as a bilateral cooperation between Brazil and Japan. Participating in the project are, from Japan: the Forestry and Forest Products Research Institute and the Institute of Industrial Science of the University of Tokyo, and from Brazil: INPE and the National Institute for Amazonian Research (INPA), a Brazilian research institution which is responsible for research of forestry and ecological science in the Amazon. The project aims to advance the development of carbon dynamics assessment technology for a wide range of forests under joint research by Brazil and Japan in order to contribute to the current discussion of Reducing Emissions from Deforestation and Forest Degradation, REDD.

3. Sharing Brazil’s Rainforest Conservation Experience with Other Countries

In 2010, a new initiative started under a Japan-Brazil partnership, with Brazil’s interest in expanding their accumulated experiences on forest conservation and environment management technologies, as well as Japan’s interest in solving global issues. The International Course on Rainforest Monitoring (Third Country Training Program) started in that year with an aim of widely sharing the rainforest technology for monitoring illegal logging using satellites to other countries with rainforests. This course is offered through the partnership of four parties, the Brazilian Agency for Cooperation (ABC), INPE, IBAMA, and JICA. The implementation period was set between 2010 and 2013. Through this period, a total of 10 training sessions will be implemented accepting 120 or more personnel from 40 or more countries with dense rainforests.

In fact, Brazil has already built its high technological capability to be able to launch satellites. Over the last few decades, INPE has played a central role in transferring its technologies to other countries aiming to widely share their software which was used for the satellites. In partnership with Japan, Brazil has implemented 50 or more training courses for other developing countries since 1985. Among these courses, an example of triangular cooperation in the environmental conservation field is the

training program under the theme of watershed forest management. The program has been successfully implemented in two phases between 1990 and 1998. Through these activities, Brazil had accumulated abundant information not only on Latin American countries but also on African countries.

The International Course on Rainforest Monitoring is intended for a wide range of countries with dense rainforests threatened by serious deforestation risk including Southeast Asian countries. It had three specialized courses held annually per region: the first course is for Latin American countries such as Mexico and Peru, the second for African countries such as Mozambique and Angola, and the third for Southeast Asian countries. This extensive global coverage of beneficiary countries in this program has made the course a pioneering effort on dealing with issues on a global scale. In its implementation, Brazil partnered with Japan which has had many years of experience in collaborating with Asian countries.

The three-week training is mainly divided into two components covering theory and practice. The National Institute for Space Research, INPE, in charge of training related to forest monitoring using satellites, is an institution that provides experts for processing and making satellite images and transferring technology. With over 20 years'



Practice of using Terra Amazon system

experience, it has advanced remote sensing technology. Training participants learn concepts of remote sensing and deepen their understanding of the Terra Amazon system, work on processing rainforest satellite monitoring images, and identify locations where rainforests have disappeared. Brazil offers the Terra Amazon system at no cost. The system is characterized by its high versatility due to its flexible specifications and it can be customized to fit the circumstances of each country. Although each country needs to prepare and install satellite images to be processed, image processing is implemented at no cost. This advantage has been well-received from participating countries. Also, participating countries have access to necessary



Trainees receiving lecture at IBAMA

technical support as JICA and INPE agreed to appoint technical support staff during the project implementation period until 2013.

IBAMA, which has over 30 years of experience in forest monitoring and has implemented training for environmental analysts, is in charge of how the provided image data is used for actual monitoring and regulation. They offer training, by using the Terra Amazon system, focused on enhancing image interpreting capacity which enables training the identification of the locations of deforested areas and improving the administration system, allowing the swift crackdown on illegal activities.

This whole package of training has been executed under the Japan-Brazil Partnership Programme (JBPP). The triangular partnership between Japan and Brazil has already started in 1985 mainly aiming to disseminate the fruits of the past Japan's cooperation with Brazil to other developing countries. Since the two countries reached an agreement on the Partnership Programme in 2000, the cooperation entered into the full-fledged execution phase implementing trilateral cooperation on an equal footing between the two countries. In 2010, Japan and Brazil agreed to focus on formulating the project aiming to tackle various global issues. As priority areas for partnership, "environment and climate change," "food security," "measures for health and infectious diseases," "strengthening good governance and public security," and "disaster prevention" were selected⁶.

In the field of "environment and climate change," various training programs were offered in the form of triangular cooperation, including not only rainforest monitoring in the Amazon but also capacity development in project formation, implementation and monitoring on REDD plus in Latin American countries. With regard to sustainable development promotion, agro-forestry as an approach of combining rainforest conservation and small scaled sustainable agriculture also attracts attention as described as "agricultural methods leading to the

⁶ Sakaguchi (2011)

creation of forests.”.

4. Status of Follow-up Actions among Participating Countries: Indonesia as an Example

A country with significant economic growth, Indonesia is the 8th largest forest nation in the world. The land size of Indonesia is 180 million hectares, and forests account for about half, at 94.43 million hectares. Started in the 1970’s, land diversion for lumber processing and agriculture has resulted in a large scale forest development, forest fires, and illegal logging causing serious deforestation. Between 1990 and 2000, the amount of forest decreased 1.91 million hectares annually which ranked Indonesia 2nd in the amount of forested areas impacted in the world, following Brazil. Although the speed has slowed down since 2000, the rate of deforestation in Indonesia is still the 3rd in the world. Under these circumstances, the Indonesian government is shifting policy from advancing forest development toward forest conservation including the elimination of illegal logging, forest fire prevention, and promoting sustainable forest management ⁷.

Cooperation between Indonesia and Brazil progressed taking various steps. Prior to the implementation of the “International Course on Rainforest Monitoring” for countries in Southeast Asia, a Japan-Brazil joint mission was dispatched to Indonesia in July 2011 for the purpose of conducting a needs



Meeting at the President’s Office in Indonesia

assessment and planning a training course making use of Brazil’s experience. From the discussion emerged a strong interest in the use of high-level remote sensing technology using microwave sensors, which makes observation of rain forests from above the clouds possible throughout the year. Indonesians who later participated in the training discovered that the Terra Amazon system that they learned during the training would work quite well in Indonesia. With its strong desire to exchange rainforest conservation technology at a policy level, Indonesia dispatched a team of high-level officials to Brazil. Their interests were not only in Brazilian monitoring technology but also Brazil’s experience in the

⁷ FAO(2010), Baser et al.(2011)

establishment of management systems. In addition to this training course, complementary technical cooperation using ALOS for controlling illegal logging was provided to Indonesia as the bilateral cooperation between Indonesia and Japan.

5. Review of the Past and the Future Perspectives

Efforts have been made to maximizing the training course's benefits. One challenge was to select appropriate participants to enable effective knowledge exchange. In order to recruit the appropriate participants from countries with diverse technological levels, training participants are carefully selected and the maximum number of participants per training set limited to 12 people. Also efforts have been made to customize the training programs to suit the needs of particular groups of participants.

The forest monitoring system was created through a trial and error process by Brazil, the world's largest rainforest country, and it has contributed to a reduction of the deforestation ratio. It offers a huge opportunity for countries with rainforests. In order to maximize the learning, several means of support have been made available after training such as the following:

- 1) A technical coordinator makes tours to the participating institutions.
- 2) Consultation related to the system is provided via e-mail or TV conferences.
- 3) Building a network between trainees is encouraged.

There are challenges, however. First, program may wish to invite more decision makers from the policy-making level as well as technological experts. Second, in beneficiary countries, due to a shortage of engineers who are responsible for the operation and diffusion of knowledge acquired from training, there is a need for improvement in terms of facilitating participation and dissemination of learning after the training. JICA has a system of follow up support through which Brazilian experts



Discussion with support staff on diffusing the system after the training

can be dispatched, for activities such as workshops with returning training participants. Taking full advantage of these and other mechanisms, it is essential for the beneficiary countries to spread the benefits of the training in their own countries.

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