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Soybean and livestock farming behind deforestation

Under a bright sunny sky, I entered the Amazon jungle. The air was thick and heavy with humidity, the temperature 30 degrees Celsius. My ears reverberated with the clear, insistent buzzing of insects.

Traveling two hours by car from Manaus, Brazil, I reached the experimental forest managed by the National Institute of Amazonian Research (INPA). Trees stretched upward to heights in excess of 30 meters.

After walking through the forest for about 15 minutes, a tall, rusted steel structure came into view: an observation tower used by the institute to monitor changes in tree leaves. Gasping for breath after climbing 45 meters to the tower's top, I looked around at the vista far below. The tree canopy, which had been well above my head earlier, was now spread out below me like a fluffy sea of green.

Using a combination of field surveys and observation by satellite, the INPA is proceeding with a project to accurately measure the amount of carbon held by the Amazon's forests. Through photosynthesis, trees absorb carbon dioxide (CO2) in the atmosphere and store the carbon. However, when they are cut down, burned or decompose, they release CO2 back into the atmosphere. The institute is trying to establish an accurate method for measuring carbon volume for a prospective international framework, where developed countries would provide funds to developing countries in line with the volume of emissions they suppress through reduced deforestation.

"It's necessary to create a mechanism where profits can be returned to the Amazon by protecting the forests," said the INPA's Niro Higuchi, 60.

What is the current state of the Amazon forests they are trying to protect?

According to Brazil's National Institute for Space Research (INPE), about 19 percent, or 760,000 square kilometers, of the approximately 4 million square kilometers of forest once covering the nine states of the Amazon had been lost by 2011. That is an amount roughly equivalent to two times the land mass of Japan.

The primary causes of deforestation are pasturage and soybean cultivation. Global demand for food is rising, and Brazil, with its abundant lands, has become one of the world's leading food-producing nations. Particularly for soybeans, of which it exports 70 percent to China, production volume is high, and this year it is expected to surpass the United States as the world's top producer.

Additionally, according to a Brazilian NGO, the number of cattle in the Amazon has increased from 27 million in 1990 to 64 million in 2003.

In both soybean cultivation and livestock farming, cases of clearing forested land without first going through official procedures are not uncommon. Keeping a watchful eye on this illegal clear-cutting is INPE situated on the outskirts of São Paulo. Using satellites, the space institute provides the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) with the latest images depicting the state of deforestation, which it creates once every two days.

Based on the image data, the IBAMA's Manaus office uses helicopters and trucks to visit the deforested sites and directly confirm the situation.

"Using the satellite imagery alone, we cannot confirm whether the deforested site in question has been illegally clear-cut or is the result of natural degradation," said office director, Mario Reis, 47.

With these efforts, annual deforestation in the Amazon has been reduced from 27,000 square kilometers in 2004 to 6,600 square kilometers in 2011. Dalton Valeriano, who is involved with monitoring the forests at INPE, said, "It used to be that if grain prices rose, so did the area of deforested land; however, over the past few years, even when prices rise, deforestation is no longer coupled to it. I believe the efforts of the authorities concerned have produced a definite result."

It is also said that being able to increase production volume without clearing more land, thanks to rising agricultural productivity, is a contributing factor to the drop in deforestation.

Still, there are many who believe that deforestation cannot be stopped so easily.

"If you neglect to monitor, deforestation will definitely increase," said the IBAMA's Luis.

INPA's Higuchi provided a warning as well.

"The drop in deforestation over the past few years is a result of the global economic slowdown, the government has just been lucky," he said. "If the global economy recovers, there is a high probability that deforestation will increase once again."

PETROLEUM AND IRON ORE… VARIOUS RESOURCES LIE IN THE AMAZON

Due to varying factors such as the difficulty of access and strict environmental regulations, resource development in the Amazon has yet to swing into full gear. However, it has become apparent that an abundance of resources lies buried in the region and interest among many nations is growing.

Yielding iron ore, manganese, copper and other metals, large-scale development is already under way at the Carajás Mine, 500 kilometers south of the Amazon's mouth in the state of Pará. Full-scale development at the mine began in the 1980s, and last year it produced a record high 109.8 million tons of ore.

In addition to ore, the Amazon is also believed to be rich in petroleum resources. Preliminary calculations reveal 4 billion to 6 billion barrels of oil lying in the basin of the Rio Solimões, one of the Amazon's headwaters. That is enough oil to cover Japan's entire consumption for three to five years. The Brazilian petroleum company Petrobras has already started drilling some wells in the area, producing 60,000 barrels of oil a day. However, that represents only a fraction of Brazil's total. Almir Barbassa, Petrobras' CFO, said, "Personally, I have hope; however, difficulties remain on the technical front."

Natural gas has also been discovered in the same area and the amount is said to account for one-third of the country's identified reserves. There are reports that Brazilian and Russian companies will begin jointly developing the area next year.

In addition to this, a variety of mineral resources such as diamonds, platinum, gold, copper and nickel are being found in each of the Amazon states. There is also an abundance of rare earths such as titanium, tantalum and manganese. When considering the amount of the reserves alone, it is possible that they could become an important supply source for the world. Estimates say that latent mining potential in the Amazon could reach 2 trillion reais in value (about 80 trillion yen).

However, many of these resources lie within sanctuaries set aside for indigenous peoples. Ratified in 1988, Brazil's Constitution incorporates environmental protection regulations that prohibit development within such reserves. In order to actually develop the resources, it would be necessary to amend the Constitution or make new laws. Developing transportation infrastructure is also a challenge and commercial production of these resources remains low.

IRREPLACEABLE TREASURE OF THE EARTH / ABNORMAL CHANGES IN THE "FLYING RIVERS"

The Amazon is home to the world's largest rain forest. There are concerns that there could be various negative impacts upon the Earth, should these forests shrink in size.

In January, the British scientific journal Nature published an article by Eric Davidson, a senior scientist at the Woods Hole Research Center in the United States, stating that "the Amazon is in 'transition,' changing from a place that stores carbon to one that releases it." The forests of the Amazon store a vast 100 billion tons of carbon. This is one-third of all carbon stored by the world's forests and equivalent to the total amount emitted burning fossil fuels worldwide for 10 years. However, it has been pointed out that if severe droughts continue, it is possible the amount of carbon stored by the Amazon's forests could decrease.

Additionally, the rain clouds bringing moisture to the Amazon region are produced by the high-density forests therein. Flowing southerly from the northwest across the South American continent, clouds traveling along the main air currents in the upper skies transport 3,200 cubic meters of water a second.

That is equivalent to 13 times the average annual discharge of the Tone River in Japan, earning the currents the name "Flying Rivers." Recently, however, abnormal changes have started to occur due to the effects of deforestation.

According to Dr. Jose Marengo, 52, a climatologist at INPE and a member of the U.N.'s Intergovernmental Panel on Climate Change (IPCC), 1.5 times the amount of water evaporating off the surface of the world's oceans evaporates from the extremely dense and lush forests of the Amazon. This produces rising air currents while reducing pressure at ground level, which in turn draws in new winds from the Atlantic Ocean. The existence of this enormous forest summons winds throughout the year, resulting in the birth of clouds.

Recently, however, with 2009 bringing heavy rain and 2010 extreme dryness, the previously stable regional climate has begun to experience frequent swings between severely dry conditions and torrential downpours. Heavy rain occurred again this May, and the Rio Negro recorded its highest level of water since such observations have been kept.

Marengo pointed out the possibility that water vapor could be decreasing due to deforestation.

"If the Amazon loses any more forested land it could invite the formation of a savannah," he warned. In the September issue of Nature, Luiz Aragão of the University of Exeter estimated that if deforestation continues at its present pace, the amount of rainfall in the Amazon could decrease by 12 to 21 percent. They said there is a risk of falling into a vicious cycle of deforestation leading to increased release of carbon dioxide which, in turn, leads to less rainfall and thus shrinking areas of forested land.