

Understanding the Greatest Show on Earth

IT IS NATURE'S MOST MAGNIFICENT—and important—showcase. Spread across 2.5 million square miles and nine nations, the region contains around 50% of the world's rain forests, flora and fauna and, dominated by the globe's greatest river, it contains two-thirds of the world's fresh water.

It is the most comprehensive project of its kind ever undertaken in the Amazon.

More important even than the physical wonders of so much biodiversity, the Amazon River basin also acts as a giant external lung for more than six billion people, absorbing vast amounts of carbon dioxide and storing and recycling it to produce 20% of the world's oxygen needs. Without the Amazon, the world would effectively choke to death.

But even as the globe relies so heavily on this ecosystem and one million hectares of it are lost each year to mainly human encroachment, scientists still do not know how this system truly functions.

A four-year, US\$4 million project between JICA and Brazil's National Institute for Amazon Research (INPA) launched in 2010 aims to answer outstanding questions such as how much carbon the entire ecosystem holds. From the accumulated data politicians and scientists will be able to more effectively meet such challenges as climate change and the preserva-

tion of biodiversity.

It is the most comprehensive project of its kind ever undertaken in the Amazon employing both the latest technology including satellites, radar, aircraft instruments and lasers imaging and also simple 'leg power' to plot forest life.

Local human monitors have established more



Satellite monitoring of human destruction in the Amazon forest



Measuring the Amazon at ground level



NASA

Monitoring the World's Rain Forests from Space

The destruction of the Amazon rain forest peaked in 2004 when 26,000 square kilometers of virgin trees were felled. By last year the devastation had been reduced to 6,000 square kilometers.

The Japanese satellite ALOS Daichi has helped Brazilian federal authorities reduce the destruction by beaming images back to earth of the threatened regions even during the rainy season when heavy clouds blanket the forests.

According to Claudio Almeida of Brazil's National Institute for Space Research such monitoring, which is part of a



three-year JICA-sponsored project, can also help to track climate change, agricultural production, the spread of disease and even infrastructure development such as new roads.

A related four-year program which runs through 2014 is now helping to transfer this rain

forest monitoring expertise to other countries facing similar problems.

Two JICA technicians are part of a team including personnel from the Space Research Institute and the Brazilian Institute of Environment and Renewable Resources (IBAMA) based in the Amazon city of Belem which is holding a series of training seminars for officials from other Latin American countries, Africa and South East Asia.

than 1,500 spots throughout the Amazon where they tally tree numbers, their measurements and the amount of carbon each contains.

The combined information will provide a comprehensive picture of how much carbon the entire basin contains and how much CO₂ is not being released into the atmosphere where it would fuel even further climate change and environmental degradation.

According to Niro Higuchi, the leading INPA researcher on the project, the technological results and human observations are a 'perfect combination' and will allow researchers to fill in any current gaps in their understanding of the system.

Equally important, he said, was that Japanese technology would allow scientists to fully 'interpret' raw data to build up a comprehensive information base.

Experts from the Forestry and Forest Products Research Institute of Japan (FFPRI) and Tokyo University visit the region at least three times a year. JICA sends three Brazilian counterparts to Japan annually for advanced training.

Higuchi, a forestry expert who was born in Brazil to Japanese parents, has been working on similar work since 1980 and said the current project was effectively a continuation of a program launched in 2004.

He said preliminary results were mixed. "In the short term," he said, "we are okay for the moment. We are about in equilibrium. Overall, the forest is still ac-

cumulating carbon and helping to clean the earth."

However, other factors such as forest destruction are also at work, he said. Almost 20% of the Amazon has already been destroyed.

Governments and scientists have already recognized that altruism or nostalgia will not save the world's natural resources and that they must be seen to be able to pay their way. Higuchi said the current project would help 'value' the Amazon and that the results would help to protect the forest in the long term.

Ongoing international negotiations are already trying to put into place a system of national obligations, responsibilities, rewards and penalties in such areas as climate change.

A mechanism known as REDD (reducing emissions from deforestation and forest degradation) allows nations which use their forests to mitigate climate change to potentially receive financial and other benefits—a system which could benefit Brazil and surrounding nations once they have accurate information on how the Amazon truly works. ■



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