HELPING TO SAVE THE PLANET

Tourist paradise: The Maldives

Paradise lost: The 2004 Tsunami

Paradise preserved: JICA rebuilds sea defenses

It was perhaps the most bizarre government meeting in history.

Cabinet ministers dressed in scuba diving gear, as did attending journalists. Gathered around a securely anchored horse-shoe shaped table, the participants communicated with white boards and hand signals during the 30 minute summit. Witnesses included shoals of multi-colored exotic fish.

An unusual underwater cabinet meeting.

AP IMAGES

The underwater conference held in several metres of clear pearl blue ocean water was a gimmick, of course, but with deadly serious intent.

The meeting was called by President Mohamed Nasheed to highlight the precarious plight of the Maldives, a chain of 1,190 low-lying coral reef islands in the middle of the Indian Ocean, in advance of December's world climate summit in Copenhagen.

Known by world travelers as one of the most beautiful vacation locations on earth with its palm-lined beaches, gentle breezes, and wonderful sea life, to climate change and environmental experts the Maldives represent a far more sinister symbol of impending disaster—the island nation could literally disappear under the waves unless the international community comes to grips with the effects of climate change, rising sea levels and environmental degradation.

The islands have already had a foretaste of what might be in store. The great 2004 Pacific tsunami swept over most of the coral land surface—standing only 2.1 meters above sea level—causing dozens of deaths and widespread destruction.

"Climate change is the only thing that I believe has the power to fundamentally end the march of civilization as we know it."

Former US President Bill Clinton

In the wake of that catastrophe, Japan sent emergency teams and humanitarian relief and extended its first official development loan (ODA) to the Maldives to help reconstruct port, harbor and sewerage facilities. A subsequent project is helping to develop clean energy resources.

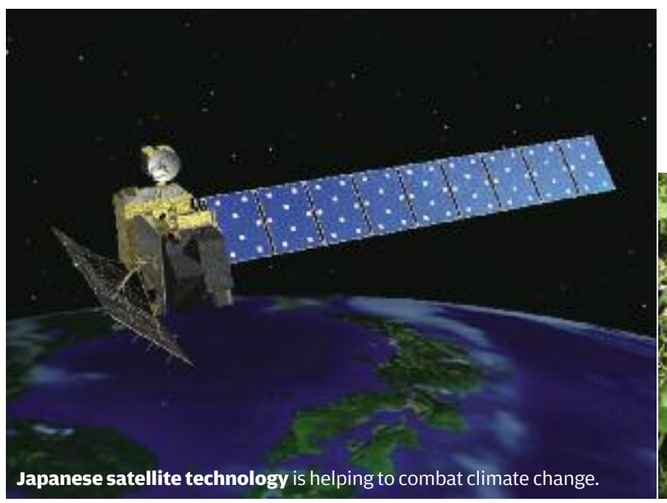
Despite that assistance the longer term threat remains and President Nasheed told the special 'water cabinet' meeting "If the Maldives cannot be saved today, we do not feel that there is much of a chance for the rest of the world."

Asked what would happen if the Copenhagen meeting failed, President Nasheed replied: "We are going to die."

At almost the same moment halfway across the world British Prime Minister Gordon Brown was warning that unless an agreement was reached in Copenhagen "Let us be in no doubt; once the damage from unchecked emissions growth is done, no retrospective global agreement, in some future period, can undo that choice."

"Political leaders have a responsibility to future generations to create a sustainable society by transforming the social structure that we have known since the industrial revolution."

Japanese Prime Minister Yukio Hatoyama



Japanese satellite technology is helping to combat climate change.

JICA ARCHIVES

Forest conservation in Laos.

WFP

Because of its own history, Japan has been a leader in the climate change debate for many years.

Floods in Mozambique, deforestation in Laos and drought in Kenya.

Because of its own history—its position on Asia's 'Ring of Fire' and its constant exposure to natural calamities such as earthquakes and other climate and geographical vagaries, Japan has been a leader in the climate change debate for many years. It hosted the so-called 1997 Kyoto Protocol, a legally binding document committing signatories to tackle climate change and global warming by reducing theizr emission of greenhouse gases.

Recent prime ministers have all unveiled specific initiatives. In 2007 then Prime Minister Shinzo Abe unveiled a Cool Earth 50 project with an overall aim of halving global carbon emissions by 2050.

The following year his successor, Yasuo Fukuda, unveiled the 'Cool Earth Partnership'—a five-year, $10 billion fund to support developing countries climate change goals. Special 'Cool Earth Loans' were made available to help states reach their climate efforts. The premier said Japan would also link with the United States and the United Kingdom in a new multilateral fund.

Shortly after taking office, current Prime Minister Yukio Hatoyama announced his own 'Hatoyama Initiative' pledging to reduce Japan's own emissions by

JICA ARCHIVES

Raising new tree seedlings in Kenya's semi-arid regions with JICA assistance.

25% by 2020 and to work closely with developing countries on their own programs.

"Cambodia is not a country responsible for climate change, but is the victim." *Premier* HUN SEN

AS JAPAN'S KEY DEVELOPMENT AGENCY, and the world's largest bilateral organization with operating assets of around US$10 billion annually, the Japan International Cooperation Agency (JICA) undertakes many of the climate change and related projects in developing countries—those nations often most adversely affected by the fallout but least able to deal with the consequences.

The U.N. Development Program (UNDP) noted: "Developing countries and the poorest people who live in them, are the most vulnerable to climate change." For instance, Africa accounts for only 4% of global greenhouse gas emissions, the same amount as the state of Texas.

But more than one billion people, virtually all in developing countries including Africa, do not have enough water for daily needs and a similar number do not have enough to eat, according to U.N. figures. Nearly one-third of the world's population is without electricity or other modern energy supplies.

A recent list of stories in one issue of the *New York Times* newspaper underlined how pervasive the issue has become. They included: Floods in Mumbai; Floods in Turkey; Monsoon Follows Drought in India; Drought; California Wildfires; Dusty Storm in Sydney; Drought in Kenya; Drought in Ethiopia; Flood in Philippines; Typhoon in Viet Nam.

Several years ago JICA established a global environment department to oversee the organization's growing commitment on that issue which is often closely related to climate change developments. In December 2007, an office for climate change was created.

In 2008 JICA underwent a sweeping reorganization, merging with one arm of the Japan Bank for International Cooperation (JBIC). 'New' JICA for the first time was able to offer all three major components of development assistance and all 'under one roof'—technical expertise, grant aid and yen (soft) loans. The increased synergy, financial and technical muscle provided by the merger has significantly increased JICA's ability to participate more fully and effectively in the climate change arena and such directly related areas as the environment.

(Turn to page 10)

More than one billion people, virtually all in developing countries, do not have enough water for daily needs and a similar number do not have enough to eat.

FROM KYOTO.....

NASA

Unusual twin cyclones circle the earth.

The Kyoto Protocol is a legally binding initiative by nations to help tackle climate change and global warming by reducing their production of four greenhouse gases, particularly carbon dioxide, and two groups of other gases.

The protocol was initially adopted for use on December 11, 1997 in Kyoto, Japan, entered into force on February 16, 2005 and by January 2009, 183 parties had ratified the agreement. The most prominent absentee is the United States which, on a per capita basis, is the world's largest polluter.

The Kyoto document is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), an international environmental treaty with the goal of reaching the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

The Kyoto Protocol required 55 heavily industrial nations, so-called Annex I countries, until now the world's major polluters, to reduce their overall greenhouse gas emissions by 5.2% from the levels of 1990. The targeted reductions vary from state to state—Japan by 6%, the European Union by 8%, the United States 7% and Russia 0% for instance.

Other developed and developing countries were designated Annex II countries. Developing countries have no requirements under the Protocol, but under a complicated set of regulations intended to benefit everyone, industrialized nations could 'buy' emission credits from low-level polluters or otherwise help developing countries with funds and technology assistance.

The absence from Kyoto of the United States, which contributes roughly a quarter of the world's greenhouse gases, has been the single biggest failure of the protocol though other nations have not thus far met their own emissions targets.

Even if all levels were met before the 2012 target date envisaged by Kyoto, that would represent only an interim victory. The United Nations has projected an overall rise of 10% in greenhouse gases since 1990 and the need for far larger cuts than Kyoto requires.

Even so, the Kyoto Protocol is a unique international initiative that recognizes one of the most pressing challenges facing the entire globe today and as such represents both a major symbolic and moral victory.

Setting the stage for the next step.....

.....TO COPENHAGEN

What is the Copenhagen climate change summit?

The conference is a successor to the Kyoto Protocol and is the latest in an annual series of United Nations meetings which began at the 1992 Earth Summit in Rio de Janeiro aimed at coordinating international action to combat climate change.

Who will take part?

Some 192 countries have signed the climate change convention. More than 15,000 officials including heads of state, environmental ministers, advisers, diplomats, advocacy groups and journalists will attend the meeting, officially known as COP15.

What does COP15 stand for?

It is the official name of the Copenhagen summit—the 15th Conference of the Parties (COP) under the United Nations Framework Convention on Climate Change (UNFCCC). The COP is the highest body of the UNFCCC and includes environment ministers who meet once a year to discuss developments in the convention.

Who are the main players?

The United States, currently the world's worst polluter, rejected the Kyoto Protocol though the new Obama administration has signaled a major policy shift on climate and environmental issues. The U.S. has urged that emerging economies must also share the burden of reducing carbon emissions while countries such as China and India believe it is the responsibility of the major industrialized countries to take the lead and shoulder major responsibility. Japan has taken an active role on the issue. In addition to hosting Kyoto 1997 Tokyo has announced such initiatives as Cool Earth 50 aimed at reducing global emissions 50% by the year 2050. Much of Japan's official development assistance (ODA) supports projects in developing countries to fight climate change and help millions of the world's poorest people to meet the challenges posed by the crisis.

What are this summit's aims?

The overall aim is to agree a new climate treaty after Kyoto, though that is unlikely until followup meetings in 2010. Yvo de Boer, executive secretary of UNFCCC says four essentials are necessary: a strong undertaking by industrialized countries to significantly reduce carbon emissions; commitments by emerging giants such as China, India and Brazil to limit their own footprints; plans to help developing countries reduce emissions and adapt to new realities; adequate funding to meet all of these challenges.

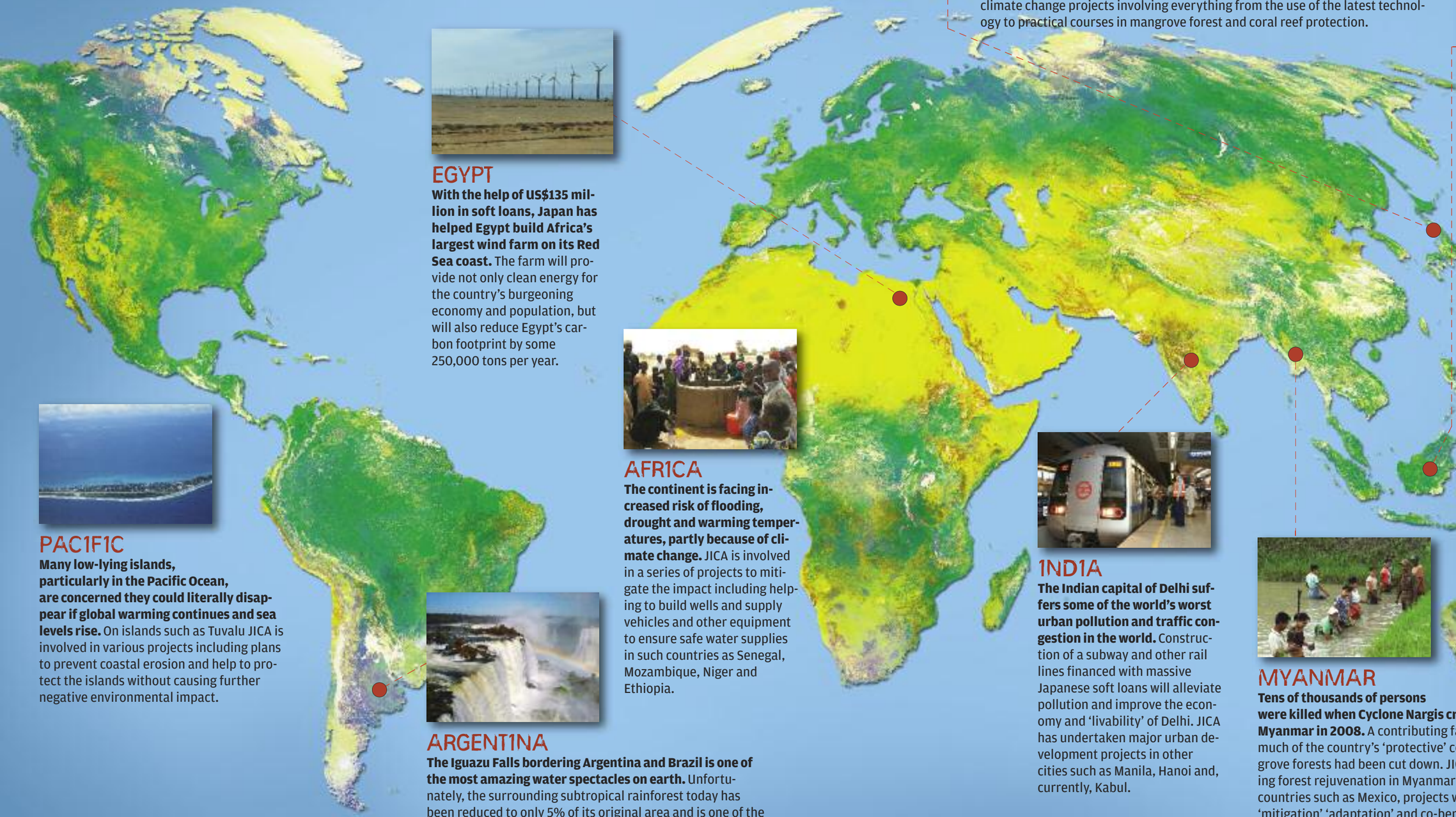
What are the main problems?

Burden sharing is the 'elephant in the room.' Many world scientists agree that by 2050 the world needs to cut emissions by 80% compared with 1990 levels to limit global warming to a 2 centigrade average rise. But there is no agreement yet on which countries should cut emissions by how much and who will help provide the billions of dollars necessary to assist poorer countries to successfully participate in the overall international initiative.

JICA ARCHIVES

Analyzing satellite data from the Amazon.

CLIMATE CHANGE PROJECTS AROUND THE WORLD



EGYPT

With the help of US$135 million in soft loans, Japan has helped Egypt build Africa's largest wind farm on its Red Sea coast. The farm will provide not only clean energy for the country's burgeoning economy and population, but will also reduce Egypt's carbon footprint by some 250,000 tons per year.

JAPAN

JICA and other agencies run what is reputedly the world's largest training program of its kind, inviting more than 8,000 persons from some 140 countries annually to attend a smorgasbord of programs. Increasingly they include climate change projects involving everything from the use of the latest technology to practical courses in mangrove forest and coral reef protection.

INDONESIA

Because of massive forest destruction, Indonesia is the world's third largest polluter. JICA in 2008 provided its first climate change program loan, some US$300 million, for a series of projects not only to reduce the destruction of the trees but various other 'mitigating' and 'adaptation' programs to exploit Indonesia's huge reserves of clean geothermal energy or make better and more efficient use of its water resources.

AFRICA

The continent is facing increased risk of flooding, drought and warming temperatures, partly because of climate change. JICA is involved in a series of projects to mitigate the impact including helping to build wells and supply vehicles and other equipment to ensure safe water supplies in such countries as Senegal, Mozambique, Niger and Ethiopia.

INDIA

The Indian capital of Delhi suffers some of the world's worst urban pollution and traffic congestion in the world. Construction of a subway and other rail lines financed with massive Japanese soft loans will alleviate pollution and improve the economy and 'livability' of Delhi. JICA has undertaken major urban development projects in other cities such as Manila, Hanoi and, currently, Kabul.

PACIFIC

Many low-lying islands, particularly in the Pacific Ocean, are concerned they could literally disappear if global warming continues and sea levels rise. On islands such as Tuvalu JICA is involved in various projects including plans to prevent coastal erosion and help to protect the islands without causing further negative environmental impact.

ARGENTINA

The Iguazu Falls bordering Argentina and Brazil is one of the most amazing water spectacles on earth. Unfortunately, the surrounding subtropical rainforest today has been reduced to only 5% of its original area and is one of the most endangered ecosystems in South America. An ongoing project is collecting and managing basic information, educating local communities on the importance of conservation and training local officials. Similar programs are expected to start in Brazil and Paraguay in the future.

MYANMAR

Tens of thousands of persons were killed when Cyclone Nargis crashed into Myanmar in 2008. A contributing factor was that much of the country's 'protective' coastal mangrove forests had been cut down. JICA is encouraging forest rejuvenation in Myanmar and other countries such as Mexico, projects which underline 'mitigation' 'adaptation' and co-benefit by protecting economic and social activity, absorbing carbon emissions and preventing future coastal erosion.

HELPING TO SAVE THE PLANET

JICA ARCHIVES

Making biomass measurements in the Amazon.

(Continued from page 7)

"Unless we take steps to arrest climate change, we are heading toward catastrophic consequences that will be irreversible."

Former UN Secretary General KOFI ANNAN

UNDER RECENTLY ESTABLISHED JICA guidelines, a set of 'basic principles' emphasizes projects which not only aim to reduce greenhouse gases but at the same time achieve sustainable economic growth in poorer nations. Relations by, among other things, strengthening manpower resources and developing programs to protect vulnerable coastal zones, glacial regions or arid areas before the situation deteriorates further.

A clean development mechanism (CDM) is official jargon for developed countries helping developing states to achieve sustainable development while at the same time receiving carbon emission 'credits' for their participation.

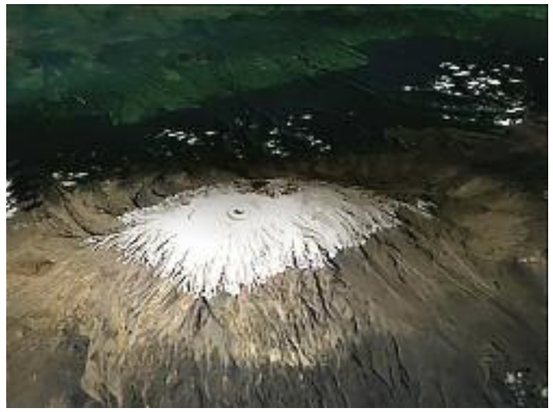
Some projects incorporate each aspect. Programs to regenerate mangrove forests in places like Mexico and Myanmar will help reduce greenhouse gases through carbon absorption, and helps prevent climate change by halting coastal erosion and neutralizing rising temperatures while at the same time sustaining economic growth through local industry.

"Forget about making poverty history. Climate change will make poverty permanent."

Bangladesh activist NAZMUL CHOWDHURY

THE IMPORTANCE OF NATURAL BARRIERS such as mangroves was emphasized in 2008 when Cyclone Nargis crashed into Myanmar virtually unhindered, killing tens of thousands of persons in the worst natural disaster in that country's history *(see cover picture)*.

Mangrove rejuvenation, forestry and afforestation projects from China to Ethiopia are only one strand of a myriad of specific climate change projects currently undertaken by JICA and partner countries.



NASA

The receding ice cap of Africa's largest mountain, Kilimanjaro. Scientists now predict the snow will totally disappear within two decades.

As Japan's key development agency, JICA undertakes many of the climate change projects in developing countries.

Satellite technology is helping to preserve the great rainforests of the Amazon and Indonesia where Japan last year announced a US$300 million yen loan—its first and most ambitious climate change loan to date *(see page 14)*.

Developing alternate clean energy sources is a major plank to try to tame climate change. Japan has helped to establish the largest wind farm in Africa on Egypt's Red Sea coastline *(see page 11)*, bring electricity for the first time to isolated Nigerian villages

(Turn to page 12)

The desert is blooming again—with Japanese help for Africa's largest windfarm.

DESERT WINDS BRING NEW HOPE TO EGYPT

It is one of the most inhospitable places on earth. Temperatures regularly soar to over 50 degrees Celsius in summer and winds whip across the stony desert with the same ferocity as storms in the North Sea. For centuries it was home only to the occasional nomad, offshore pirates or hardy desert reptiles.

Today, Zafarana on Egypt's Red Sea coastline carries some of the country's highest hopes for a better future. Its rocky shoreline has gained the reputation of being among the world's top diving spots, attracting enthusiasts from across the globe.

And slightly inland, the harsh climatic conditions of extreme heat and wind have turned Zafarana into a virtual laboratory to establish mechanisms to combat climate change and develop clean, renewable sources of energy.

Starting in the 1990s European nations helped Egypt to establish a high-tech wind farm in this desolate region. In 2003 Japan joined the project, providing the equivalent of US$135 million in yen loans and providing logistics, construction expertise and consulting services to build 142 wind turbines on the desert floor.

Harnessing the very ferocity of the desert to productive use has been a major challenge. Each wind turbine, for instance, had to be specially prepared to cope with the heat, salty sea air and withstand storms which whip across the region at the equivalent of nine meters per second—perfect for turning the turbines' great windmill-style arms. Special seals were developed to prevent the fine sand granules from swirling into the units and rotor blade mechanisms and destroying them.

Africa's Largest Wind Farm

Today, there are some 500 turbines providing 120 megawatts of power from the site. The government has earmarked more than 8,000 square kilometers—an area the size of Puerto Rico—in the region making Zafarana the largest wind farm in Africa and among the largest in the world.

It has received an official seal of approval as a Clean Development Mechanism (CDM) project. This is a Kyoto Protocol system which benefits both developing countries, helping them to reduce greenhouse gas emissions and develop clean energy resources, and donor nations such as Japan which are also credited with certified emissions reductions (CERs) in lieu of their assistance.

With around 81 million people, Egypt has the Arab world's largest population. In recent years, its industries have also been booming, boosting energy consumption by 8% annually. Both developments have put a massive strain on the country's energy resources and its efforts to mitigate global warming and reduce its environmental impact.

Egypt's oil and gas reserves are expected to be exhausted within 50 years and the country aims to generate 20% of its power needs from renewable sources by 2020, with 12% of that target figure provided by wind power farms such as the one at Zafarana.

JICA ARCHIVES

Once the farm is completed, it will have a total output of some 425 megawatts of electrical output, be able to provide clean electricity to some 340,000 households and save 250,000 tons in CO_2 emissions each year.

A region which was once considered as only a barrier to any kind of development is now carrying a country's hopes for a better future.

via small renewable energy power stations and is helping to harness the world's largest supplies of geothermal resources in Indonesia.

Pure scientific research involving JICA and other Japanese institutions and universities is seeking solutions to glacial meltdowns in the Himalayan mountains, the threat to low-lying Pacific nations such as Tuvalu or how to more effectively harness waste from Brazil's massive sugar cane harvests which currently contribute to air pollution.

"The global warming scenario is pretty grim. I'm not sure I like the idea of polar bears under a palm tree."

British comedian LENNY HENRY

THE FALLOUT FROM CLIMATE CHANGE affects every area of daily life across the globe. JICA has helped to improve the transportation systems in two of the world's most crowded capital cities, New Delhi and Manila—improving the quality of daily life and economic activity and reducing polluting gases.

Agriculture and water may be severely affected by climatic changes. In Africa JICA is involved in helping to double the continent's rice crop by, among other things, developing new strains more resistant to drought and high temperatures.

In Bangladesh, one of the most disaster-prone countries in the world, projects to establish early-warning disaster systems, promote education programs in schools and build cyclone resistant shelters which can also double as schools were launched. In the Solomon Islands a program to strengthen malaria control seeks to limit the risk of infection which has increased with climate change.

JICA also runs what has been described as the world's largest training program when more than 8,000 government experts, administrators, academics and businessmen from around 140 countries are invited to Japan annually on a smorgasbord of training programs. Many of these are now devoted to scientific research on climate change and related environmental issues.

"In the past we used to have droughts every 10 years. Now they are coming almost every year, right across the country."

Kenyan climate change adviser LEINA MPOKE

CLIMATE CHANGE HAS BECOME THE MOST urgent, and perhaps the most complex issue of our times," JICA President Mrs. Sadako Ogata said. "This is particularly true in developing countries where JICA is committed to helping millions of the world's most vulnerable groups to improve their lives through better health care, education, jobs and a safe environment."

She added, "These countries are suffering a disproportionate fallout from climate change. Africa, for instance, has been responsible for few of the problems, but climate change nevertheless has affected the lives of hundreds of millions of people–farmers tilling the land or young children searching for increasingly scarce sources of clean water.

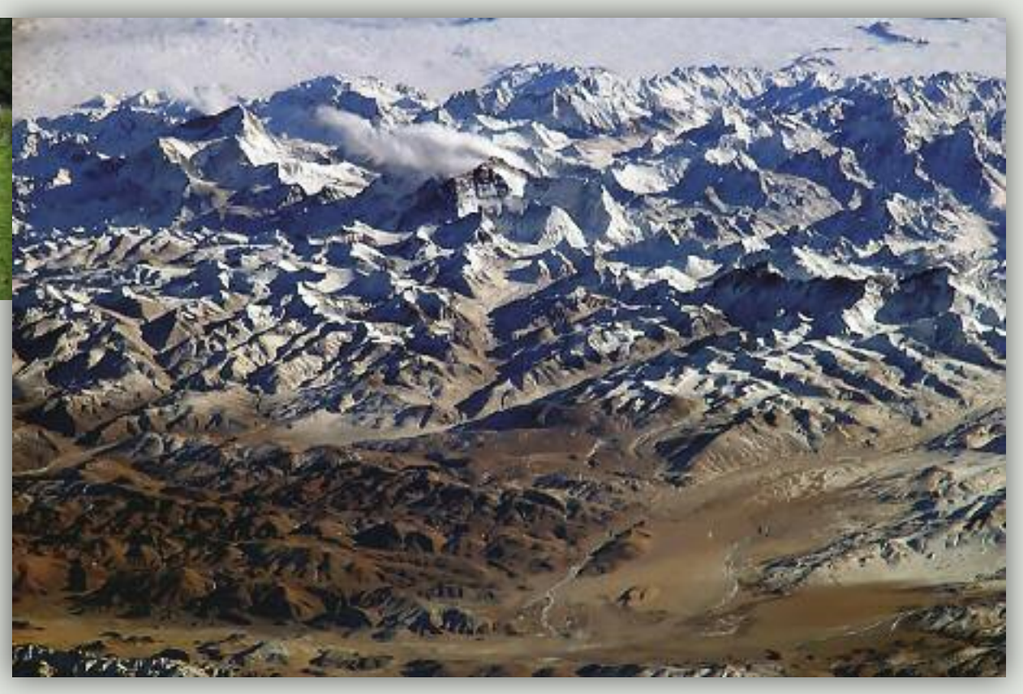
"It is the job of JICA," she said, "to help in the battle against climate change, concentrating particularly on helping the people most at risk."

JICA's approach emphasizes projects which not only aim to reduce greenhouse gases, but at the same time achieve sustainable economic growth.

FROM THE HIMALAYAS TO THE PACIFIC...SCIENCE TO THE RESCUE

JICA ARCHIVES: NASA

Monitoring the actions of glaciers "on the roof of the world."



High in the Himalayan mountains on the 'Roof of the World', Bhutan is a tiny country dotted with more than 2,700 glacier lakes, huge bodies of water which form when the glaciers themselves begin to melt during summer months.

When one of the glacier lakes burst its banks, the floods, carrying small mountains of rocks and mud, crashed into the old capital of Punakha killing some residents.

It was a wakeup call.

Far out in the Pacific Ocean, the 10,000 people who live on nine low-lying coral atolls which make up the nation of Tuvalu have received their own wakeup call. Their nation could literally disappear in coming decades.

Across the world in Brazil, one of that nation's proudest accomplishments in producing huge quantities of ethanol for various energy needs has been clouded by the fact that huge amounts of waste, or bagasse, produce significant amounts of carbon monoxide and add to that country's global warming footprint.

In all three instances, and other situations around the world, the Japan International Cooperation Agency (JICA) has been teaming up with the Japan Science and Technology Agency (JST), Japanese universities and other technical bodies to develop innovative solutions to tackle climate change problems around the world.

The lake above Punakha has been subject to periodic flash floods for centuries, but following the latest catastrophe in 1994, local officials realized that many of the other glacier lakes were also subject to flooding. This phenomenon and the total disappearance of glacial ice has been recorded across the globe, from the European Alps to the top of Mount Kilimanjaro, Africa's highest mountain.

JICA and JST experts have been assessing the glacial danger, both current and taking into consideration possible future global warming trends. Working with local officials, a five-man JICA team in September surveyed the glacier system and overflow areas at a 5,000 meter level and other institutions will join the project at a later date.

Using satellite data and onsite research, the project will then formulate a series of disaster prevention alternatives.

Disappearing Under the Waves

In comparison to the numbing heights of the Himalayas, Tuvalu's problem is that it is too close to current ocean surface levels, between one and five meters above sea level. If ocean waters rise, as many experts predict, Tuvalu could literally disappear.

"We live in constant fear of the adverse effects of climate change," former Prime Minister Saufatu Sopoanga has said. "The threat is real and serious, and is of no difference to a slow and insidious form of terrorism against us."

In addition to the rising water levels, coastal erosion has been exacerbated by accelerated population growth and environmental degradation including the destruction of coral reef and the use of massive amounts of local sand to build an international airport.

Another research team, including scientists from Tokyo University is engaged in a detailed study of the atolls structure, how the corals live, the move of waves and wind and their effects.

Using such data and other information gleaned from satellite technology, it is hoped to develop a comprehensive plan within five years which will effectively help protect the islands without causing any further environmental impact.

In Brazil, sugar cane is one of the country's most important crops and much of it is used to produce ethanol from the sugar as a bio-fuel. Brazil is the second largest producer of ethanol after the United States.

However, a major downside is that the fibrous residue left, bagasse, has a major impact on emissions when it is burned in thermal power plants.

JICA and JST have again joined forces in the current fiscal year to try to find

JICA ARCHIVES

This island could literally disappear soon.

LAND OF SPLENDOR – AND BIG PROBLEMS

Some of Indonesia's problems are as towering as its natural beauty.

JICA ARCHIVES: NASA

Tackling Indonesia's forest fires highlighted by a satellite image.

Indonesia is a land of superlatives. Stretching along thousands of miles of the equator and wedged between the Asian mainland and Australia, the archipelago consists of a staggering 17,500 islands, only 6,000 of which are inhabited.

With a population of an estimated 240 million people from some 300 ethnic groups, it is the world's fourth most populous country and its flora and fauna are just as diverse. Indonesia boasts 25% of the world's known species of fish, 12% of all mammal species, 10% of all flowering species, and 17% of all known birds. Even today, new species of every type are being uncovered in remote parts of the country.

Tapping into geothermal reserves and improving the country's riverine system.

JICA ARCHIVES

But some of Indonesia's problems are as towering as its natural richness. There are some 150 active volcanoes spread among the islands and in September 2009, the latest tremor spread death and destruction to parts of Sumatra, killing several hundred people. In perhaps the most famous earthquake in history, the explosion of Krakatau killed an estimated 36,000 people in 1883 in an explosion reputedly heard as far away as Japan.

Indonesia's forests are the most extensive in the world after the Amazon basin in Latin America and the Congo basin in Africa, but in recent years they have also become one of the world's major climate change and environmental headaches.

While global warming is normally associated with gas-guzzling vehicles in the United States or belching power plants in China, the world's top two emitters of greenhouse gases, Indonesia is in the No. 3 spot, principally because of vast forest fires caused by illegal logging, burgeoning local populations and the spread of agriculture, particularly vast plantations of oil palm trees.

Huge Fires

The fires are so huge they are easily visible from hundreds of miles out in space. The U.N. Food and Agriculture Organization (FAO) estimated that in a five-year period alone earlier this millennium an area the size of Portugal was destroyed, threatening everything from wildlife to fisheries to the long-term well-being of local communities.

But the negative impact spreads far beyond Indonesia itself. Like the Amazon and Congo basins, the Indonesian rainforests yield not only a bounty in natural resources but act as a massive absorption 'sink'—taking in and neutralizing CO_2 emissions from around the world—a vital function also now under threat.

The Japan International Cooperation Agency (JICA) has worked closely with Indonesia for years on many types of development projects and whenever necessary, by also sending rescue workers, medical staff and emergency supplies to areas struck by natural disasters, as it did for the recent earthquake.

In its first, and most ambitious climate change program loan, JICA in 2008 allocated the equivalent of around US$300 million for a series of initiatives to bolster Indonesia's own national action plan on climate change. The government announced last year that out of 45 policy targets, 35 had been reached while progress had been made in nine others. JICA experts have advised on many of these programs, but the battle has only just begun.

Forest Destruction

Preventing forest fire, or spotting them early and reducing their spread, is a key component in the agency's activities. More than a decade ago, JICA introduced satellite technology to provide 'early warning' of fires. On the ground, Japanese experts have been assisting in fire prevention for nearly two decades and currently are helping to develop new guidelines which will be distributed to and implemented by local communities.

Experts and local forest fire brigades hold seminars to teach local communities the latest fire prevention techniques, encourage their direct participation in fire-fighting activities based on long-established procedures developed in Japan and emphasizing the negative economic, social and safety impact of fires on their communities and the wider environment.

JICA and the Japan Science and Technology Agency (JST) are developing a system to exploit the natural advantages of stretches of peat-soil rainforest, particularly the underground water present, to alleviate the threat of forest fires.

Indonesian officials regularly attend advanced training courses on fire management and prevention techniques in Japan.

Climate Change Impact

JICA's activities in Indonesia cover a far greater range of activities than simply providing expertise and financial assistance to directly tackle climate change. Other projects include what officials describe as 'mitigating' the effects of climate change or 'adapting' to the changing conditions.

On Java Island, the 320-kilometer-long Brantas river basin covers 12,000 square kilometers and is both a blessing and a curse for the local population. The waters are the lifeblood of local agriculture but are also subject to frequent and unpredictable flooding.

Three times since the 1970s JICA has helped to develop new master plans for the region to cope with changing weather conditions and more are en route. Experts predict rainfall patterns will continue to change in coming decades, triggering both more serious flooding and more prolonged droughts and necessitating the need to constantly review and update development projects.

Already JICA has implemented projects to more effectively utilize water resources, control erosion and improve both irrigation systems and power generation through yen loans. The agency developed an early warning flood control system and has provided agricultural equipment and fertilizer.

Now, the government, together with JICA expertise, has embarked on a more ambitious overall water resource management project involving multiple local governments and local communities working together to draw up a single master plan involving both upstream and downstream river basins.

"It has become essential that all the various organizations and communities work cooperatively to both control and manage the various water resources," according to JICA expert Yokito Sugimura. "It is key that governments and regional communities work closely together."

Another approach to reducing the impact of climate change is development of alternate, clean energy resources. Indonesia has the world's largest reserves of geothermal energy, but currently has developed only three percent of that capacity. Further development is both risky and enormously expensive, but the government has set a target of providing 5% of the country's overall energy needs from geothermal sources by 2025.

JICA has provided yen loan funding for the construction of geothermal plants and developed master plans in 2006 and 2007. Last year it conducted an updated survey, established a test drilling fund and outlined several proposals including incorporating the private sector more fully into future

JICA's WORLD

Publisher:
Juro Chikaraishi
Office of Media and Public Relations

Editor:
Raymond Wilkinson

Art Director:
Vincent Winter Associates

JICA'S WORLD
is published bi-monthly by **JICA**
Nibancho Center Bldg
5-25,Niban-cho
Chiyoda-ku
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Cover Photograph:
Myanmar—Cyclone Nargis strikes in 2008.
Photo by NASA

The Japan International Cooperation Agency (JICA) is the world's largest bilateral development organization, operating in some 150 countries to help some of the globe's most vulnerable people.