ASEAN CENTRE FOR BIODIVERSITY

The newsmagazine of the ASEAN Centre for Biodiversity

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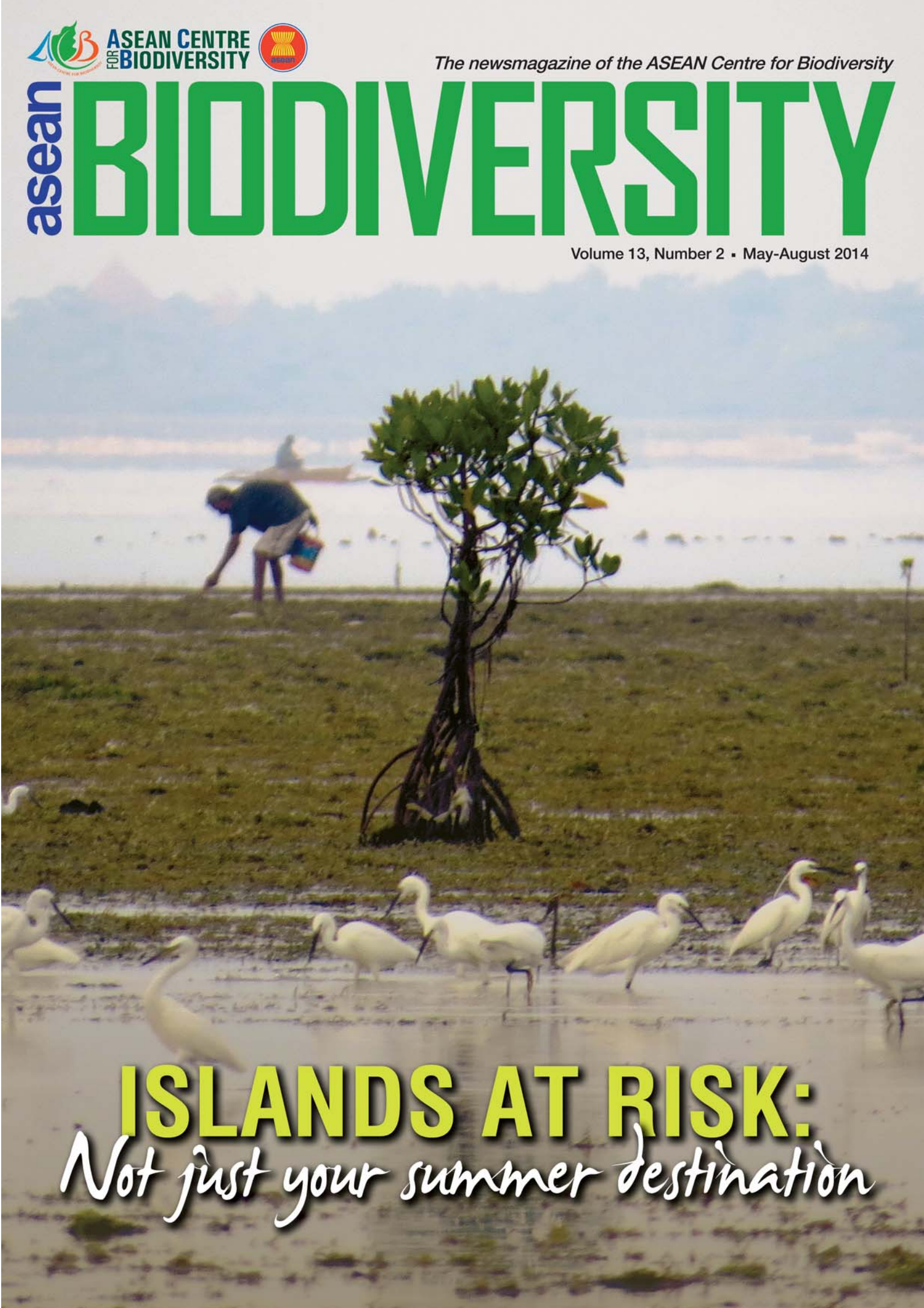

ISLANDS AT RISK:

Not just your summer destination

ASEAN CENTRE FOR BIODIVERSITY

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The ASEAN Champions of Biodiversity is a recognition programme for outstanding initiatives on biodiversity conservation and advocacy in Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam.

CATEGORIES

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Most Outstanding Biodiversity Conservation Project by an Individual or Institution in the Business Sector

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Most Outstanding Biodiversity Reportage by a Journalist/ Broadcaster or a Media Organization

Youth Sector

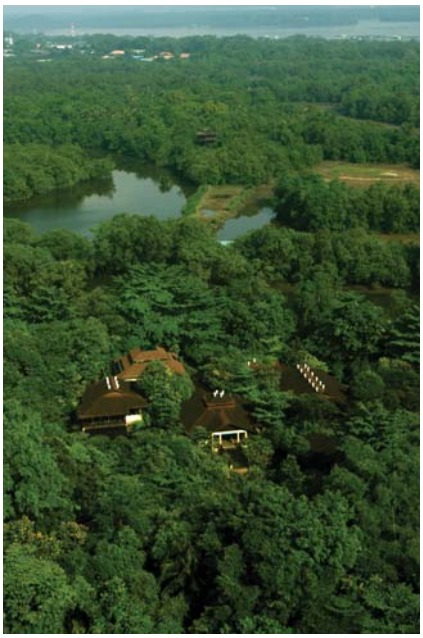
Most Outstanding Biodiversity Conservation Project by a Young Person or a Youth Organization

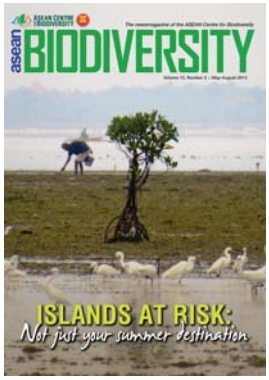
For more details, visit **champions.aseanbiodiversity.org**.
For questions, e-mail **champions@aseanbiodiversity.org**.

United Nations Decade on Biodiversity

CONTENTS

VOL. 13 ▫ NO. 2 ▫ AUGUST-SEPTEMBER 2014





About the cover

It's time to think of islands as more than just the next summer getaway. The result of unique and complex natural histories, islands are pockets of rich biodiversity, often not seen anywhere else in the world. In the face of climate change and other increasing environmental pressures, some of the world's islands, along with the people and the irreplaceable biodiversity within, are becoming increasingly vulnerable to storm surges, rising seawater, and others. There is hope though, and people and governments need to work together to protect fragile island resources.

Cover photo by Grace Anne S.Rodulfo

SPECIAL REPORTS

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ISLANDS AT RISK

By Sahlee B. Barrer

Why are islands suddenly so important?

Islands have always been areas of extreme fascination, and bring to mind warm weather, long stretches of white powdery beaches, and dreams of endless summers. These days, however, these sublime destinations islands are increasingly at risk from various pressures, ranging from pollution, sedimentation, to impacts from climate change.

There are more islands out there than you think. For some, the sheer number of islands is almost a given, particularly in countries like the Philippines, which has more than 7,100 islands. This may not be so obvious to many other land-locked countries. However, the world's 175,000 islands are incredible diverse, ranging from low-lying coral atolls to vast jungle archipelagos to the densely populated island cities of Hong Kong, Montreal, Manhattan, and Singapore, and remote ice-covered lands. Almost one-third of the world's countries are islands. Over two-thirds of Parties to the Convention on Biological Diversity (CBD) have island ecosystems. Recognition of the rich biodiversity of island ecosystems and their increasing vulnerability make their protection increasingly significant because of increasing environmental threats.

Photo by courtesy of Wikimedia Commons

Irreplaceable biodiversity in small packages

Islands and their surrounding nearshore marine areas constitute unique ecosystems and harbor rich biodiversity. The CBD states that islands constitute less than 5 percent of the Earth's landmass yet provide habitats for 20 percent of all bird, reptile and plant species, as well as 50 percent of the world's known marine biodiversity.

Islands are often habitats for endemic plant and animal species that can be found nowhere else on Earth. This is because islands have a unique evolutionary history and thus the ecosystems within and the species they harbor are exceptional treasures. When the world was covered with ice, most lands were connected, and species more or less travelled and evolved over large open and interconnected spaces. As the ice receded and land became separated by large expanses of water, the species and ecosystems that remained isolated on islands evolved over the centuries into what they are now – unique, endemic, and ultimately, irreplaceable.

Various pressures, however, continue to threaten the incomparable biodiversity of islands. Over the past century, island biodiversity has been subject to intense pressure from invasive alien species, habitat change and over-exploitation, and, increasingly, from climate change and pollution. As a result, islands constitute 7 of the world's 10 coral reef hotspots and 10 of its 34 conservation hotspots. Of 724 recorded animal extinctions in the last 400 years, about half were island species. Extinction rates for mammals are 177 times higher in island ecosystems than the average for all ecosystems. The CBD adds that 95 percent of bird, 90 percent of reptile and 70 percent of mammal extinctions have been on islands, primarily the result of the introduction of invasive vertebrates to islands. Once thriving coral reefs are now suffering the effects of bleaching, ocean acidification, pollution and other threats.

Highlighting the importance of island biodiversity

In celebration of the rich biodiversity of islands and to highlight the need for their conservation, the CBD chose the theme of Island Biodiversity for the International Day for Biodiversity in May 2014. This coincided with the designation by the United Nations General Assembly of 2014 as the International Year of Small Island Developing States (SIDS). The theme was also chosen to correspond with the timing of COP decision XI/15 paragraph 1(a) "to strengthen the implementation of the Programme of Work on Island Biodiversity".

Conservation protects both biodiversity and people

The unique species and significant ecosystems are critical to many SIDS that depend on the conservation and sustainable use of island biodiversity for their sustainable development. These rich natural resources are key to the livelihood, economy, well-being and cultural identity of 600 million islanders—one-tenth of world population. Biodiversity is the base for most island economies, such as fisheries, forestry, agriculture, and tourism. The conservation and sustainable use of the biodiversity of islands is thus critical not only to reducing biodiversity loss but ensuring the wellbeing of some of the world's most vulnerable populations.

Conservation of islands and the biodiversity and people they harbor is all the more urgent with the possibility of displacement of whole populations due to rising sea levels, increasingly violent storms, and other impacts of climate change. The era of climate change refugees has already begun with the evacuation of the Cateret Islands of Papua New Guinea in the South Pacific.

With homes and crops destroyed by rising sea levels, in April 2014 about 2,000 Cateret Islanders moved their meager belongings to a larger nearby island with higher elevation. In September

"Conservation of islands and the biodiversity and people they harbor is all the more urgent with the possibility of displacement of people and whole populations due to rising sea levels, increasingly violent storms, and other impacts of climate change."

2014, a Tuvalu family was granted residency in New Zealand after claiming to be climate change refugees, saying they would be affected by climate change if they were forced to return home. After waiting two years for this decision, the Tuvalu family is believed to be the first successful applicant for residency on humanitarian grounds where climate change is one factor. Tuvalu is a tiny, remote island in the Pacific between Hawaii and Australia with a population of less than 11,000. The average elevation in Tuvalu is about two meters above sea level and is considered to be among the places that could sink if sea levels continue to rise.

Entire ecosystems are at the brink of collapse due to environmental change. This does not just mean the end for many species but the collapse of the economies and societies that depend on them. These climate change cases may not necessarily open the floodgates of climate change refugees across the world, but it certainly presents a preview of what the future and may bring, and should be more than enough to spur more governments into action.

Bright spots on the horizon

Taking matters into their own hands, island nations are taking action to ef-

Photo by courtesy of Wikimedia Commons

fectively conserve biodiversity and promote sustainable livelihoods. Despite significant vulnerabilities facing islands, leaders of island countries and countries with islands have made visionary commitments at local, national, regional and global levels. Governments are working together in innovative partnerships with public and private partners to reduce biodiversity loss and achieve commitment targets to the CBD.

One such partnership is the Global Island Partnership (GLISPA), which was launched in 2006. GLISPA has catalyzed more than US$130 million in commitments for action on island conservation and sustainable livelihoods. It has assisted more than 30 countries to launch or strengthen major island commitments. The Partnership facilitates collaboration between all islands regardless of their size or political status. It is recognized as an effective mechanism for advancing the conservation of island biodiversity and was named a best practice partnership by the United Nations Commission on Sustainable Development (Rio+20).

The GLISPA has also supported other initiatives that have been built at the regional level. These include the Micronesia Challenge, an ambitious commitment by Micronesian governments to strike a critical balance between the need to use their natural resources today and the need to sustain those resources for future generations. In 2006, five Micronesian governments — the Republic of Palau, the Federated States of Micronesia, the Republic of the Marshall Islands, the U.S. Territory of Guam and the Commonwealth of the Northern Mariana Islands — committed to "effectively conserve at least 30 percent of the near-shore marine resources and 20 percent of the terrestrial resources across Micronesia by 2020."

Another similar endeavor is the Caribbean Challenge Initiative (CCI), a coalition of governments, companies and partners working together to accelerate action on the marine and coastal environment. The CCI was founded in 2008 by a group of Caribbean governments eager to enhance the conservation of their marine and coastal resources, and has since grown to include private sector membership and garner over US $75 million in funding commitments. CCI Governments and territories signed a CCI Leaders Declaration in May 2013 committing them to protect and conserve 20 percent of their marine and coastal resources by 2020. CCI companies then committed to changing business practices and supporting the conservation actions of the CCI.

These partnerships demonstrate how recognition of the fragility of ecosystems and the vulnerability of populations can inspire political momentum and create diverse initiatives to ensure the conservation of islands and their resources. Urgent and immediate action is needed to halt and reverse trends and threats to island ecosystems and innovative partnerships can chart a new course to build resilient and sustainable island communities. Environmental governance of islands with their maritime territories ultimately affects global climate, food supplies and resource cycles, and partnerships with a climate change context and framework are critical to ensuring the conservation of unique, irreplaceable, and significant natural resources vital not only to island countries and communities, but the rest of the global population. □

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PARADISE PROTECTED:
MAKING ECOTOURISM WORK FOR ISLAND BIODIVERSITY CONSERVATION

By Sahlee B. Barrer

Islands are generally thought of as the great summer destination – a chance to soak up some sun, walk on white sandy beaches, and marvel at the amazing corals and wildlife beneath the sea. Islands are idyllic, romantic, pristine, and are thus prime destinations for tourists and have great potential for ecotourism.

More than being one's next vacation destination, islands harbor an amazing wealth of biodiversity. According to the Convention on Biological Diversity (CBD), islands constitute less than 5 percent of the Earth's landmass yet they are estimated to provide habitats for 20 percent of all bird, reptile, and plant species, as well as more than 50 percent of the world's known marine biodiversity. The isolation of island regions has led them to being global centres for endemic species, with a richness of endemism 9.5 times higher than in mainland regions. And because of numerous threats to islands, they also provide habitats for 40 percent of all listed Critically Endangered and Endangered species, cover 7 of the world's 10 coral reef hotspots, and 10 of 34 global conservation hotspots. Much of the threats to islands are induced by human activities, such as migration, tourism, unsustainable extraction of natural resources, introduction of invasive alien species, and impacts from climate change.

Island resources provide tremendous benefits and critical natural capital to more than 600 million people. Biodiversity provides the base for most island economies, including fisheries, forestry, agriculture, and tourism. More importantly, environmental management and governance of islands and their tremendous marine territories have global impacts, affecting climate, food supplies, and resource cycles. Conservation and sustainable use of invaluable island resources and their surrounding waters are thus critical to global conservation goals.

Wealth of island biodiversity in ASEAN

In ASEAN, the 10 member states include various islands with extremely high biodiversity. These include the island of Borneo, which encompasses Brunei Darussalam, Indonesia, and Malaysia. The region also contains three mega-diverse countries, specifically Indonesia, Malaysia and the Philippines. The Philippines, Malaysia and Indonesia also form part of the coral triangle, the center of the world's highest marine diversity. While easily dismissed as a country that has lost most of its natural resources, the island state of Singapore has become a prime example of how biodiversity can be maintained in the world's growing cities. Nature studies and projects continue to discover and rebuild natural areas in the country.

"Island resources provide tremendous benefits and critical natural capital to more than 600 million people. Biodiversity provides the base for most island economies, including fisheries, forestry, agriculture, and tourism."

These highlight the valuable biodiversity of island nations in ASEAN. Many ASEAN Member States also encompass islands with extremely high and increasingly vulnerable biodiversity. Conservation programs should be strengthened to protect the fragile resources of these areas. One such strategy is to strengthen ecotourism, particularly highlighting the natural and unique attractions found in these islands.

ASEAN Heritage Parks: ecotourism as a tool for conservation

Various protected areas and ASEAN Heritage Parks (AHPs) in the ASEAN Member States have been managed to ensure that ecotourism benefits both people and the environment. With a total of 33 in the region, AHPs are protected areas that are specially chosen to increase collaboration in protected area management in the region, and best represent the ecosystems and species of Southeast Asia. They are often habitats of ASEAN's most enigmatic and endangered wildlife, and thus benefit from significant programmes on conservation and management, including ecotourism.

Ao Phang-nga-Mu Ko Surin-Mu Ko Similan National Parks and Tarutao National Park, Thailand

Located in Phang-nga province, Ao Phang-nga, Mu Ko Surin, and Mu Ko Similan National Parks are the most well-known marine protected areas in Thailand. Ao Phang-nga is popular for its mangrove ecosystem and karst topography; Mu Ko Surin for its shallow reef; and Mu Ko Similan for scuba diving.

In Ao Phang-nga National Park, visitors can take a boat ride to various islands, including Khao Tao, where prehistorical artifacts have been found, such as rock tools, broken ceramics, parts of a stone axe, and a sharpened fish bone. Visitors can take a trip through the mangrove forests and observe soldier crabs, mud gobies, and Meder's mangrove crabs. Other activities offered by the park are camping, canoeing or kayaking, cave touring, cultural sightseeing, and snorkeling.

Snorkeling and scuba diving are the most popular activities in Mu Ko Surin because of the rich marine life in the park. Recorded marine fauna is estimated at 126 species, including whales, whale sharks, as well as Hawksbill, Olive Ridley, and Green sea turtles.

In Mu Ko Similan, visitors have the opportunity to enjoy the beach life, swim with wild turtles, go birdwatching, as well as snorkel and scuba dive. A visit to the Chaw Le fishing village on Koh Surin Tai Island provides the rare chance to learn about the traditional culture of sea gypsies and witness ancestor worship ceremonies.

Bukit Timah Nature Reserve and Sungei Buloh Wetland Reserve, Singapore

Bukit Timah Nature Reserve (BTNR) retains the largest block of forest on Singapore and has over 900 species of vascular plants, 124 species of birds, 200 species of butterflies, and 15 species of freshwater fish.

The substantial number of visitors to BTNR has necessitated the construction and improvement of a visitor centre, boardwalks, resting huts, information map-boards, trail railings, and interpretative signages to enhance safety and improve visitor experience. Visitors can walk through the various nature trails, go birdwatching, as well as take the guided tours.

Sungei Buloh Wetland Reserve (SWBR) is Singapore's first and only protected wetland reserve, and is home to over 500 species of tropical flora and fauna, including 223 species of birds and 35 species of dragonflies. SWBR has a number of activities to ensure that visitors not only enjoy the natural features of the park, but are educated on the wetland's biodiversity values as well. The Marine Fish Programme creates public awareness on more than 100 species of fish found in the reserve and offers Marine Fish Guided Walks to visitors.

A technological innovation at the park is the installation of a Wireless Learning Trail to enhance visitors' learning experience and develop a better appreciation of the natural environment. Using Ultra Mobile Personal Computers (UMPC), visitors can receive wetland information and pictures by scanning 2-D barcodes along the boardwalk. People can listen to birdcalls, observe the behavior of mudskippers, get stimulating questions on the park, and even participate in quizzes and worksheets provided on the UMPC. Other activities in the park include coastal cleanups, reforestation, mangrove plantings, and thematic guided walks. The reserve is also a popular site for birdwatching and photography.

Kinabalu National Park and Taman Negara National Park, Malaysia

Malaysia is one of the region's leading examples in ecotourism, and this is truly evident in Kinabalu National Park. The park covers 75,370 hectares and is known to have the most complete list of montane species of all taxa, many of which are endemic to the site. Kinabalu National Park is reported to have one of the richest flora in the world per unit area. Recorded fauna includes 112 recorded mammals and more than 300 species of birds.

At Kinabalu National Park, visitors can climb to the summit of Mt. Kinabalu; bathe in the natural hot springs at Poring; see the butterfly house, ethnic garden, and mini-zoo; experience the canopy walkway; or walk through the forest to a large waterfall in the park. There are various accommodations for travelers, such as the Laban Rata rest house and other chalets midway to the summit; campsites at Poring Hot Springs; and campsites, dormitories, and chalets near park headquarters.

Mt. Kinabalu is also known for its intimate connection with the folklore and local traditions of Sabah. On its slopes are the homes of Hill Dusuns or Kadazans, who belong to the largest ethnic group in the state. They are noted for their basketry and other handicrafts and still use traditional methods of farming. For the Kadazans, Mt. Kinabalu is the resting place of the spirits of their ancestors and as such, remains sacred.

The park earns a substantial amount from the thousands of visitors that visit Kinabalu, as fees are charged for

entrance to the park, use of various facilities, transportation to the gates that mark the start of treks to the summit, and various other fees. The Laban Rata rest house, chalets, and restaurants are run by a private company that pays rental fees to the park. This allows the park management to concentrate on conservation and management activities, while accommodations, food, and other services are handled by a private organization.

Taman Negara National Park is one of the world's oldest rainforests and is considered older than either the Amazon or the Congo, as it has remained undisturbed for over 130 million years. The park covers 434,351 hectares and is home to an estimated 185,000 species of fauna and 8,000 species of flowering plants.

The park receives two types of income, one from the government and the other from the privately operated Mutiara Resort, which manages the guesthouses, chalets, restaurant, lecture halls, and other facilities in the park. This allows park management to concentrate on conservation projects.

Visitors can choose to do a number of activities in the park, such as hiking, night walks, fishing, shooting the rapids on Lata Berkhoh, exploring the Gua Telinga cave system, birdwatching, traversing the canopy walkway, or taking a boat ride on the Tahan river. The park is a haven for nature lovers and it is quite common to spot deer, wild boars, tapirs, monkeys, and many types of birds.

Taman Negara National Park can be considered a model in ecotourism activities and financial sustainability for the following reasons: locals are first in line for employment as guides, rangers, and other staff; locals are the service providers through boat and tour operations, restaurants, and other services; partnership with the private sector in the operation of facilities and provision of services; number of qualified, professional, and expert staff; informative briefing and orientation from expert tour guides with audio and visual presentations; availability of appropriate facilities and interpretative signage; focus on visitor management and safety; and variety of recreational activities and amenities.

Infrastructure has been carefully designed to ensure that they blend into and are appropriate for the forest environment. Buildings are painted in earth colors to camouflage the structures. The chalets and some wooden structures are elevated with cement foundations to prevent termites from damaging the wood in the buildings.

Taman Negara also provides an opportunity to see how local indigenous groups live in the rainforest. A visit to the Baki Tribe provides insights into indigenous methods of hunting and producing fire.

Protecting islands at risk

Why islands? Aren't most of the world's ecosystems at risk?

With various pressures threatening fast dwindling resources, islands are becoming increasing vulnerable particularly in the face of climate change. More recently, islands in the Pacific are being evacuated by communities as rising seawaters threaten their lives and property, and are expected to engulf whole islands in the immediate future. Communities leaving their homes in the aftermath of extremely severe storms are becoming increasingly common, and the global community is bracing itself for the scenario of populations of small island countries possibly seeking refuge in mainland states. The age of climate refugees is clearly at the world's doorstep.

Still, many island states are working to ensure that their countries and people are not swept away by the impacts of climate change. Highlighting issues affecting the extremely rich, rare, and unique biodiversity of island nations is a first step to creating awareness of the urgency of the issue, and providing strategies for conservation and management may help contribute solutions to protecting islands at risk.

It is no longer enough to merely highlight the natural beauty of islands. Visitors must be made aware that islands are not just places of beautiful sunsets, romantic idylls, and fun at the beach. These areas have been formed through a unique and complex natural history that run for millennia and thus provide habitats for ecosystems and species that may not be seen anywhere else in the world. This places the "eco" in tourism, and allows people to contribute to the conservation and sustainability of these globally significant and fragile environments. □

Wikimedia Commons

One of many small islands at peril: Fakaofo Atoll in the Tokelau Group, photographed from 30,000+ feet on October 19, 2005.

(CAR-)BON VOYAGE – SMALL ISLANDS IN BIG TROUBLE

By Philipp Gassner

The award for the sexiest volcano alive goes to Eyjafjallajökull. As a tongue twister, it definitely beats Mount Pinatubo! Go ahead, try it yourself: Eyjafjallajökull. But as a volcano, the Philippines' Mount Pinatubo won the race, with its eruption in the summer of 1991 deemed 10,000 times larger than Eyjafjallajökull's in 2000.

Still, Eyjafjallajökul learns the trophy since it is the world's first carbon neutral volcano, too. Sounds odd, considering that volcanic eruptions emit millions of tons of carbon. Well, one way for carbon neutrality is carbon offsetting – the reduction in emissions of carbon made in order to compensate for an emission made elsewhere, be it a car, a factory or a volcano. But who would pay to offset a volcano? The owner? Officially Eyjafjallajökull belongs to Iceland. Already short on cash, the country luckily wasn't charged for the volcano's emission. Instead, Eyjafjallajökull took care of itself. Its ash plume grew from the east coast of Canada and the US, to as far west as Siberia and Mongolia, grounding countless commercial airline flights. Thus, the planes were kept from emitting CO2– more or less the same amount as Eyjafjallajökull released: the first carbon-neutral volcanic eruption.

Chilly 100 ppm

But why even talk about carbon neutrality? Let's see and go on a journey 300 ppm ago. For those who wonder, ppm is short for parts per million, in this case, 100 parts of carbon dioxide per one million parts of air. A hundred out of a million doesn't sound a lot. And it isn't. That's why scientists call the period of the planet 850 million years ago 'Cryogenian' or 'Snowball Earth', nearly frozen from the poles to the equator.

The problem at hand is the fabulous fusion reactor in the sky, also known as the sun, sending us its rays, which penetrate the Earth's surface and escape back to space. Luckily, there is a warming blanket around the planet, also known as greenhouse gases, reflecting some of the escaping rays back to the otherwise frosty planet. The most famous of such blankets is carbon dioxide or CO2. But 100 ppm CO2 only makes a rather thin blanket leaving the planet freezing with only 4 ºC and 85 percent ice cover. A true snowball!

Here come our friends, the sexy volcanoes. Take Mount Pinatubo. On first sight he is a very cool guy, or rather a cooling guy. In addition to CO2, he exhales sulfur dioxide, too. If CO2 is a blanket, sulfur dioxide is a mirror, increasing the global cloud cover so much, that the sun's rays were reflected and the Northern Hemisphere cooled by 0.6°C for two years. But if you get to know Pinatubo, Eyjafjallajökull and their buddies, you see that they are hot indeed. Or rather heating. Their enormous CO2 emissions, that would make every smoky coal plant jealous, rendered the Earth's blanket ever more cosy and thick.

Cosy 230 ppm

Thick and thin blankets came and went throughout the history of the Earth, driven by volcanoes among other heating or cooling phenomena. Like a yo-yo, our planet was fluctuating between two dominant climate states: the greenhouse earth and the icehouse or snowball earth. Since nobody wants to live on a snowball, Earth, fortunately, continued to warm and ended up with a cosy 230 ppm thick CO2 blanket. Under this blanket, you could measure a pleasant 13.6 º C about 10,000 years ago during the so-called Holocene. The ice covers from the last big ice age melted down to 15 percent, making space for *Homo sapiens* – the modern humans – to spread to all parts of the world and develop civilizations.

Not being sidetracked to stay warm in the cold anymore, *Homo sapiens* tried to be worthy of its name, and smartly invented lots of stuff such as agriculture, and the steam engine. The former helped the hunter and gatherer society of some 15 million people globally to grow to billions; the latter provided the energy for them to move and produce stuff – and more and more CO2 blanket for Earth's atmosphere from burning fossil fuels. Thus, this gloriously smart invention marked the industrial revolution and the dawn of the so-called Anthropocene. The Age of Humans then started to compete with the sexy volcanoes in having a global impact on the Earth's ecosystems and atmosphere, now having 290 ppm CO2 and 13.7 ºC.

From 290 to dripping 400 ppm

290 ppm, 13.7 ºC. Cozy enough for people to thrive. However, this is when we should have stopped! This is when things went wrong. How wrong, shows a peep on the 'Keeling Curve', famously displaying rising CO2 levels as a steep, linear curve. A curve that reached the symbolic threshold of 400 parts per million on 9 May 2013. How does 400 ppm feel again? Hard to say, since the last time the atmosphere showed such levels about 4.5 million years ago, humans were not yet around to let us know. What we do know, however, is that back then the Arctic was ice-free, savannah spread across the Sahara desert, coral reefs suffered mass die-offs, temperatures were 4 ºC warmer than today, and polar temperatures were at 10 ºC. What that means for the leftovers from snowball Earth, the polar ice covers, you can easily experience on a hot day if you don't lick your ice cream fast enough: it melts and drips. Not on your fresh white shirt as chocolate ice-cream tends to do, but in the oceans. Their levels were up to 40 meters higher than today.

As 40 meters are hard to imagine, let's start with 8.2 mm. That's the annual sea level rise Australia's National Tide Facility has measured on the Carteret Islands, Papua New Guinea. The 0.6 square-kilometer island has a maximum elevation of 1.5 meters, which 2,600 people call their home. Or called, to be precise. Coupled with climate change's tendency towards more severe weather patterns, the island is predicted to be completely submerged in 2015. Not wanting to wait till they had to swim away, in May 2009, the entire community of Carteret was forced to leave their home for good, becoming the first official climate change refugees.

Reggae, Mambo, Reggaeton

And they won't be the last. Just remember the recent catastrophic climate events, such as the North American drought in 2012, costing $35 billion in the Midwest alone, or typhoon Haiyan, one of the strongest tropical cyclones ever recorded, killing thousands in the Philippines. Such auspices are felt by so-called Small Island Developing States (SIDS) first – and not by coincidence. Their small size and isolation makes them vulnerable to environmental disasters and climate change, while the 32 SIDS of the Caribbean, the Pacific, Africa, the Indian Ocean, and South China Sea contribute little to climate change. Their combined population of 63.2 million people lives in an intimate relationship with nature and the oceans. Fish contributes at least half of total animal protein intake in some small islands and Pacific Tuna fisheries alone comprise more than 50 percent of their export. Coral reefs provide an estimated $375 billion per year in goods and services to the world.

Also on land, small islands are rich in biological diversity and home to many endemic species, found nowhere else on Earth. The Seychelles, Comoros, and Mascarene islands in the Indian Ocean for instance hold numerous critically endangered bird species, amphibians, reptiles, and insects. Thus, small islands make a contribution to global biodiversity that is out of proportion to their land area. But they are not only biodiversity hot spots. Reggae, Mambo, Reggaeton, Bob Marley, Tito Puente, or Rihanna all come from small islands, making them cultural hotspots, with 28 World Heritage Sites.

400 ppm: leave or change

But in a 400 ppm world, these hotspots are at peril: coral reefs are slowly bleaching in warming water to finally die off. Of the 724 recorded animal extinctions in the last 400 years, half were island species. At least 90 percent of the bird species that have become extinct in that period were island-dwellers. And human island-dwellers like the people of Carteret have to leave.

Leave or change? And for the necessary change, the small size of small islands can actually be a blessing. Many SIDS, including the Maldives, Tuvalu and several Caribbean island states, are working to achieve climate neutrality.

Leave or change? And for the necessary change, the small size of small islands can actually be a blessing. Many SIDS, including the Maldives, Tuvalu and several Caribbean island states, are working to achieve climate neutrality. Unlike our carbon neutral friend Eyjafjallajökull, these states want to get there using renewable energy or lead the way in ocean conservation efforts. Some of the largest Marine Protected Areas in the world are being established in the Pacific, supported by initiatives such as the Micronesia Challenge, the Caribbean Challenge Initiative, the Coral Triangle Initiative, and the Phoenix Islands Protected Area.

In Southeast Asia, the ASEAN Centre for Biodiversity, supported by GIZ, the German Development Cooperation agency, aims to protect island biodiversity. In this spirit, the Convention on Biological Diversity (CBD) announced *'Island Biodiversity'* to be the theme of the International Day for Biodiversity (IDB) on May 22, 2014, coinciding with the designation by the United Nations of 2014 as the *'International Year of Small Island Developing States.'*

These efforts show that SIDS are ideal locations for pilot projects, which can then be rolled out in other countries on a larger scale. There is hope that they can be the change they want to see in the world, as President Mohamed Nasheed, his cabinet and colorful fish made clear. You heard right, they were surrounded by reef fish, when they famously met underwater in October 2009, to highlight the threat of global warming to the Maldives.

Tropical 1,000 or safe 350 ppm?

These threats will increase as CO2 levels keep rising. And they are rising at an unprecedented speed. Naturally, an increase of only 10 ppm would need at least 1,000 years. But the world's scientists agree, in the latest emissions scenarios presented by the Intergovernmental Panel on Climate Change, that we could reach 1,000 ppm by the end of the century. Such levels were last seen 100 million years ago during the 'Cretaceous Warmth' with average temperatures of 22 ºC. All of the Earth's glaciers melted, tropical plants and reptiles were found close to the Earth's poles, and one third of today's land areas were under water, including the center of the United States. Let's rather go back to 350 ppm, which is considered safe for people and the environment as we know it, including small islands. We should learn from them, or from Eyjafjallajökull, on how to finally become carbon neutral. □

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Photo by Sahlee B. Barrer

MANAGING PHILIPPINE ISLANDS' BIODIVERSITY

By Jonathan L. Mayuga *

The Philippines, an archipelago of 7,107 islands and islets, is one of the 17 mega-diverse countries in the world. Yet, it remains among the world's biodiversity hot spots underscoring that protection against the many threats to the country's unique flora and fauna cannot be overemphasized, according to Theresa Mundita Lim, director of the Biodiversity Management Bureau (BMB) of the Department of Environment and Natural Resources (DENR).

Here is why: a total of 148 species are on the list of threatened Philippine fauna, which include mammals, birds, reptiles, and amphibians, found across the country. Of these, 24 are in the "critically endangered" category, including all species listed in Appendix I and 28 under the "endangered" category. These include all species listed in Appendix II of the Convention on International Trade in Endangered Species; 85 are under the "vulnerable" category; and nine more are in the "other threatened species" category.

The Philippines, having been tagged as one of the world's richest in terms of biodiversity, is fifth in the number of plant species and maintains 5 percent of the world's flora. It has high species endemism, which covers at least 25 genera of plants and 49 percent of terrestrial wildlife. The Philippines is also fourth in bird endemism and has about 3,214 fish species, with about 121 endemic and 76 threatened species, according to data released by the DENR-BMB.

Formerly known as the Protected Area and Wildlife Bureau, the bureau was renamed BMB, expanding the coverage of its mandate beyond the management of the country's unique wildlife and their natural habitats to managing the country's biological diversity.

'Island Biodiversity'

THE BMB, along with Germany's Gesellschaft für Internationale Zusammenarbeit (GIZ), led the country's celebration of the International Day for Biological Diversity (IDB) to highlight its commitment as party to the Convention on Biological Diversity (CBD) and other agreements that seek to protect the world's ecosystems.

The United Nations has proclaimed May 22 of each year as IDB to help increase the understanding and awareness of biodiversity issues.

IDB is celebrated by 193 member-countries, including the Philippines. The celebration, with the theme "Island Biodiversity," held at the Ninoy Aquino Parks and Wildlife Rescue Center in Quezon City, was highlighted by the launching of the BMB coffeetable book, entitled *Treasures of the Philippine Wild,* awarding of the BMB-GIZ photo contest winners, and the holding of the 2014 Youth Summer Camp. An EcoWalk was also held around the park, during which biodiversity management, anchored on learning more about it and taking time to share it with the family, was encouraged to help ease the pressure of biodiversity loss.

'Very blessed'

Berthold Schirm of GIZ sums up the country's richness in terms of biodiversity by saying that the Philippines is "very blessed. It is unbelievable. You have much more than in Germany. However, those species in the Philippines, and globally, are under threat." He said the extinction of important species is happening around the globe.

"These species are not reduced, but lost, forever," he added. In the Philippines, Schirm said, there is hope, if ecosystems are managed in an effective way. He said there is a need for all stakeholders to help protect the country's rich biodiversity by ensuring that "all hands are on deck" in defense of ecosystems around the world. Schirm believes that there is a need for more investment for the protection of ecosystems through education. The youth, he said, could play a very important role in preventing habitat loss, listed as the No. 1 reason for the rapid rate of biodiversity loss.

This year's global celebration highlights the need to protect island biodiversity, of which the country has a lot to lose, being an archipelago.

Islands as repositories of biodiversity

According to Director Lim, islands are repositories of species' richness and endemism. "Roughly 20 percent of all the world's vascular plant diversity and 15 percent of all the world's mammals, birds and amphibians are found only on islands," she said.

Lim said that around one-third of all the world's threatened mammals, birds, and amphibians are found only on islands. "Species endemic to island biodiversity hot spots include one-fifth of the world's threatened amphibian fauna; one-fourth of the world's threatened mammals; and more than one-third of all the threatened birds in the world."

According to Lim, protecting island biodiversity is protecting its unique wildlife and flora. Quoting Dr. Terry Gosliner, curator at the California Academy of Sciences, she said: "The Philippines's complex geological history made it a gold mine of new life forms. This is the place where the action is..."

Newly discovered species

There are newly discovered species found only in the Philippines, which adds more reason why its islands, no matter how small, should be protected. Among these are the purple crab that is found only in small, lowland forest ecosystems in Palawan; *Varanus bitatawa,* a fruit-eating monitor lizard; deepsea swell shark; bleeding-heart pigeon; and the Dinagat cloud rat found only on Dinagat Island.

Lim said that for the people inhabiting the islands, biodiversity translates into a source of pride and income through ecotourism, and food security and sustenance, noting that biodiversity sustains lives and the lives of other species with which humans share the place they live in called Earth.

Threats to biodiversity

In the Philippines, as well as in other countries, logging and land conversion, destructive fishing, encroachment of protected areas and pollution caused by siltation, and unmanaged waste that lead to habitat destruction, are threats to biodiversity. Lim said human pressure on the environment, such as the unsustainable use of natural resources at a rate much faster than they can be

Varanus bitatawa

blogs.dicovermagazine.com

replenished—such as overfishing, overharvesting of non-timber products—is another factor.

Another serious threat to biodiversity is poaching and illegal wildlife trade that continues to haunt the Philippines. Lastly, biological pollution through the introduction of invasive alien species or species that don't naturally occur in a specific area and exotic species, which could be invasive and become pests or cause diseases, usually cause the extinction of endemic species.

Protection of Philippine biodiversity

The BMB, which is the primary agency responsible for the protection of the country's biodiversity, promotes the designation of certain areas as protected areas (PAs) or natural parks (NPs) under the National Integrated Protected Areas System (NIPAS) Act of 1992. The law provides for the conservation and protection of wildlife resources and their habitat.

To date, Lim said there are 240 declared PAs but only 115 of them are backed by presidential proclamation or act of Congress.

The BMB is currently assessing how many of these declared PAs and NPs have an active Protected Area Management Board, the policy-making body tasked to manage these uniquely important land and water bodies. Lim noted that the Philippines is a signatory to international agreements and conventions, such as the Convention on the International Trade in Endangered Species, which was established to prevent international trade from threatening species with extinction; and Convention on Biological Diversity, which aims for the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising out of the utilization of genetic resources.

The Philippines is a signatory to the Ramsar Convention on Wetlands and Convention on Migratory Species. The Ramsar Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands, while the Convention on Migratory Species, the only global and UN-based intergovernmental organization, is established exclusively for the conservation and management of migratory species.

She said that information, education, and communication are important components of the campaign to protect the country's biodiversity.

"That is why the DENR continues to engage people in communities and partner with various local governments and the private sector for the protection of the country's environment, and promote sustainable use of natural resources," she added.

The official was referring to the Community-Based Forest Management Agreements and Community-based Coastal and Marine Resource Management and the "Adopt-a-River/Estero" programmes.

With the 7,107 islands and islets to protect against destructive human activities, Lim said the government would need all the help it can get.

But she said that anyone can help protect and conserve the country's biodiversity through their own little way by planting trees; participating in river-rehabilitation efforts; practicing proper solid-waste management; conserving energy, paper, and fuel; boycotting wildlife products; simply turning off the lights and recycling; or better yet stopping the use of plastic bags. □

Photo courtesy of Howard Ignatius

Three million birdwatchers make ecotourism one of the fastest growing travel sectors in the world.

DESTINATION FLYWAYS

By Philipp Gassner

'Take only memories and leave only footprints' charms the travel brochure in bright letters. Also the scenery sounds to die for, doesn't it? 'A romantic landscape of coastal tundra, near crystal clear coastal lagoons and bays.' Let alone the food: 'Enjoy our three course menu with a fresh variety of larval invertebrates, midges, mosquitoes, flies, beetles, and spiders. Perfected with a juicy smoothie of selected grass seeds and berries.' It's definitely time for a holiday.

Mr. Piper couldn't agree more. Have you met Mr. Piper? Mr. Sand Piper. He is a bit lonely and bored by his wintery home in Myanmar, Thailand and Viet Nam, and by the same old cousin of shrimps and other boring seafood. So he doesn't hesitate long and books the advertised adventure trip to northeastern Russia along the Bering Sea coast of the Chukotsk peninsula and southwards down the Kamchatka peninsula.

After 8,000 exhausting kilometers, with his neighbor annoyingly close to him and the board entertainment system broken, Mr. Piper finally arrives at the Arctic Circle in the final days of May. The brochure didn't promise too much: excellent food, stunning scenery and on top, lots of handsome girls. The lonely days are over. He immediately begins displaying the best suit he brought. Travel in style he always says. And before long he meets his dream girl, they get married and live happily ever after. Too good to be true? It was! His wife leaves him only three weeks later and heads back home. Poor Mr. Piper stays behind with their children.

Surely by now you guessed that Mr. Piper is a bird, if the larvae diet didn't already give him away. He is a migratory Spoon-billed Sandpiper to be more precise. And after his chicks reach fledging age they too depart, following the 8,000 km south on their own a few weeks later.

Layover stepping stones

Mr. Piper is one of one billion international tourists every year, spending US$ 1.03 trillion in 2011 alone. But this industry is dwarfed by the billions of migratory birds that set out to travel the world. Mr. Piper doesn't like to travel alone. He flies together with 200 fellow waterbird species that twice a year flies through the East Asia-Australasian Flyway connecting Russia to Southeast Asia and Australia. As they travel, conveniently they don't have to worry about passports and visas, since they don't mind any political borders that they cross.

However, one thing they couldn't get rid of are layovers. But instead of trying to sleep on uncomfortable benches in the departure halls of Manila, Jakarta, or Tokyo Airport, they use networks of sites that act like 'stepping stones' along flyways for resting, feeding, breeding, and wintering. Thus, spanning continents and oceans, used by a myriad of bird species, flyways represent one of the most spectacular and valuable phenomena of the world's natural heritage.

Pollen luggage

This heritage is used by plenty of migratory animals that are key components of the ecosystems that support all life on Earth. For instance their luggage: instead of sunscreen and a camera they bring lots of pollen and seeds with them, contributing to ecosystem structure and function. Moreover, they regulate the number of species in ecosystems and provide food for other animals. Animals like us humans – through subsistence, recreational, and commercial hunting and fishing. In this way they also have a great significance in many cultures – in legends, stories, religions, medicine and customs - or in the way we measure time and experience seasons. Not surprisingly there is a great deal of people preferring to watch them overeat: Mr. Piper and company attract a lot of so-called ecotourists such as whale watchers or bird spotters. The latter already being three million people, give a hint that ecotourism is one of the fastest growing travel sectors in the world.

Quite aware of this, the UN World Tourism Organization (UNWTO) partnered with the World Migratory Bird Days, May 10 and 11. The 2014 theme 'Destination Flyways: Migratory Birds and Tourism' promotes building local sustainable tourism by linking together key migratory bird sites, local communities and the global wildlife watching industry - with benefits for both people and migratory birds.

Seawalls and CO2

To grasp the importance of this effort, we could ask Mr. Piper who is one of only 100 breeding pairs remaining in the wild. Some shorebirds show annual declines of nine percent and a third of the bird species in the flyway are already critically threatened. Why? Mind you, this region is also home to 45 percent of the world's human population, putting many bird sites under threat from land reclamation and degradation. Just take one example of a stepping stone being lost: Saemangeum, the largest seawall in the world, eliminated one of the Yellow

Photo Courtesy of Smith Sutibut

Mr. Piper, the Spoon-billed Sandpiper *(Eurynorhynchus pygmeus)* is only one of the hundreds of bird species travelling the East Asia - Australasian flyway.

Sea's most important shorebird refueling habitats, which hosted half a million migrating shorebirds.

But Mr. Piper's peers also face more indirect threats, such as habitat fragmentation and degradation caused by climate change. While Mr. Piper emits only a few kilos of carbon dioxide on his 16,000 km travel, humans are not as frugal. For the same trip, the average airline passage would emit more than 1.5 tons of carbon dioxide. And since they are produced at cruising altitudes high in the atmosphere, they trigger a series of chemical reactions and atmospheric effects that have a multiplying warming effect. One passenger emits an equivalent of close to four tons. This is four times the emissions of the average Filipino, a year. Civil aircraft, ironically fundamental for international tourism, thus accounts for two to six percent of global warming, with emissions having risen by 83 percent since 1990.

Unfortunately, this is not the only environmental impact of tourism, as it also consumes vast amounts of energy, water, land, and habitats. Mount Everest's damaged habitats and slopes littered with garbage from countless tourists, deforestation, and water scarcity at the Western Indian coast or the loss of Mr. Piper's habitat in Saemangeum are but some reminders.

"Mr. Piper emits only a few kilos of carbon dioxide on his 16,000 km travel, the average airline passage would emit more than 1.5 tons of carbon dioxide for the same trip, and one passenger emits an equivalent of close to four tons."

No passport, no boarders

Luckily, governments, conservation organizations, scientists, and others around the world, work together to conserve Mr. Piper's and other migratory birds' habitats. For instance, the East Asian Australasian Flyway Partnership works to protect migratory waterbirds, their habitat, and the livelihoods of people dependent upon them. BirdLife International and its many national partners are working together to protect chains of Important Bird Areas used by migrating birds. The ASEAN Centre for Biodiversity, supported by GIZ, the German Development Cooperation, promotes the ecosystems approach in biodiversity conservation specifically in ASEAN Heritage Parks, including other protected areas and the flyways.

Lots of such stones are also found in 119 States in the African-Eurasian flyway, used by 255 fellow bird species of Mr. Piper. The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (UNEP/AEWA) aims to conserve them, from the northern reaches of Canada and Greenland, across Europe, the Middle East, and Central Asia to the southern tip of Africa.

However, since birds don't have a passport and don't know political boarders, international efforts are also crucial. The Convention on the Conservation of Migratory Species of Wild Animals (CMS) under the aegis of the United Nations Environment Programme is concerned with the conservation of wildlife and habitats on a global scale.

Within this framework, sustainable tourism has its role to play: planning and management can dramatically reduce the impact on environments and bird habitats, and help locals to conserve and benefit from their biodiversity. But the sustainable tourist plays an even more important role - respecting local cultures, supporting local economies and being environmentally conscious. The brochure was right after all: *Take only memories and leave only footprints.* □

Photo by Indra Sari Wijaya

Symbolic for disaster risk and natural resilience: Jakarta during big floods January 2013, by Indra Sari Wijaya.

Stubborn Planet – Risk, Ruin, Resilience

By Philipp Gassner

Imagine a good old pal of yours gets diagnosed with a serious disease. Would you react like this? "He feels fine, this can't be happening." "Why him? It's not fair!" "I'll do anything, can't you stretch it out? A few more years." "I'm so sad, why bother with anything?" "It's going to be OK. If I can't fight it, I may as well prepare for it."

These *Five Stages of Grief,* described by psychiatrist Elisabeth Kübler-Ross in 1969, are typical for resistance to change. And they also apply if the patient is known as Earth. Suffering from a disease called global warming, the first stage would be *Denial,* too. Just look at the many climate change deniers who continue to fight an uphill battle against the largest scientific consensus in history about the existence of man-made global warming. Followed by *Anger, Bargaining, Depression,* let's hope they also come to *Acceptance* eventually: "If we can't fight it, we may as well prepare for it."

To prepare for climate change and accompanying natural disaster, we have to look at risks. Risk can be defined as undesirable consequences of actions, where two things matter: the extent of the damage and the probability of occurrence. For instance, in the very improbable case of a meteorite wiping all the life from our green Earth, the potential damage of the risk is very high. Less extreme, there is risk in everyday life. To increase the probability of one's death by one in a million, one can choose to travel six minutes by canoe, eat 40 tablespoons of peanut butter, fly 1,000 miles by jet, smoke 1.4 cigarettes a day, or live two days in New York's polluted air. Your peanut butter eating habit aside, the latter gives an

"To prepare for climate change and accompanying natural disaster, we have to look at risks. Risk can be defined as undesirable consequences of actions, where two things matter: the extent of the damage and the probability of occurrence."

indication where many health risks in people's lives come from: the environment. Environmental hazards are responsible for an estimated 25 percent of the total burden of disease worldwide.

Cozy planet

This burden can be luckily reduced and managed, since the Earth itself is similarly stubborn towards change as humans are. Call it stubborn or resilient. More precise, resilience is the ability of a system to cope with change and to respond to a disturbance by resisting damage and recovering quickly. One example is the Earth's delicate climate system itself. The sun is sending its rays, which penetrate the Earth's surface and escape back to space. Luckily, there is a warming blanket around the planet, also known as greenhouse gases, reflecting some of the escaping rays back to the otherwise frosty planet. The most famous of such blankets is carbon dioxide, CO2. If it is too thin, people freeze: 850 million years ago during the Cryogenian, Earth resembled a snowball with only 4°C, nearly frozen from the poles to the equator and 85 percent ice cover.

Then again you also don't want the blanket too thick and sweat a lot, like 100 Million years ago during the 'Cretaceous Warmth' with average temperatures of 22°C. All of the Earth's glaciers were melted, tropical plants and reptiles were found close to the Earth's poles, and one third of today's land areas were under water, including the center of the United States.

Fortunately, the Earth yo-yoed to a cozy CO2 blanket, under which you can measure a pleasant 13.6 º C, making space for modern humans to spread to all parts of the world. This was possible through the resilience of geological mechanisms, storing and releasing CO2 for example via forests, swamps or oceans, thus balancing the climate.

Underwater USA

This delicate balance, however, can also be tipped once human activities affect ecosystem resilience too much. And this is happening at the very moment: reduction of biodiversity, exploitation of natural resources, pollution, land-use, and climate change are increasingly causing regime shifts in ecosystems, often to less desirable and degraded conditions – such as an underwater USA.

Even more than the USA, Southeast Asia and the Pacific suffer from the current global warming and the impacts of natural disasters, mainly due to the large number of people living along the coast and in low-lying islands. Those islands are not the most convenient places to be in, particularly when the leftovers from snowball Earth, the polar ice covers, melt into the sea. Mind you, sea levels were up to 40 meters higher than today, when temperatures were 4 ºC warmer. As 40 meters are hard to imagine, let's start with 8.2 mm. That's the annual sea level rise Australia's National Tide Facility has measured on the Carteret Islands, Papua New Guinea - the 0.6 km2 small island with a maximum elevation of 1.5 meters, which 2,600 people call their home. Or called, to be precise. Coupled with climate change's tendency towards more severe weather patterns, the island is predicted to be completely submerged by 2015. Not wanting to wait till they have to swim away, in May 2009, the entire community of Carteret was forced to leave their home for good, becoming the first official climate change refugees.

Climate change means ocean change

But these refugees do not only have to fear rising sea levels. Rapidly growing greenhouse gas concentrations are driving the entire ocean system toward conditions not seen for millions of years. Since oceans absorb more than 90 percent of global warming, they become warmer, more acidic, change their salinity, their concentration of oxygen, and their circulation patterns. This leads, among others, to a decline in phytoplankton, a critical part of the planetary life support system. These tiny green 'plant drifters' produces half of the oxygen people breathe. Another grim example of what to expect is a recurrence of the 1998 El Niño event, when exceptionally high temperatures caused the bleaching and death of 16 percent of all corals worldwide. Experts agree that under current scenarios, 90 percent of coral reefs will have dramatically changed or disappeared by mid-century. If, and when they go, they will take with them about one-third of the world's marine biodiversity, on which over a billion people rely for their daily food.

These people are all too often poor, who pay for disaster with their lives. In 2009, six of the ten countries with the highest mortality rates and GDP losses from natural disasters were in Asia, with 82 percent of all lives lost in disasters since 1997. The region will also bear the highest adaptation cost of the estimated $100 billion a year in a 2° warmer world.

How can this happen? Isn't the world with its ecosystems supposed to be stubborn towards change and thus very resilient? Let's go back to 1983, when a sudden, unexpected collapse of the Caribbean coral reefs occurred. Why had the resilient ecosystem become so vulnerable? Following several centuries of overfishing, the once diverse community of herbivores, grazing on algae, had been extinguished. This left the control of the algae cover almost entirely to a single species of sea urchin. When this species abruptly disappeared, the reefs choked immediately below the deadly algae layer. They had shifted irreversibly and this caused huge economic losses.

Insurance on the cheap

To prevent economic losses, it is common sense to take out insurance. Likewise, here the diversity of algae eaters acted as natural insurance, providing resilience. Alright, better safe than sorry then. Let's get insurance against

the risks of climate change and its natural disasters. But who will provide this? Surely not AXA or Allianz! The answer waits just around the corner of the beach of Carteret Island: a couple of inconspicuous, torpedo-shaped seedlings in the sand. Wading a bit further in the chest-deep, brackish, tea-colored water, we can see towering giants: 25-meter tall mangroves, which are the best example of biodiversity resilience - even in the face of the 2004 Indian Ocean tsunami, the deadliest natural disaster in recorded history. When the rumbling 30-meter wave hit three mangrove-sheltered villages of the Cuddalore District on India's East shore, the lucky inhabitants experienced the cushioning effect of mangroves. Already 30 trees per 100 square meters reduce the maximum flow of a tsunami by more than 90 percent. Satellite photographs remarkably show the contrast against two neighboring villages without mangroves, which were found in shreds.

And this trick does not only work to protect from the odd tsunami, but also from much more frequent calamities, such as typhoons and floods. Even though mangroves can only be planted in an appropriate habitat with the right sea stream and sand dynamics, sometimes involving restoration efforts, the potential is huge. No wonder that Viet Nam decided to plant and protect nearly 12,000 hectares of mangroves, spending US$ 1 million but saving annual expenditures of well over US$ 7 million, on dyke maintenance alone. Try to get such interest rate from your bank.

Besides planting and protecting mangroves for better resilience, climate and disaster resilience has become a major goal for national and international bodies. Efforts encompass social, economic, technological, and political strategies that are being implemented at all scales of society, from local community action to global treaties. The International Day for Disaster Reduction, October 13, for instance, encourages every citizen and government to take part in building more disaster resilient communities, nations and regions. In Southeast Asia, the ASEAN Centre for Biodiversity (ACB) addresses the problem in numerous ways, with support from the German Development Cooperation's (GIZ) Project on the nexus between biodiversity and climate change.

Blue Carbon locked into the soil

The fact that both are closely interlinked, brings us back to the *Acceptance* of the problem: "If we can't fight it, we may as well prepare for it." But wouldn't it be better to fix climate change in the first place, rendering insurance against it obsolete? Just take the inconspicuous mangroves who point at the solution by addressing the root cause. This cause is the boosted carbon dioxide levels in the atmosphere, which lead to the warming greenhouse gas effect. Just like any other tree, mangroves capture carbon from the air and store it in their wood. But mangroves do an even better job. To discover their secret, we have to dig deep in the muddy, grubby ground. In the rich, tidally submerged soil, mangroves store about 90 percent of the fixed carbon in the form of organic material, which decomposes very slowly. Thus, they continuously lock huge amounts of blue carbon into the soil under the sea level: 1,000 tons per hectare, more than three times as much as tropical forest on land. That's true resilience towards climate change, transforming the five stages of grief to: *Denial, Anger, Bargaining, Depression,* and *Fight!* □

A Healthy Risk? Ancient Answers

By Philipp Gassner

One hot summer day in ancient Sicily thousands of years ago, noble Damocles was a guest at the banquet of his tyrant king Dionysius. Surrounded by magnificence, power and authority, Damocles envied the ruler and exclaimed: 'My king, you are truly extremely fortunate'. Promptly, Dionysius offered to switch chairs with Damocles, so that Damocles can taste that very fortune. When Damocles accepted the proposal and sat down on the throne surrounded by every extravagance, Dionysius had arranged a huge, razor-sharp sword hanging above the throne, held only by a single hair of a horse's tail.

Sounds like quite a health risk to take, doesn't it? Let's have a closer look.

We can define risks as undesirable consequences of actions, where two things matter: the extent of the damage and the probability of occurrence. In Damocles' case, the potential damage of the risk is the highest possible, namely, the loss of his life, while the probability of occurrence is extremely low, for according to the myth the thread did not break.

Whereas the 'Sword of Damocles' has become a byword for a happy situation overshadowed by danger, risks to our health don't always have to be as extreme. Of course, there might always be a meteorite on its way to – very improbably – wipe all the life from our green Earth. Yet, everyday life health risks are much more tangible. For instance, to increase the probability of one's death by one in a million, one can choose to travel six minutes by canoe, eat 40 tablespoons of peanut butter, fly 1,000 miles by jet, smoke 1.4 cigarettes a day, or live two days in New York's polluted air.

Your peanut butter eating habit aside, the latter gives an indication where many health risks in our lives come from: the environment. Environmental hazards are responsible for an estimated 25 percent of the total burden of disease worldwide.

Pollution from Pandora's Box

Air pollution 'is the single biggest environmental health risk' with around seven million deaths a year, according to a recent World Health Organization (WHO) report. However, much worse affected than New York is Southeast Asia – now the most polluted region in the world with more than five million deaths from air pollution. Does this pollution stink from the Pandora's box we have opened?

Pandora was the first woman on Earth, created by Zeus, the Greek 'Father of Gods and Men'. One day, men didn't behave well and Zeus was furious with vengeance. Thus, he gave Pandora a wedding gift of a beautiful jar, with instructions not to open it under any circumstance. But urged by her curiosity, Pandora couldn't help but open it and all evil contained in the box escaped and spread over the Earth.

The health risk of air pollution can be seen in such evil: once freed, it can have persistent and ubiquitous consequences.

Climate change oracles

Thousands of years after their creation, people in Greece are often in doubt about important questions in their lives. On such hesitations, the blind seeress Pythia can shed light. She is the most famous oracle and lived in the city of Delphi. One day, a weary king came to the temple and asked the oracle if he would win the battle. She smiled and told him a great king would win the battle. That was exactly what he had wanted to hear and he went away happily. However, when he led his men into battle, they lost and he is killed by the other king – the great king.

Pythia's prophecies are enigmatic and ambiguous. They might reveal that a major danger is impending, but they won't tell how high its probability, severity, or distribution might be. The oracle is characteristic for many environmental health risks nowadays, which have high uncertainty with regard to both risk dimensions. Take climate change, already causing an estimated 150,000 deaths annually. These occur, for instance, from more frequent extreme weather conditions, like Typhoon Haiyan, or from affected patterns of food production, impacting on malnutrition.

The same is true for biodiversity loss and the degradation of ecosystems: for many of the world's poor, one of the greatest environmental threats to health remains lack of access to safe water and sanitation, says the ASEAN Centre for Biodiversity. Water resources are replenished and purified by water ecosystems. When they are lost, human health and well-being is undoubtedly put at risk, while exact probabilities, severity, or distribution remain yet unclear.

Cyclops' diseases

While sailing home from the Trojan War, the hero Odysseus and his men came ashore to restock their food and water. They were thrilled to find a cave full of sheep, built a fire in the cave, and cooked some sheep on a sharpened stick. 'Uaaagh', suddenly echoes through the cave and a one-eyed giant appeared at the mouth of the cave, swinging a club. Swiftly, Odysseus grabbed a sharpened stick and blinded the Cyclops, who is restricted by his one eye. Odysseus and his men got safely away by pretending to be sheep making bah-bah sounds until they crawled to safety.

The Cyclops' limitation to perceive only one part of reality with his one

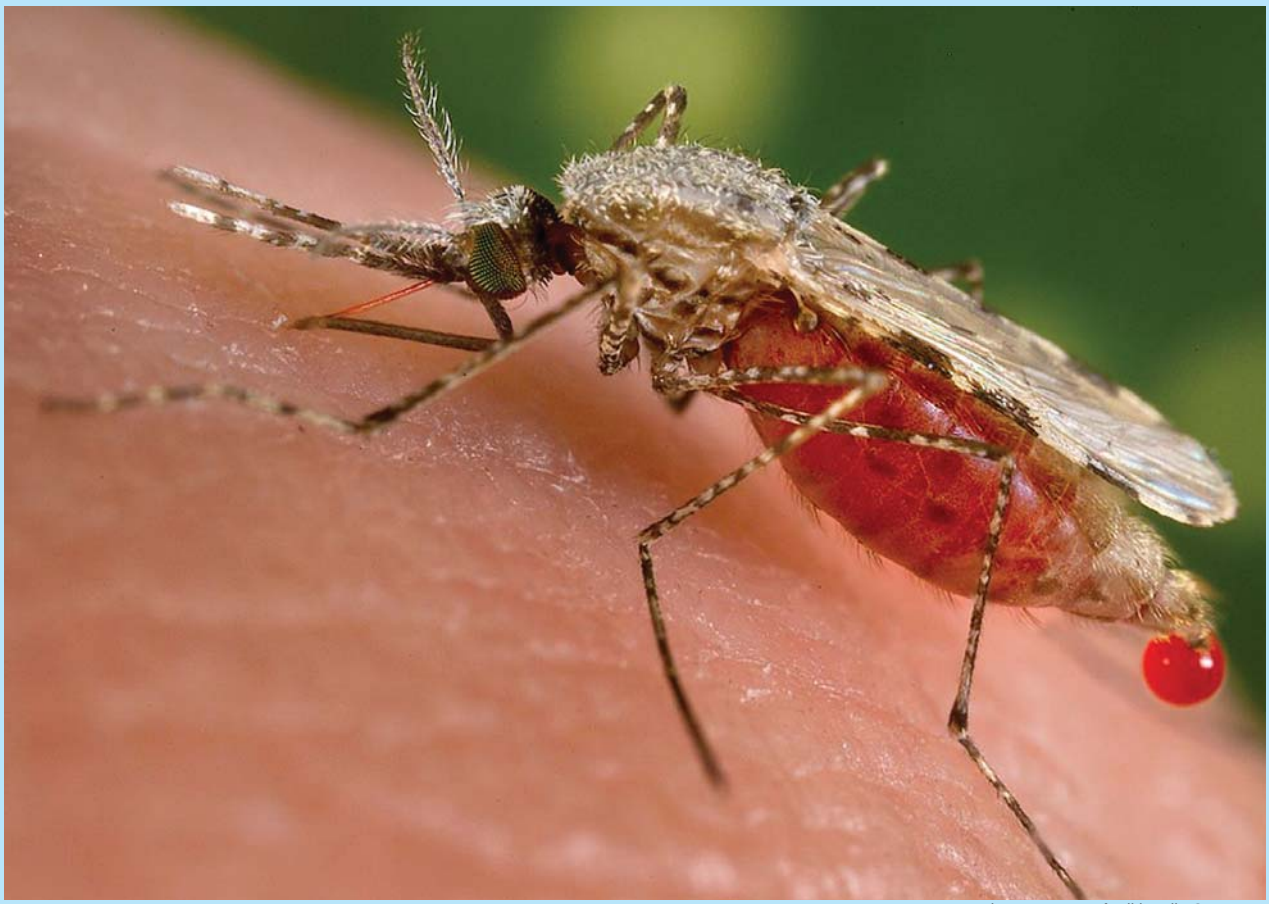

Photo courtesy of Wikimedia Commons

An *Anopheles stephensi* mosquito obtaining its blood meal from a human host. This mosquito is a known malarial vector with a distribution that ranges from Egypt all the way to China.

eye also describes many health risks. When viewing them, only one side can be ascertained while the other remains unsure. It is often the case that risks are greatly underestimated, the magnitude of which can be grasped but probability of occurrence is uncertain or continuously changes.

Prominent examples are vector-borne diseases. Mankind has always co-habited with innumerable other living forms. While many of them support us, some few can transmit infectious diseases between humans or from animals to humans. Such vectors are, for instance, mosquitoes, ticks, flies, or fleas. These benefit from tropical climates, inefficient water management, low priority for health impacts in development activities, unplanned urbanization, widespread poverty, and factors of a changing environment. Altering temperature and rainfall conditions as well as deforestation and loss of biodiversity affect both the transmission and control of the most common vector-borne diseases including malaria, dengue, and leishmaniasis. Especially in Southeast Asia, malaria is still endemic in 10 of 11 countries, making up 40 percent of the global population at risk of malaria. The global magnitude of vector-borne diseases is clear with 17 percent of all infectious diseases causing more than one million deaths annually.

'Vector-borne diseases have significant impact on socioeconomic status of communities, and they vigorously fuel the vicious circle of poverty,' says Dr. Poonam Khetrapal Singh, Regional Director of the World Health Organization (WHO) Southeast Asia, indicating the severe effects of such environmental health risks. Nevertheless, cyclops-like, we can't fully grasp the probabilities of environmental impacts. But there is no need to turn to stone.

How to kill the beast

Medusa was a beautiful, young woman with magnificent long, silky hair. One day, while she was in goddess Athena's temple, she fooled around with the god Poseidon which angered Athena. She was so angry that she changed Medusa's beautiful hair into hissing serpents and turned her into a horrible looking monster. Medusa became so horrible that any living thing that looked upon her turns into stone.

In ancient Greece, the world was full of dangers. Some novel phenomena affect people today with the same fear and dread. Instead of turning into stone, however, there are solutions at hand. Remember, Medusa was defeated in the myth with a smart strategy, using a mirror, rather than looking directly in her eyes. Such strategies are emphasized by the WHO, which is reinforcing the linkages between health and environment.

An example is 'Integrated Vector Management', which promotes greatest disease control benefit, while minimizing negative impacts on ecosystems, e.g., from the excessive use of chemicals.

Fittingly, World Health Day 2014 on 7 April invited everyone to 'protect yourself from vector-borne diseases', which aimed to create necessary behavioral change. To do so, the WHO works with partners to provide education and improve awareness so that people know how to protect themselves and their communities. But even more important are the conservation of a healthy environment and the mitigation of climate change to minimize the environmental health risks in the first place. This is the focus of the 'Health and Environment Linkages Initiative' by the WHO and the UN Environment Programme, and the ASEAN Centre for Biodiversity in the region. The Philippine-based Centre, supported by the GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) since 2010, coordinates sustainable use and conservation of biodiversity. After all, the best risk management is prevention: Healthy ecosystems for healthy people. Let's take this wakeup call seriously and avoid Cassandras' destiny.

Cassandra was a beautiful young priestess at Apollo's temple, with great ambition. One day, the mighty god Apollo passed by and was delighted by Cassandra. He was fond of making a deal. If Cassandra kissed him, he would give her the gift of prophecy so she could see into the future. Cassandra does not hesitate. As soon as she was able, she looked eagerly into the future. But she did not like what she saw: Apollo was helping to destroy her beloved city of Troy. She spat on his face. Apollo was furious, and since he could not take away his gift, he added to it. From that time on, Cassandra could see the future, but no one believed a thing she said. Later, when Cassandra warned her people that the Trojan horse was a trap, nobody paid the slightest attention. They laughed at her and widely opened the doors. □

LEARNING BY EXPERIENCE

Success stories fuel learning on ecotourism between PHL and Malaysia

As nature areas designed to conserve pristine land and seascapes as well as the amazing wealth of wildlife and ecosystems within, protected areas have all the necessary elements to build ecotourism. Sustaining ecotourism however, with facilities and infrastructure; financing and benefit sharing mechanisms; support from the government, private sector, indigenous and local communities, and other stakeholders; information and education materials and campaigns; and conservation and management programmes are also necessary to ensure that visitors are encouraged to visit and therefore support protected areas with tourism currency.

While having the inherent biodiversity, cultural, and historical values to drive ecotourism, many protected area managers still need support and insight into successful ecotourism ventures. As a leader in ecotourism in Southeast Asia, protected area managers from other ASEAN Member States (AMS) stand to learn from the success stories on ecotourism in Malaysia.

Taking a cue from Malaysian ecotourism

In March 2014, 32 staff members of the Biodiversity Management Bureau (BMB), as well as planning and policy personnel of the Department of Environment and Natural Resources (DENR) of the Philippines, participated in the *Experiential Learning Package on Protected Area Management and Ecotourism in Taman Negara National Park, Pahang, Malaysia.* The learning package was organized by the ASEAN Centre for Biodiversity (ACB) in collaboration with the DENR and the Department of Wildlife and National Parks (DNWP) of the Ministry of Natural Resources and Environment (MoNRE) of Malaysia.

The experiential learning package aimed to provide participants with an understanding of the elements and principles of ecotourism, as well as the policies and standards of ecotourism in Malaysia; the opportunity to share experiences and lessons learned in recreation and ecotourism; means to develop a re-entry plan for an ecotourism project in an ASEAN Heritage Park (AHP) or protected area (PA); and identify or recommend next steps to facilitate the implementation of activities in the re-entry plan based on the experiences in the ecotourism package.

The experience of a lifetime

The learning experience included a five-day field visit to Taman Negara National Park, one of three AHPs in Malaysia, as well as Paya Indah Wetlands, National Elephant Conservation Center, and Batu Caves. Aside from seeing firsthand how ecotourism is conducted and managed in these areas, the participants also had the chance to build stronger networks of cooperation with their Malaysian counterparts. Since the experience was vastly different from the Philippines, many agreed that the learning package was truly an experience of a lifetime.

The visit to Taman Negara, with its towering forests, wide rivers, indigenous culture, and luxurious but unobtrusive chalets, was a chance to see nature and indigenous ways of life up close and still have all the comforts of home. The

Paya Indah Wetland Reserve provided lessons on transforming degraded areas into ecotourism sites. The National Elephant Conservation Center merged both conservation and reduction of human-elephant conflict, with the sheer joy of seeing and touching the gentle giants. The Batu Caves provided insights on cave management and preservation, while earning from and managing visitors to the site.

Designed with conservation and comfort in mind

As one of the oldest rainforests in the world, Taman Negara National Park has been able to maintain the integrity of its wildlife and ecosystems because of its relative isolation. The park is noted for its rich biodiversity, magnificent forests and expansive rivers, and rich culture, particularly with the presence of the local Baki tribe. These elements provide the foundation for the park's ecotourism, which are complemented with canopy walkways, forest trails, boat rides, fish sanctuaries, a wide range of accommodations to satisfy every budget, restaurants, and other amenities that facilitate visitor traffic to the park. These also support various activities such bird watching, photography, hiking, night treks, boat tours, and others.

Many of the facilities in the park are carefully designed to protect and ensure that they blend in with the environment. A wide river separates the park from the rest of the world, and from the entrance one can only see the signage of the park, the jetty where the boats dock, steps to the entrance, as well as the trolley that carries baggage and the park's supplies. This was intentionally designed to give visitors an intact view of the forest, with practically no break in the greenery in sight.

Inside Taman Negara National Park, visitors can see the park center, restaurant, signages to the different attractions and facilities, and the various accommodations, ranging from basic guest houses to vastly comfortable chalets. Most of the structures are painted in earth colors to blend into the forest. While made of wood, the structures are built on cement foundations and elevated from the ground to prevent damage from termites. The buildings have no eaves to capture rainwater or forest debris, so that leaves, branches, and twigs can just fall to the ground. This prevents damage to the roofs and reduces maintenance costs.

Boardwalks are also made of fiberglass composites. These are unpalatable to termites, lengthen the lifespan of the boardwalks, and again, reduce maintenance costs of the park.

The canopy walkway uses ropes to hold the plank walkways. No nails or other sharp objects are used in the rope anchors, since any break in the epidermis of the tree would serve as an entry point for fungal or bacterial infection and thus weaken the trees in the long term.

Still, deep in the forest, while designing conservation, the comfort of the park's guests is also a priority for park management. The range of facilities can accommodate guests with varying budgets. The chalets provide luxurious comfort that one can expect in a hotel, but not necessarily in a protected area, such as big comfortable beds and cable television. Internet service and mobile phone signals are also available.

Everybody chips in, and everybody benefits

Public-private partnership marks the management of Taman Negara National Park. Facilities were built with private sector support, and Mutiara Hotel and Restaurant, a private organization, manages the chalets, restaurant, and offers tour packages in the park. Mutiara remits a percentage of its income to the government, which allows park management to focus on natural resource management, wildlife protection, law enforcement, and visitor management.

Members of park management are local residents and trained as rangers, guides, law enforcers, and search and rescue personnel. Local community members who are not part of the workforce of the park still derive income from park activities through boat rentals for tours, and the operation of eateries and souvenir shops.

The indigenous community is also recognized as a stakeholder in the park. Visitors get to understand the local culture with a visit to the Baki tribal village, where members of the indigenous group demonstrate how they make fire using twigs and rocks, and how they capture game with blowguns. They also make small handicrafts as souvenirs.

Staff attitude makes a difference

One of the most notable impressions was the courtesy and kindness showed by staff members to the participants. This makes a difference as visitors will always remember, aside from the many memorable sights and experiences inside the ecotourism destination, the treatment they received from local staff. Good experiences will ensure return visits, as well recommendations to others to see the protected area.

High hopes for PHL ecotourism

With lessons learned from the experience, there are high hopes for ecotourism to Philippine protected areas as the country certainly has the necessary ingredients to increase travel to nature based sites. There is increasing global appreciation for Philippine beaches and mountain landscapes, and this provides an opportunity for park managers to benefit from and continue to conserve the country's natural capital. This will require generating partnerships with the private sector, development of infrastructure and facilities to support and sustain ecotourism, and ensuring benefits to all stakeholders, including local and indigenous communities. □

Soil Secrets – Fertile Ground to Combat Desertification

By Philipp Gassner

Over a billion people watched the 2014 Football World Cup Final, which likely became the world's most-watched television event in history. This impressively shows just how connected the world has become, via TV, or the Internet with more than two billion users online. Then again this number is only greeted with weary smiles by some other creatures, which might not update their Facebook status as often, but are way more connected than us. They already invented the social network when life conquered land– 400 million years before Mark Zuckerberg was even born: the *Wood Wide Web* is the largest unseen communication system on Earth, where 92 percent of all plant families have an account. Instead of tweeting, plants use symbiotic association between their roots and special fungi. This so called *mycorrhiza* enables long distance communication between plants by sending chemical information that benefits the receivers. For instance: *'#Stimulate Defense against @Parasites'* or *'#Inhibit Growth of neighboring @Plants.* PLS retweet'. But way better than Twitter, *mycorrhiza* acts as the world's biggest drinking straws. In some forests, the fungi provide plants with up to 90 percent of the minerals and water they need. In turn, they depend on the plants to give them organic compounds needed for their own growth. This mutual interaction turns a habitat into one super-organism. A true Soil Socialism.

Soil socialism

Socialism is only one of the many secrets of soil. Soil is the literal skin of the Earth. On average, only 50 cm thick, the so-called Pedosphere contains a whole zoo. Just take a handful of dirt and guess how many organisms you picked up. The equivalent to all World Cup viewers worldwide – one billion. Of these organisms, only few species have been described by scientists, for instance, about 70,000 species of fungi, which is roughly the capacity of the largest football stadium in Brazil. Imagine the Estadio do Maracana in Rio de Janeiro with a different fungus species on every single seat. And there are even more species of other organisms, such as roundworms, and millions of bacteria species. Clearly, soil biodiversity dwarfs the biodiversity of every other ecosystem.

The Earth is not green, it is brown. And its brown is shaded in many different layers. From the surface down, little by little, there are shifts in conditions like light, temperature, air, or water, creating a particular niche for each species. From the 2,400 year old mushroom *Armillaria solidipes*, to the largest living organisms, covering 8.4 km^2, to tiny ants, worms, or bacteria.

Skin of the Earth

Instead of playing football, however, these soil organisms are busy in other ways. Very busy: they are bio-reactors, they buffer water, pollutants or heat, they filter and clean, and they store water, nutrients and carbon. For instance, soil contains 1,500 billion tons of organic carbon, more than Earth's atmosphere and all the plants together, making it a key player of climate change. Therefore, soil biodiversity is very valuable for humans, providing food, livestock, fiber, energy, water, and mining resources. A recent study valued these free services at US$ 1.5 trillion each year. Even more importantly, soil is the link in the pursuit of sustainable development, securing human well-being and ecosystem services. In a nutshell, soil is the most significant non-renewable geo-resource.

Non-renewable? Not quite, since soil does not fall from the sky. Instead, soil is a result of its parent material, climate, topography, organisms, and time. Lots of time. One centimeter of fertile soil needs, on the average, 1,000 years in the making. At a much faster rate, however, it gets destroyed. During the time it took you to read until here, the population increased by 500 people, CO2 in the atmosphere rose by 18,000 tons, 75 hectares of tropical forest got cut, 30 hectares of soil degraded, 70 hectares turned into deserts, and 17 hectares were sealed by urban encroachment – where a hectare is about the size of a football field. At the same time 47 people, including 36 children, died from hunger.

It becomes clear: if soil, with all its bustling organisms, disappears, the environment shifts to a radical new state – the one of a sterile planet. Scientists call this land degradation–the reduction of biological productivity – and desertification–land degradation under dry climates. Land in dry climates with water scarcity is called dryland, where 12 million hectares are transformed into new man-made deserts each year – an area which could produce 20 million tons of grain.

To make matters worse, drylands emit an estimated 300 million tons of CO2 each year as a result of desertification, which is about four percent of the total global emissions, fueling global warming. This becomes a vicious circle: when the ground heats up, organic matter decomposes quicker, reducing soil fertility and again releasing CO2 into the air. In addition, more extreme weather with floods, storms, and droughts is expected to expand erosion and land degradation.

Photo by Wilfredo L. Leonado

'Surviving Drought'

Out of soil before oil

A land degradation world trip shows the scope: already during the 1930s, North America's Great Plains turned into the Great Dust Bowl. Farms were covered by dust and hundred thousands of families were driven from their land by eight years of black blizzards. More recently, such blizzards also haunted China's Yellow River Basin, blowing away 1.6 billion tons of loess, a crumbly, fertile soil, deposited over millennia. In Haiti, the loss of one-third of its top soil cover is the root cause of poverty and unrest. The country's agriculture is on its knees, after the majority of the once forested country turned into the most denuded landscape. Also, a large part of sub-Saharan Africa suffers poverty from land degradation, since planted crops leach the nutrients from the soils, while poor irrigation practices in Australia, the Middle East, and India saturate land with salt. In other parts of Asia, such as Kazakhstan, Uzbekistan, and northern China, the desert is growing by 3600 km^2 a year–an area leading to new dust bowls that choke Beijing, among others.

Further south, a dust bowl seems hard to imagine in Southeast Asia's lush rainforests. Sure enough, the forest won't turn to desert overnight, but land degradation is all too familiar in many countries in the region. The ASEAN has extraordinary levels of biodiversity on the verge of rapid loss, with the highest relative rate of deforestation among all major tropical forest regions. At risk of losing 75 percent of its forests by 2100, the region might turn into a new Haiti. A taste of this was the 2010 drought across southern China and Southeast Asia. Bringing the Mekong River to its lowest level in 50 years, and letting over 20 million people face water shortages, it showed just how prone the region is to climate change and land degradation.

Land degradation and desertification will remain a huge problem, if the Earth's soils are not appreciated as the living, dynamic interfaces they are. Thus, already in the mid-1980s agricultural economist Lester Brown cautioned that civilization may run out of soil before oil.

Let's climate proof it

Unlike oil, if treated right, soil is a renewable resource. That land degradation can be prevented, is not even rocket science. From their Dust Bowl, US farmers, for instance, learned to use new plowing methods to curb erosion, and started to grow cover crops to retain soil between planting seasons. But instead of engineering our way out, we can also ask what nature would do. Indeed, biodiversity and ecosystem services themselves can prevent forests and fertile land to turn into deserts. If we only let them. This so called ecosystem-based adaptation is often the easiest and cheapest approach, especially in the face of climate change. Through livestock planning and monitoring, for example, holistic land management eases the natural recovery of grasslands for future generations.

'Land Belongs to the Future', as the theme of World Day to Combat Desertification 2014 on 17 June, rightly spotlights 'Let's Climate Proof It'. This effort to increase the attention given to land and soil within climate change adaptation is part of a bigger global movement, aiming at Zero Net Land Degradation. By 2030, land degradation shall be stopped, as well forest degradation, which the ASEAN Centre for Biodiversity (ACB) focuses on in Southeast Asia. Supported by GIZ, the German Development Cooperation, the Philippine-based centre aims to protect the region's vast biodiversity above and below ground.

Below ground, we can also find the solution for land and soil restoration. Mind you, there is a lot of land suitable for rehabilitation through forest and landscape restoration – worldwide more than two billion hectares. Let's look at 5,000 of them: already in 1992, Paolo Lugari had managed to reforest this area in the Colombian region of Vichada successfully– against all odds. The land was degraded and had very poor soils, a hundred times more acidic than normal. But together with the trees, over 250 plant species returned, as well as the rain. Rainfall increased by 16 percent and the formerly toxic water is now drinkable by the community. Whom should they thank then? Instead of high-tech or industrial fertilizers, it was the world's oldest social network: a symbiosis between pine trees and established mycorrhizal fungi enabled the planted seedlings to survive the harsh conditions. It seems, there is a lot to learn from soil socialism. □

Speechless Diversity – Talking 'bout the Evolution

By Philipp Gassner

He must have felt lonely. Very lonely, as he couldn't talk to anybody. At least not in his native language. The New Guinean Lua had indeed only a single speaker in the whole wide world, as recorded in 2000. Also other residents of the island won't have a big debate club. The language Bo is spoken by 85 people, Likum and Hoia Hoia by 80, Ak by 75, Karawa by 63, Abomby 15 and Guramalumhas only three speakers. In contrast, New Guinea features around 1,000 languages, making it the world's most linguistically diverse place, where it is not unlikely to be greeted with Hello, Tabeaya, Aelak, Koyao, Selamt, Kawonak, Nayak, Brata or Nareh. Being ennea-lingual certainly dwarfs growing up with two languages.

Around 7,000 languages are counted globally. But why? Wouldn't a single global language make life so much easier? It would at least have avoided famous translation mistakes like the fast food slogan 'finger lickin' good', which came out in Chinese as 'eat your fingers off'. Also the Dairy Association's campaign 'Got Milk?' would certainly not have translated to: 'Are You Lactating?' in Mexico.

Murmuring mates

This would also not have happened to animals, which communicate, but don't formulate words. While birds only have their songs, primates are a bit more sophisticated with vocalization, hand gestures, and body language; however, they don't have a spoken language. In contrast, our ability to express complex and infinite thoughts with spoken language is one of the ways we are separated from our primate counterparts by evolution. And evolution has its funny ways: just take feathers. They were an adaptation to keep freezing birds warm, and were only later used for flying. Likewise, between 30,000 and 100,000 years ago, language developed as a result of other evolutionary processes in the brain. Cognitive structures that were used for things like tool making or rule learning happened to be also good for complex communication, as linguist Noam Chomsky and evolutionary biologist Stephen Jay Gould argue.

Nevertheless, language is not a mere, random by product of evolution. Think the turtle and its shell which is an evolutionary adaptation, making a population change over time to better survive. For instance, think of a bird in its brand new, cozy feather dress, picking at the poor reptile. A shell-protected animal would be more likely to survive than its naked fellow, and the innovation of the shell passed on from generation to generation. That's natural selection at work. According to scientists Steven Pinker and Paul Bloom, similarly, *Homo sapiens* benefited big time, when they began to communicate while hunting, farming and defending themselves: 'Watch out Arrg, there is a huge saber-toothed tiger over there!' This gave a distinct survival advantage over their mumbling, murmuring mates, helping language use to spread. Moreover, language helped with successful social interaction. It is hard to imagine using Facebook without any language.

Tree-climbing kangaroos

This might explain one language but not 7,000. To better understand this diversity, let's go back to the second largest island of the planet: New Guinea. The country is not only linguistically diverse, but also in terms of biological abundance, harboring for instance tree-climbing kangaroos and more orchid species than found anywhere else in the world. As seen with the turtle and the birds, both language and biological diversity are products of evolution and have evolved in remarkably similar ways. As a result, biodiversity hotspots, such as tropical forests feature high linguistic diversity, whereas deserts for example have few languages. Higher biodiversity can support larger cultural diversity. Both diversities depend on the same environmental factors such as temperature, rainfall, or topography. When animal populations get isolated long enough from each other, for instance by a mountain range, they split in new, different species. If this happens to communities, they may form new, different languages.

Language diversity is traditionally preserved by indigenous peoples who passed down their knowledge orally from generation to generation. In this way, 90 percent of the world's languages are spoken by less than 100,000 people. These languages are keys to maintaining the encyclopedia of traditional indigenous knowledge, cultural identity, traditional heritage, and customary laws. Such laws are, for instance, the base for systems of forest governance that in turn foster the sustainable use and protection of biodiversity.

Inundated island, lost languages

Since biological, linguistic, and cultural diversity are inseparable and mutually reinforcing, it is not surprising that they also share the same fate: a quarter of all languages are now threatened with extinction. Linguistic diversity is declining as fast as biodiversity – about 30 percent since 1970. Different to endangered plants and animals, languages do not usually go extinct because an entire population of speakers dies out. Instead, they are lost within a few generations, as the speakers of a minority, often indigenous language, change to a more prevailing one. Be it names, uses, and preparation of medicines, farming methods, spiritual and religious beliefs and practices, or animal and plant species – their loss is irreplaceable and ir-

Photo by Aldrin Cuadra

Hope for the future stewardship of cultural and biological diversity.

reparable. At the end of the day, both diversities are fading due to human population growth, increasing consumption and economic globalization, shrinking the differences between parts of the world. When an indigenous language is lost, so too is traditional knowledge on how to maintain biological diversity and address environmental challenges, such as climate change.

Climate change, ironically, often affects indigenous peoples the most, as they are closely dependent on the environment and its resources. This aggravates the difficulties already faced by vulnerable indigenous communities, including human rights violations, discrimination, unemployment or political and economic marginalization; be it water shortage from shrinking glaciers and snow cover in the Himalayas, droughts and fires in the Amazon region, or vegetation loss that impacts on traditional cattle and goat farming in Africa's dry Kalahari Basin. Also, Papua New Guinea (PNG) is affected, like much of the Pacific region, which is comprised of small island states, the traditional lands of many indigenous peoples. The sea level rise on PNG's low Carteret Islands made its 2,600 indigenous peoples the first official climate change refugees, just before their island is predicted to drown in 2015.

Clashing cultures

Paradoxically, indigenous communities worldwide contribute little to greenhouse emissions themselves. On the contrary, they are vital to the resilience of many ecosystems they live in. Often indigenous peoples react to the impacts of climate change in creative ways, drawing on their traditional knowledge. Take floating, flood protected vegetable gardens in Bangladesh, planted mangrove storm protection in Viet Nam, or wind and solar power on tribal lands in the Great Plains of the US.

These valuable contributions by indigenous communities are gaining recognition, after centuries of clashing cultures. All too often, there was conflict between indigenous peoples and conservationists, who saw native people as a problem to be solved by eviction. One of the oldest examples was the conflict in Yosemite Valley, California which became a national park in 1914 with frequently violent expulsions of the Miwok Native Americans who had lived in the valley for already 4,000 years. A more recent, sad reminder was the bizarre scenes of indigenous peoples who, armed with bows and arrows, clashed with the police, near Rio's Maracanã stadium just weeks before the World Cup in Brazil.

Virtual villages

It was in Brazil's Kari-Oca villages where the Indigenous Peoples Earth Charter was affirmed in 1992, uniting one voice against the exploitation of natural resources upon which indigenous peoples depend. It took another 15 years until the UN General Assembly adopted the Declaration on the Rights of Indigenous Peoples on 13 September 2007, emphasizing the rights of indigenous peoples to 'live in dignity, to maintain and strengthen their own institutions, cultures and traditions and to pursue their self-determined development'. In 2014, the second international Decade for Action and Dignity ends with the International Day of the World's Indigenous Peoples, on 9 August. Its theme 'Indigenous peoples building alliances: Honoring treaties, agreements and other constructive arrangements', gave a vision of peace, friendship and cooperation, which is supported in the region for instance by the ASEAN Centre for Biodiversity (ACB). Supported by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), ACB focuses on just and sustainable access and benefit sharing of Southeast Asia's vibrant biodiversity. Protecting this biodiversity goes hand in hand with maintaining the rich diversity in culture and language. Language rights for indigenous peoples can be a first step, ensuring recognition in constitutions and laws, education in one's mother tongue, and establishment and access to media in indigenous languages.

A new kind of media is tested in the village of Erindiroukambe, in the Namibian Kalahari desert. 3D visualizations of the village on tablet computers are supposed to help residents embed their knowledge in a virtual village, stored for future generations. Kasper Rodil at Aalborg University in Denmark is currently developing a drawing app for the tablet 'which imitates the way elders draw diagrams in the sand to explain what they mean'. Let's see… perhaps soon Facebook will be used in Bo, Likum, Hoia Hoia, Ak, Karawa, Abom and Guramalum. □

22 MAY

International Day for Biological Diversity

By Mr. Ban-Ki Moon, Secretary General, United Nations

This year's International Day for Biological Diversity falls in the International Year of Small Island Developing States and is being observed under the theme of "Island Diversity".

For some 600 million island-dwellers – nearly one-tenth of the world's population and representing one in three United Nations Member States – biodiversity is integral to their subsistence, income, well-being and cultural identity.

Half the world's marine resources lie in island waters. Biodiversity-based industries such as tourism and fisheries account for more than half the gross domestic product of small island developing states. Coral reefs alone provide an estimated $375 billion annual return in goods and services. Many island species on land and sea are found nowhere else on Earth. Legacies of a unique evolutionary heritage, they hold the promise of future discoveries – from medicines and food to biofuels.

Yet, reflecting a global pattern, island biodiversity is being lost at an unprecedented rate in the face of growing risks. Rising sea levels caused by climate change, ocean acidification, invasive alien species, overfishing, pollution, and ill- considered development are taking a heavy toll. Many species face the prospect of extinction. People's livelihoods and national economies are suffering.

The process to define a post-2015 development agenda and the Third Conference on Small Island Developing States in Samoa in September 2014 both offer opportunities to attend to the unique needs of small island developing states and reverse the global decline in biodiversity. Because of their vulnerability, small island developing states are demonstrating a growing understanding of

the links between healthy ecosystems and human well-being. Many have made local, national and regional commitments to conserve and sustainably use biodiversity, including through ratifying important instruments such as the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization.

I call on all countries around the world to follow suit and ratify the Protocol without delay. Around the world, many innovative partnerships are being forged to preserve marine and coastal resources, enhance resilience to climate change, and develop sustainable tourism, fisheries and other industries. On this International Day, let us commit to adopting, adapting, and scaling up best practices so we can protect fragile ecosystems for the benefit of all the islanders – and indeed people everywhere – who depend on them. □

5 JUNE

World Environment Day

By Braulio Ferreira de Souza Diaz, Executive Secretary, CBD

On this World Environment Day, celebrated during the International Year of Small Island Developing States, we raise our voices in unison to draw attention to critical issues facing the world's islands.

Islands constitute less than five percent of the Earth's landmass yet provide habitats for 20 percent of all bird, reptile, and plant species. Islands harbor more than 50 percent of the world's known marine biodiversity, seven of the world's 10 coral reef hotspots, and 10 of its 34 conservation hotspots. The conservation and sustainable use of the natural resources of islands is critical to achieving the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets.

Residents of islands understand the linkage between healthy ecosystems and biodiversity and human well-being. Biodiversity-based industries such as tourism and fisheries account for over half the GDP of the economies of Small Island Developing States. Coral reefs alone provide an estimated US$ 375 billion every year in goods and services, globally.

Yet the biodiversity of islands is at risk. Due to the vulnerability of their endemic biota and their intense human use, islands have higher extinction rates. For example, 64 percent of all recorded extinctions in recent human history happened on islands. Extinction rates for mammals are 177 times higher in island ecosystems than the average globally.

Moreover, the special characteristics of islands and island biodiversity

also make them highly vulnerable to a large range of potential impacts from climate change. Climate change and ocean acidification threaten marine resources, such as coral reefs, that are suffering the effects of bleaching, pollution, and other stressors. Projected sea-level rise poses a high risk for low-lying islands and their coastal resources, such as corals, mangroves, and reef fish. Aichi Biodiversity Target 10 recognizes the need to minimize pressures on coral reefs and other ecosystems impacted by climate change and ocean acidification.

Resilient and healthy ecosystems are a cost-effective way of managing some of the adverse impacts of climate change, such as increased storm surge, flooding and erosion. For example, it is estimated that coral reefs and seagrasses protect 5.5 percent of Jamaica's GDP from sea-level rise and hurricanes. St. Lucia's marine protected areas have produced significant gains to fish stocks and have also shown that protecting coral reef ecosystems assists in their recovery in the aftermath of natural disturbances such as hurricanes.

When appropriately designed, ecosystem restoration and management of terrestrial and coastal biodiversity including seagrasses, salt marshes, mangroves and forest ecosystems, can also increase carbon sequestration and decrease emissions from ecosystem degradation, thereby contributing to climate change mitigation. The negative impacts of climate change are projected to compound biodiversity loss through invasive species. Climate change is likely to increase opportunities for invasive species because of their adaptability to disturbance and to a broader range of biogeographic conditions and environmental controls. The impacts of those invasive species may be more severe as they increase both in numbers and extent, and as they compete for diminishing resources such as water. In this regard, achieving Aichi Biodiversity Target 9 is important where invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

From the preservation of marine and coastal resources to climate change mitigation and adaption, from the production of renewable energy to the development of sustainable tourism, islands offer many lessons in resilience and sustainability. As discussions in the United Nations are progressing to frame new sustainable development goals, the experience and knowledge of islands can contribute significantly to the conservation and sustainable use of the planet's biodiversity and natural resources.

Pledges from island governments such as the Micronesia Challenge, the Caribbean Challenge Initiative and the upcoming Western Indian Ocean Coastal Challenge, together with cooperation platforms such as the Global Islands Partnership, are showing the way for successful multi-Party commitments in support of the conservation and sustainable use of biodiversity. Such innovative projects have come to be known as "Bright Spots." These projects are making a difference in advancing conservation and sustainable livelihoods.

To achieve the goals of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets, we need to build on these "Bright Spots." We need to identify those that have the potential to be scaled and replicated as solutions to the conservation and sustainable use of biodiversity throughout the world.

We also need to continue and build on the collaboration between the Rio Conventions – the United Nations Framework Convention on Climate Change, the United Nations Convention to Combat Desertification and the Convention on Biological Diversity. All three of these historic environmental agreements address, in an inter-related way, the challenges of climate change, land degradation, and biodiversity loss. And their work is of great relevance to islands.

As we celebrate World Environment Day 2014, let us celebrate the spirit of islands and islanders and work together for a sustainable future – a future of life in harmony with nature, the future we want. □

17 JUNE

World Day to Combat Desertification

By Braulio Ferreira de Souza Diaz, Executive Secretary, CBD

The land under our feet is ancient. Minerals and organic material have mixed together over decades, if not centuries and millennia, to provide the bed upon which our food is grown. The plants which grow in this soil are not only the basis for food and fiber; they also contribute to our supply of clean water and are a storage place for carbon. Land is the key for life and livelihoods today.

As the global population increases in the years to come, and as climate change affects the availability of water, with consequences for water and food security, land will become even more important. Drylands hold a significant proportion of the world's soil carbon stock, and land degradation contributes to greenhouse gas emissions. Sustainable land management is therefore a key climate change mitigation strategy.

Biodiversity conservation and sustainable land management will be critical for managing our ecosystems so that they can support improved water security for food production as well as being more resilient to climate change.

Ecosystem-based adaptation, which integrates biodiversity and ecosystem services into an overall adaptation strategy, can be cost-effective and generate social, economic and cultural co-benefits.

INTERNATIONAL DAY OF THE WORLD'S INDIGENOUS PEOPLES, 9 AUGUST

Recognizing the Rights of Indigenous Peoples

In order to provide an opportunity for advocates to strengthen cooperation on indigenous peoples issues such as human rights, the environment, development, education and health, the United Nations (UN) declared the 9th of August as the International Day of the World's Indigenous Peoples. The date was chosen as it marks the day of the first meeting of the UN Working Group on Indigenous Populations of the Sub-commission on the Promotion and Protection of Human Rights, in 1982.

The theme of the 2014 celebration is "Bridging the gap: implementing the rights of indigenous peoples." The UN crafted this theme to "highlight the importance of implementing the rights of indigenous peoples through policies and programs at both the national and international level working together towards this common goal with Governments, the United Nations system, indigenous peoples, and other stakeholders."

According to the International Work Group for Indigenous Affairs, indigenous peoples comprise at least 370 million people worldwide. Eight ASEAN countries – Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand, and Viet Nam – have indigenous peoples.

Who are Indigenous Peoples?

Native people, tribes, ethnic minorities – these are just some of the terms being used to collectively describe indigenous peoples. According to the Asia Indigenous Peoples' Pact (AIPP), they prefer to be collectively referred to as "Indigenous Peoples".

"There are also names given by outsiders, some of which are not appreciated by many of us, since they often imply notions of cultural inferiority, being "primitive" or "backward". Examples are *chuncheat* (meaning "ethnicity", or literally "national people" in Cambodia) or *sakai* (literally meaning "slave") used in Thailand for some hunter-gatherer groups. We ourselves prefer to use the names which our ancestors have given us," the AIPP emphasized in its publication called ASEAN Indigenous Peoples.

Jose R. Martinez Cobo, the Special Rapporteur of the Sub-Commission on Prevention of Discrimination and Protection of Minorities, defines indigenous peoples: "Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing in those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal systems."

This approach can contribute to the conservation of biodiversity while providing climate change adaptation benefits.

The Tenth Meeting of the Conference of the Parties, held in 2010 in Japan, adopted the Strategic Plan for Biodiversity 2011-2020 and 20 Aichi Biodiversity Targets, which provide a framework for biodiversity conservation, ecosystem restoration, and sustainable land management.

In particular, I would like to highlight Aichi Biodiversity Target 15, which calls for the enhancement of the resilience of ecosystems and the restoration of at least 15 percent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation, and combating desertification. Also relevant are: Target 5, which aims that by 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced; Target 7, which calls for areas under agriculture, aquaculture and forestry to be managed sustainably, ensuring conservation of biodiversity; and Target 14, which aims that by 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

As sister Rio Conventions, the Convention on Biological Diversity and the United Nations Convention to Combat Desertification have many areas of convergence, the most significant being the work to conserve, restore, and sustainably utilize dryland ecosystems. In fact, the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets provide strong bases for implementing the synergies between the two Conventions at the national level.

As we celebrate the World Day to Combat Desertification let us strive for sustainable strategies that integrate the management of land, water, and biodiversity through sustaining ecosystem services. In this way we can combat desertification, help adapt to climate change, and achieve the goals of the Strategic Plan for Biodiversity 2011-2020. □

Indigenous Peoples as stewards of biodiversity

Since indigenous peoples depend largely on biodiversity for food, medicine, shelter, and clothing, among other basic needs, they are highly knowledgeable on the sustainable utilization of these natural resources.

"Indigenous peoples can be considered as experts in natural resource management and biodiversity conservation since they are interacting closely with nature for their everyday needs. The traditional knowledge that they have developed through years of interacting with the environment has been very valuable not only for them, but also to modern industry and agriculture. As we celebrate this year's International Day of the World's Indigenous Peoples, we are emphasizing that the ASEAN Centre for Biodiversity (ACB) is giving the rights of indigenous peoples utmost recognition and respect," said Atty. Roberto V. Oliva, ACB Executive Director.

The Convention on Biological Diversity defines traditional knowledge as "the knowledge, innovations, and practices of indigenous and local communities around the world." Traditional knowledge may be in the form of "stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds."

"Indigenous peoples are our silent partners in conserving biodiversity. They have long been the custodian of traditional knowledge, which is a key to protecting our environment. It is our turn to protect them," Director Oliva emphasized.

Way forward

The first World Conference on Indigenous Peoples was held on 22-23 September 2014 and served as a venue to provide "an opportunity to share perspectives and best practices on the realization of the rights of indigenous peoples, including pursuing the objectives of the United Nations Declaration on the Rights of Indigenous Peoples." The said Declaration "emphasizes the rights of indigenous peoples to live in dignity, to maintain and strengthen their own institutions, cultures and traditions and to pursue their self-determined development, in keeping with their own needs and aspirations." *Pam Reblora*

PHILIPPINES

OLANGO ISLAND

Wildlife Sanctuary

Visits to nature destinations always bring out a wealth of emotions. Some make you want to shout out in amazement or dance with joy. Others, like Olango Island, make you want to meander… Look at the mangroves… Watch the fish… Meander once more… Think of coffee and quiet mornings… And just sit back and bask in the serenity of nature.

Located five kilometers off the coast of Mactan, Philippines, Olango Island is a mere 20 minute boat ride away from busy metropolitan Cebu. A major eco-tourism destination for nature lovers, local cyclists, and birdwatchers, quiet Olango Island has a diverse coastal ecosystem consisting of extensive coral-line sand flats, mangroves, seagrass beds, and offshore coral reefs. It is home to the 1,030-hectare Olango Island Wildlife Sanctuary (OIWS), which is one of best-known flyways in the world for migratory birds. The sanctuary is a haven for birds migrating from Siberia, Northern China, Japan, and other parts of northern Asia during the winter months.

Common redshank

Chinese egret

Photos by Wikimedia Commons

Nationally and internationally significant ecosystem

Olango Island Wildlife Sanctuary was proclaimed a protected area through Presidential Proclamation 903 on 14 May 1992 and is one of the initial components of Republic Act (RA) 7586 or the National Integrated Protected Areas System (NIPAS) Act of 1992. It covers a total area of 1,030 hectares. On 8 November 1994, the sanctuary was recognized as the Philippines' first Ramsar site under the Convention on Wetlands of International Importance, and is one of six Ramsar sites in the country. Olango Island is also one of the Important Bird Areas in the Philippines.

Wildlife

Primary habitats in the sanctuary are mangrove forests and seagrass beds that support migratory and resident shorebirds, invertebrates, and other coastal marine wildlife.

This site has gained national and international prominence primarily due to the thousands of migratory shorebird birds recorded in the area. The OIWS is in the middle of the East Asian–Australasian Flyway, which stretches from Alaska and Russia in the north to Australia and New Zealand in the south. There are 77 species of migratory birds that use the East-Asian Austral-Asian Flyway and Olango has hosted more than half of this number (62.23 percent).

More than 40 species of migratory birds have been recorded in this site. The flagship species at the OIWS are the Asiatic Dowitcher *(Limnodromus semipalmatus)* and the Chinese Egret *(Egretta eulophotes).* Other significant species include the Bar-tailed Godwit *(Limosa lapponica),* Far Eastern Curlew *(Numenius madagascariensis),* Terek Sandpiper *(Xenus cinereus),* Grey-Tailed Tattler *(Heteroscelus brevipes),* Gull-billed Tern *(Sterna nilotica),* Striated Heron *(Butorides striata),* Rufous Night-Heron *(Nycticorax caledonicus),* Pacific Golden-Plover *(Puvialis pulva),*

Little Egret *(Egretta garzeta),* Common Redshank *(Tringa totanus),* Whimbrel (*Numenius Phaeopus),* Curlew Sandpiper *(Calidris ferruginea),* Red-necked Stint *(Calidris ruficollis),* Eurasian Curlew *(Numenius arquata),* Great Knot *(Calidris tenuirostris),* and Greater Sand-Plover *(Charadrius leschenaultii).*

The annual migration happens towards the winter months starting September when the birds leave their breeding areas in the northern hemisphere. The northward migration happens towards the months of March to May. The shorebirds around this time of the year may be seen transitioning to their colorful breeding plumage as they prepare for their long migration to the breeding areas in the north.

Threats

Some of the key issues that affect the management and conservation of the resources within the OIWS include the following:

1. Encroachment of the mangrove forest to the feeding area of the migratory birds.
2. Increased use of destructive fishing practices within the sanctuary.
3. Subsistence fishing, gleaning, and collection of mollusks and other invertebrates within the sanctuary.
4. Dependence of the local community on mangrove forests for firewood and marine wildlife for food.
5. Inadequacy of existing infrastructure and equipment to meet the demands of domestic and foreign visitors.
6. Lack of effectiveness and sustainability of information and education efforts to promote OIWS as an ecological destination.
7. Lack of updated scientific data on the biodiversity of the sanctuary.
8. Low financial allotment for OIWS that is unable to sustain effective operation of the sanctuary and the implementation of laws, rules, and regulations.

Conservation and management

The sanctuary is protected by various laws, including RA 7586; Presidential Decree No. 705 or the Revised Forestry Code of the Philippines; and RA 8550 or the Philippine Fisheries Code.

Management of the OIWS is undertaken by the Protected Area Superintendent of the wildlife sanctuary, Provincial Environment and Natural Resources Office, and Community Environment and Natural Resources Office with direction provided by the Protected Area Management Board (PAMB) and the Office of the Regional Technical Director- Protected Areas and Wildlife Coastal Zone. Activities to ensure the implementation of conservation regulations include the deputization of wildlife enforcement officers; conduct of regular patrols; networking with the Philippine National Police and local government units; and the installation of signages detailing regulations within the protected area.

The OIWS management plan includes the following strategies to ensure the sustainable management of the protected area:

1. Management zoning – the site has been divided into different management zones:
    a. Strict Protection Zone – areas with high biodiversity value, which are closed to human activity except for scientific studies and ceremonial or religious use by indigenous communities. This zone covers the principal feeding and roosting sites for migratory birds and an is important habitat of economically important marine organisms with a total area of 69.70 hectares.
    b. Recreational Zone – areas with high recreational, tourism, educational, or environmental awareness values where sustainable ecotourism, recreation, and conservation education may be allowed as stipulated in the management plan. The area is best for swimming and picnics, and also serves as a docking area for motorized pump boats. It covers an area of 7.42 hectares.
    c. Multiple Use Zones – areas for settlements and traditional or sustainable land use including agriculture, agroforestry, extraction activities, and other income generating or livelihood activities, the extent of which are prescribed in the management plan. These cover an area of 97.659 hectares.
    d. Habitat Management Zone – covers an area of 413.94 hectares. Activities conducted in the zone include mangrove planting, bird banding, netting, and leg flagging.
    e. Sustainable Use Zone – area where the utilization and collection of natural resources by indigenous community and tenured migrants and buffer zone residents are allowed using traditional sustainable methods that are not in conflict with biodiversity conservation requirements. The zone is also utilized by migratory birds as feeding and roosting area, which makes it an excellent area for birdwatching. This zone covers an area of 319.278 hectares.

f. Buffer Zone/Environmental Protection Area – areas that adjoin the protected area. The area is open for development activities such as souvenir shops, restaurants, lodging houses, and other similar enterprises, with the approval of the PAMB.

2. Research and monitoring – research and monitoring activities include the implementation of the Biodiversity Monitoring System as prescribed by the Biodiversity Management Bureau of the Department of Environment and Natural Resources (DENR); conduct of Carrying Capacity Determination on various activities and resources of the sanctuary; and bird banding to identify bird species.
3. Rehabilitation – mangrove tree plantings have been conducted to repopulate degraded mangrove areas.
4. Visitors and community program for ecotourism – this focuses on the collection of protected area fees as well as the conduct of periodic coastal clean-up and mangrove planting activities.
5. Livelihood – communities are engaged in livelihood activities generated by visits to the protected area, such as guided tours, food catering, sale of souvenirs, and establishments that sell food and beverages, among others.
6. Information and education campaign – visitors are provided an orientation of the features of the OIWS. Management also disseminates information materials such as brochures and posters to schools, libraries, and barangay centers. Signages have been installed to highlight the features of the sanctuary.
7. Training and human resource development – management has been working with various organizations to upgrade the knowledge and skills of OIWS staff particularly on bird identification and monitoring. The sanctuary is also a learning opportunity for science students, and has been a venue for on the job training for Biology students.
8. Monitoring and evaluation – there is an annual evaluation on the operation and management of the sanctuary. Park management also submits a Monthly Bird Inventory and Monthly Statistical Report on visitor arrivals and income.

The OIWS also works with other government agencies and various private organizations that support conservation activities in the park. These include the Department of Tourism, Philippine National Police, Wildfowl and Wetland Trust, Philippine Business for Social Progress, Cebu Biodiversity Conservation Foundation, Conservation International, and the Wild Bird Club of the Philippines, among others.

An annual Asian Waterbird Census is usually conducted in the OIWS on the third week of January. For those who

are keen on doing volunteer work, this is the best time to explore the area with shorebirds in mind. The staff of the DENR can facilitate the inclusion of volunteers in the census groups.

Birdwatchers' paradise

Birds can be found in the wildlife sanctuary all year round, but the migration season peaks during the months of December, January and February. These months offer a good chance of seeing huge congregations of migratory waders and shorebirds.

Visitors need to consider the tide pattern when they visit the OIWS. The best time to be in the viewing deck or bird hide of the sanctuary is during the shift from low to high tide. A high tide of 1.4 meters or higher is ideal in herding together flocks of foraging shorebirds slowly into their roosting areas among the mangrove patches. During low tide, shorebirds in the sanctuary are usually dispersed and can easily be overlooked by unaided eyes in the vast coastal sandflat. It is best to use the viewing deck to scan the area for any bird activity.

Other activities in the wildlife sanctuary

Aside from birdwatching, visitors can go swimming or camp inside the wildlife sanctuary. Visitors can also explore the open areas around the sanctuary, which are teeming with small invertebrates, crustaceans, fiddler crabs, and other interesting wildlife.

How to get there

There are several ways to get to the OIWS depending on the jump-off point for the trip:

From the Mactan International Airport, visitors can take a taxi to the pier beside Movenpick Resort and Spa in Brgy. Punta Engano, Mactan. Travel time from Mactan International Airport to the pier beside Movenpick Resort is about 15-25 minutes. Travel time from downtown Cebu City to Movenpick Resort is about 45 minutes depending on traffic conditions.

At the pier, pump boats to Sta. Rosa Pier in Olango Island start at 6:00 am and end at 5:30 pm, with a 30-minute interval between trips. There is also a roll-on roll-off barge (RO-RO) that can take vehicles to the island starting at 9:00 am. The schedule and availability of the barge may vary. Travel time to the Sta. Rosa Pier in Olango Island is about 25-30 minutes.

From Sta. Rosa Pier, take a tricycle to the *Sanctuario* or the Olango Island Wildlife Sanctuary. This is considered a special trip and visitors pay for the full capacity rate of the tricycle. Arrangements for pickup back to the Sta. Rosa Pier should be made with the driver. The round-trip fare is about P200.00 and the travel time from Sta. Rosa Pier to OIWS is about 15-20 minutes. □

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MALAYSIA

SUGUD ISLANDS

Marine Conservation Area

Established on 3 December 2001, the Sugud Islands Marine Conservation Area (SIMCA) encompasses the islands of Lankayan, Billean, Tegaipil and their surrounding shallow coastal reef areas covering 46,317 hectares. The conservation area is situated in the South Sulu Sea in the Beluran district of Sabah, Malaysia, 80 kilometers off the coast of Borneo, and 40 km from Turtle Island Park.

SIMCA is classified as a Category II under the International Union for Conservation of Nature adhering to a strict "no-take" policy, which excludes all types of resource extraction. SIMCA thus plays a key role in managing coral reef conservation for the long term benefits of marine biodiversity in Sabah.

Managed by Reef Guardian Sdn Bhd, SIMCA is the first privately managed marine conservation area in Malaysia. Reef Guardian aims to conserve marine biodiversity through low impact ecotourism, funds from which support sea turtle conservation, prevent destructive fishing practices, and promote coral reef conservation.

Wildlife

On the islands, common vegetation include casuarina trees and pandan screwpine. Large healthy corals dominate the surrounding reefs and hundreds of schooling fish can be seen while snorkeling and scuba diving. Colorful snappers, surgeon fish, parrot fish, wrasses, damsel fish, and butterflyfish are abundant. Sharks are also common, including Larger Black Tip reef sharks, Marble rays, Bamboo, and Leopard sharks. Guitar sharks can be seen from April through May, and whalesharks are spotted occasionally as they pass through the reefs during migration.

Other marine species include giant clams, spider crabs, nudibranches, yellow tail barracudas, Boxer, Squat and Saw-blade shrimps, lobsters and various crabs, cuttlefish, octopus, frog fish, pipe fish and the somewhat rarer Giant jaw fish and seahorses.

Lankayan Island is a nesting site for both Green *(Chelonia mydas)* and Hawksbill *(Eretmochelys imbricata)* turtles, and the island appears to be an important foraging area for these two species.

Threats

In the past, illegal fishing occurred within and outside the conservation area. Fishers carried out dynamite fishing that damaged the coral reef, used sodium cyanide to stun Napoleon wrasses and groupers for the live reef fish food trade, and deployed bottom gill nets at the reef edge to trap sharks, rays, and sea turtles. Agricultural run-off from the mainland also threatened to damage coral reefs. The presence of dangers to coral growth like crown-of-thorns starfish invasions is closely monitored.

The relatively shallow coral reefs make the marine life vulnerable to destructive fishing practices. The rich biodiversity of SIMCA continues to attract illegal fishermen from Sandakan and Pulau Banggi in Sabah. As recently as November 2009, illegal fishermen were apprehended with a large catch of stingrays, sharks and turtles caught in a 7 km bottom gill net.

Conservation and management

SIMCA demonstrates how collaboration between government and the private sector can be successful. The government has implemented laws to protect the region and provided marine police, who are permanently based on the island to enforce the ban on destructive fishing techniques. Private investors have invested in the eco-friendly Lankayan Island Dive Resort and plan to build a new resort on Billean Island. They also provide staff, facilities and equipment for the Reef Guardian.

Reef Guardian is a private and non-profit organization appointed by the Sabah State Government to fully manage SIMCA in close cooperation with the Sabah Wildlife Department. Reef Guardian aims to manage and control human activities within SIMCA and ensure a balance with the need utilize resources for ecotourism and conserve the islands' coral reefs and marine life.

Conservation activities and projects

Reef Guardian's specific objectives are to protect and restore coral reefs and seagrass habitats by reducing direct human impact; protect nesting, foraging, and feeding grounds of sea turtles; monitor environmental change; promote marine conservation through ecotourism and education; enforce a strict no-take zone and eliminate illegal fishing in SIMCA; establish firm working relationships with the Sabah Wildlife Department and other national and international institutions for the protection of marine biodiversity; and develop sustainable funding from ecotourism.

Reef Guardian mainly controls human activities within the conservation area, which allows the recovery and rehabilitation of coral reef and fish stock. The staff of Reef Guardian are trained and certified as Honorary Wildlife Wardens to stop and control poaching and illegal fishing within the marine conservation area. Intruders in the conservation

area can be detected by a radar tracking system that monitors activities within SIMCA. Reef Guardian works with federal and state government enforcement agencies such as Malaysia Maritime Enforcement Agency, Marine Police, and the Special Field Force to carry out regular sea patrols.

As a nesting site for the endangered Green and Hawksbill turtles, SIMCA serves a crucial role in protecting their eggs from poaching. Nightly beach patrols are undertaken, and the eggs are taken to the hatchery where they are counted and incubated before the new hatchlings are released back onto the beach.

The Reef Guardians also monitor the long-term environmental change in coral cover, fish life, water quality and sedimentation.

To protect SIMCA, Reef Guardian drafted a five-year conservation plan from 2010-2014 and includes a business plan to leverage funds from partners.

Outcomes from activities conducted by Reef Guardian include a 200 percent improvement in sea turtle nesting from 2004 to 2009; reduced dynamite fishing (in 2004, dive tourists could record four explosions while diving, while none were reported in 2007); improved coral reef cover and fish population; increased tourism; and stronger partnerships with international organizations for sea turtle monitoring and law enforcement.

Reef Guardian also partnered with Cardiff University and the Sabah Wildlife Department to set up the Sugud Islands Marine Conservation Centre (SIMRC) to strengthen marine conservation, marine education, protection of SIMCA, and ecotourism. Specifically, SIMRC aims to enhance knowledge and skills on marine research and monitoring through joint training, workshops, and research for effective management of marine resources and biodiversity conservation; provide training and teaching facilities to local and international universities and institutions for hands-on field experiences in tropical coral reef ecosystem; facilitate restocking of commercially important and threatened marine species in Sabah through mariculture practices; and promote awareness on marine conservation. SIMRC offers field courses for educational field experiences and research and visitation opportunities to students and researchers from local and international institutions.

Environmental control

At least 80 percent of waste water on Lankayan Island is diverted from the resort chalets and restaurant, Reef Guardian, and marine police buildings, and processed through a hydroponics treatment system. The treated water provides fertilizer and irrigation for the island. Fresh water arrives via a weekly barge delivery and is filtered before being distributed. Rubbish is collected, separated and sent to the mainland. Staff members are careful to ensure that no waste goes into the ocean.

Additionally, the Reef Guardian monitors Lankayan Island Resorts' occupancy to ensure the maximum allowed guests per night does not exceed 60, thus reducing the impact of the resort on the island's environment.

Education and training

Reef Guardian also produces newsletters, posters, flyers, and provides briefings to tourists, students, and government enforcement agencies to raise conservation awareness. The organization also trains its staff to improve monitoring, enforcement and leadership skills. The Reef Guardian also organizes an "International Clean-Up Day" and its Marine Education Program hosts a Sabah school visit where students have snorkeling lessons, play games that highlight conservation issues, listen to interesting talks, and watch diving videos on coral reefs and marine turtles.

Eco-friendly diving

Guests who snorkel and dive at Lankayan are strictly regulated to balance diver enjoyment and marine conservation. There are dedicated zones for snorkeling, and diving is only possible when accompanied by a resort guide.

The first dive is preceded by a briefing where guides stress SIMCA's 'no touch' and 'no landing on corals' policy.

Boat traffic inside SIMCA's protected area is restricted with only one transfer available for guests leaving or arriving at the resort each day. Walking around the island is permitted only in times of good visibility to avoid accidental damage to the turtles' nests or young hatchlings.

Funding

A conservation fee is collected from every visitor, which directly funds operational and management costs of SIMCA. Reef Guardian also generates funds from the Lankayan dive resort, and from various donors, including the National Fish and Wildlife Foundation, Conservation International, and World Wildlife for Nature-Malaysia. Reef Guardian also conducts fundraising activities, one of which was the "Adopt-A-Nest" programme at Lankayan in 2012. The project raises funds for sea turtle monitoring and protection, and in 2013 the project engaged 260 adoptions.

Ecotourism

A stay at Lankayan Island Resort grants guests access to the uniquely intimate experience of watching sea turtles nest, assisting with the hatching and release of the baby turtles, and witnessing their miraculous race to the sea.

The conservation efforts together with continuous reef monitoring and control of human activities offer guests rewarding Lankayan scuba diving and snorkeling opportunities on the easily accessible reefs along the Sabah coastline. The amount of life that exists on these reefs is impressive considering that not too long ago they were exploited by many destructive fishing methods. In the morning it is possible to see baby sharks and at sunset the larger sharks swim in close to the beach as they wait for the newly hatched turtles. The return of whale sharks during coral spawning events is also an indicator of improving coral health. Pegaso Reef is a popular diving destination where one is likely to see Sting Rays, Marble Rays, Black Tip Reef Sharks, and Leopard Sharks.

Lankayan also boasts a few good wreck dives. The Lankayan Wreck, for instance, consists of two boats lying side by side 15 to 25 meters down.

Lankayan Island is currently the only island with facilities for visitors and guests will have to make bookings through Pulau Sipadan Resort. Reef Guardian offers research and field course facilities at Billean Island. □

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GLOBAL NEWS

Nagoya Protocol receives required number of ratifications to enter into force

THE Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization will enter into force on 12 October 2014 following its ratification by 51 Parties to the Convention on Biological Diversity (CBD).

In July 2014, 12 countries deposited their instruments including Belarus, Burundi, Gambia, Madagascar, Mozambique, Niger, Peru, Sudan, Switzerland, Vanuatu, Uganda, and Uruguay. Its entry into force will mean that the 1st Meeting of the Conference of the Parties serving as the meeting of the Parties to the Protocol can be held from 13 to 17 October 2014, concurrently with the 12th Meeting of the Conference of the Parties to the Convention on Biological Diversity in Pyeongchang, Republic of Korea.

Ratification of the Nagoya Protocol by 51 Parties to the CBD represents a major step towards achieving Aichi Biodiversity Target 16, which states that, "by 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation."

The entry into force of the Nagoya Protocol will provide greater legal certainty and transparency for both providers and users of genetic resources, creating a framework that promotes the use of genetic resources and associated traditional knowledge while strengthening the opportunities for fair and equitable sharing of benefits from their use. Hence, the Protocol will create new incentives to conserve biodiversity, sustainably use its components, and further enhance the contribution of biodiversity to sustainable development and human well-being.

"Practical tools such as the Nagoya Protocol are critical for the sustainable and equitable use of biodiversity. I commend the Member States that have ratified this important international legal instrument. By fulfilling the promise made at the 2002 World Summit on Sustainable Development, they have made a significant contribution to the post-2015 sustainable development agenda," said Mr. Ban Ki- moon, United Nations Secretary-General.

H.E. Mr. Prakash Javadekar, Minister of State for Environment, Forests and Climate Change of India, said: "The Nagoya Protocol on Access and Benefit Sharing translates and gives practical effect to the equity provisions of the Convention on Biological Diversity. I am happy that this landmark treaty received the requisite number of ratifications during India's Presidency of the Conference of Parties for its entry into force. I congratulate my counterparts for making this happen. A new era is now ushered in for implementation of the CBD that would contribute to achieving sustainable development and a glorious future for all living beings inhabiting our mother Earth."

Braulio Ferreira de Souza Dias, CBD Executive Secretary, said, "The Nagoya Protocol is central to unleashing the power of biodiversity for sustainable development by creating incentives for the conservation and sustainable use of biological diversity while guaranteeing equity in the sharing of benefits."

"Entry into force of the Nagoya Protocol means not only a big step towards achieving Aichi Target 16, but is an important step in mainstreaming biodiversity into sustainable development. I congratulate all Parties who have ratified the Protocol, and I invite others to do so in time to participate in the first meeting of the COP-MOP, in Pyeongchang, Republic of Korea," he concluded.

The following Parties have now ratified or acceded to the landmark treaty: Albania, Belarus, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Comoros, Côte D'Ivoire, Denmark, Egypt, Ethiopia, European Union, Fiji, Gabon, Gambia, Guatemala, Guinea Bissau, Guyana, Honduras, Hungary, India, Indonesia, Jordan, Kenya, Lao People's Democratic Republic, Madagascar, Mauritius, Mexico, the Federated States of Micronesia, Mongolia, Mozambique, Myanmar, Namibia, Niger, Norway, Panama, Peru, Rwanda, Samoa, the Seychelles, South Africa, Spain, Sudan, Switzerland, the Syrian Arab Republic, Tajikistan, Uganda, Uruguay, Vanuatu, and Viet Nam. While the European Union will be a Party to the Protocol, its approval of the Protocol does not count towards the 50 instruments required for entry into force.

Global Oceans Action Summit charts path for ocean health

URGENT, coordinated action is needed to restore productive, resilient oceans, ensure food security, and support human livelihoods, according to participants at the Global Oceans Action Summit for Food Security and Blue Growth. The Summit also called for oceans to be embedded in the post-2015 development agenda, preferably in a stand-alone sustainable development goal (SDG) on oceans.

The Summit, which took place on 22-25 April in The Hague, the Netherlands, aimed to raise global attention and investment on countering threats to oceans, namely climate change, habitat destruction, over-fishing, and pollution. Participants explored solutions for balancing the economic demands and ecological needs of oceans, with an emphasis on governance structures and finance mechanisms. The report of the meeting contains principles and recommendations for positioning ocean health and "blue growth" more prominently on the international development agenda.

The high-level segment of the Summit was attended by over 80 ministers, chief executive officers, and heads of or-

ganizations, from around the world. The Chair's summary of the Summit contains "Pitches for action" emanating from the meeting's discussions and further elaborated during its high-level segment. These recommendations were not formally adopted, but rather regarded as "key messages" from the Summit. They are grouped under five themes: integrated approaches – breaking down silos, governance, public-private partnerships, investments, and research and development/ innovation.

Participants agreed on the need to, *inter alia:* eliminate subsidies that contribute to over-fishing and overcapacity; incentivize approaches that improve conservation, build sustainable fisheries and end illegal, unreported and unregulated fishing; strengthen the mandate and financing of Regional Fisheries Management Organizations; and invest in small and medium scale fisheries as vital stewards for growth and to support sustainable supply chains. The meeting also called for greater attention to the impacts of climate change on oceans, as well as the inclusion of ocean health in the UN Framework for Convention on Climate Change process.

UNEP holds 1st UN Environment Assembly

THE first United Nations Environment Assembly (UNEA) of the United Nations Environment Programme (UNEP) was held at the UNEP headquarters in Nairobi, Kenya, from June 23 to 27, 2014. More than 1,200 participants, including environment ministers, heads of international organizations, government representatives, civil society representatives and business leaders, attended the assembly. The overarching theme of the session was "Sustainable Development Goals and the Post-2015 Development Agenda, including sustainable consumption and production."

During the UNEA, delegates convened in plenary sessions, a Committee of the Whole (COW), and several working and contact groups to consider draft decisions. Ministers and international leaders, including UN Secretary-General Ban Ki-moon and John Ashe, President of the 68th UN General Assembly, gathered during UNEA's High-level Segment, themed "A Life of Dignity for All." Participants addressed two issues: sustainable development goals, including sustainable consumption and production; and illegal trade in wildlife, focusing on the escalation in poaching and the surge in related environmental crime. In addition to the ministerial discussions, the UNEA convened two symposia addressing two key aspects of environmental sustainability: the environmental rule of law and financing a green economy.

Delegates adopted one decision and 17 resolutions on, *inter alia:* strengthening UNEP's role in promoting air quality; the science-policy interface; ecosystem-based adaptation; implementation of Principle 10 of the Rio Declaration on Environment and Development; illegal trade in wildlife; chemicals and waste; and marine debris and microplastics. During the closing plenary, the Ministerial Outcome Document of the UNEA was adopted, although several member states noted their reservations with the document.

Many described the first session of the UNEA as a historic event but called for continued efforts to strengthen UNEP to support implementation of the post-2015 development agenda. *UNEP*

World Coral Reef Conference 2014

REPRESENTATIVES from 29 countries and 13 international organizations have declared a communiqué vowing to address the critical issues and threats facing coral reefs around the world and take strong actions to ensure the sustainability of marine resources.The communiqué was endorsed at the World Coral Reef Conference held on May 14-16, 2014 in Manado, Indonesia, which also coincided with the Fifth Meeting of the Council of Ministers of the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF).

The communiqué calls on representatives to implement appropriate measures to achieve long-term conservation, management and sustainable use of coral reefs and its related ecosystems to ensure food security, eradicate poverty, and address the impacts of climate change on the marine environment and marine biodiversity.

The communiqué also vowed to enhance cooperation with each other and build the capacity of communities so that they may work to improve and maintain resilience of coral reefs and related ecosystems. They vowed to encourage national, regional and international initiatives and commitments to conserve coral reef ecosystems that contribute to food security and nutrition for peoples' livelihoods.

They also affirmed commitment to work for synergy of science-based sustainable coral reef management policies that ensure integrated approaches and effective governance and encourage policy analysis at global and regional levels to identify opportunities to further strengthen the global coral reefs policy framework.

The conference participants announced in the communiqué their recognition of the vital role that women play in the conservation and sustainable use of coral reefs and called for inclusive growth to improve livelihoods of local community-level beneficiaries of coral reefs. As such, they called for initiatives and partnerships on sustainable coral reefs management that involve local and national governments, civil society and local communities, multilateral institutions, business communities, academia, and private philanthropy at all levels.

They further encouraged market driven research and development, technical assistance, human resources development and capacity building, including extension and outreach, to strengthen and improve seafood production and processing technology, and eliminate illegal, unreported and unregulated fishing practices.

For the private sector, they sought for the development of eco-friendly businesses to benefit the sustainable management of marine biodiversity, particularly coral reefs and related ecosystems.

Lastly, they encouraged efforts to raise awareness on the importance of sustainable coral reefs management at all levels. *WCRC News*

Countries report on achieving the Aichi Biodiversity Targets

IN preparation for the 12th Meeting of the Conference of the Parties (COP 12) to the Convention on Biological Diversity (CBD) in October 2014, countries are currently submitting their Fifth National Reports (5NR) that will enable a global assessment of progress made towards achieving the Aichi Biodiversity Targets.

"The information in the 5NR will be vital in charting work under the CBD from now until 2020," said Braulio Ferreira de Souza Dias, CBD Executive Secretary.

As of April 2014, 40 countries have submitted their 5NRs: Belarus, Belgium, Burundi, Cameroon, Canada, China, Colombia, Congo, Côte d'Ivoire, Cuba, Denmark, Dominica, Ecuador, Germany, India, Iraq, Japan, Kuwait, Malaysia, Republic of Moldova, Mongolia, Montenegro, Myanmar, Namibia, Nauru, Nepal, Niger, Nigeria, Niue, Pakistan, Palau, Poland, Rwanda, Senegal, Solomon Islands, Somalia, South Africa, Spain, Sudan and Uganda.

The 5NRs provide an opportunity for Parties to report internationally on progress made domestically on biodiversity commitments since the landmark COP 10 in 2010 in Nagoya, Japan. Submitting a national report at agreed intervals is an

obligation that needs to be fulfilled by all 193 Parties.

A focus of the 5NR is on the attainment of the Aichi Biodiversity Targets and associated national targets. These include targets under each of five goals of the Strategic Plan for Biodiversity, namely, to address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society; reducing direct pressures on biodiversity and promote sustainable use; improving the status of biodiversity by safeguarding ecosystems, species and genetic diversity; enhancing the benefits to all from biodiversity and ecosystem services; and enhancing implementation through participatory planning, knowledge management, and capacity building.

National reports also provide a key source of information for the preparation of the fourth edition of the Global Biodiversity Outlook (GBO-4), the CBD's major periodic assessment of the state of biodiversity, trends and options. The GBO-4 will contribute to assess overall progress towards the Aichi Biodiversity Targets and form an important communications tool during the 2011-2020 United Nations Decade on Biodiversity. The GBO-4, as well as the 5NRs, will be considered during COP 12 in Pyeongchang, Republic of Korea in October 2014. At COP 12, countries are expected to take stock of progress made and, among other things, prepare a road map on the way forward for the remaining implementation period of the Strategic Plan. *SCBD News*

Donors replenish Global Environmental Facility

US$ 4.43 billion has been pledged by 30 donor countries for the Global Environment Facility (GEF) to support developing countries' efforts over the next four years to prevent degradation of the global environment.

The announcement, made at the Fourth Meeting for the Sixth Replenishment of the GEF Trust Fund, held in Geneva, Switzerland, 16-17 April 2014, further

stated that the funding will support projects in over 140 countries to tackle a broad range of threats to the global environment. These threats include climate change, deforestation, land degradation, extinction of species, toxic chemicals and waste, and threats to oceans and freshwater resources.

The GEF is the main global mechanism to support developing countries' to take action to fulfill their commitments under the world's major multilateral environmental agreements (MEAs), including the Convention on Biological Diversity (CBD).

"This is a significant development. We welcome the efforts of the GEF Secretariat and the commitments of donor governments to replenish the GEF capital and thus allow the GEF to continue to serve as the financial mechanism of the CBD and other MEAs," said Braulio Ferreira de Souza Dias, CBD Executive Secretary.

"However, this still serves as a reminder that donor countries failed to fulfil the target set at the 11th Meeting of the Conference of the Parties (COP 11) in Hyderabad, India, to double the international financial flows by 2015 relative to the 2006-2010 average," underlined Dias.

"This means that we have missed the opportunity to significantly increase the investment on biodiversity to increase efforts for achieving the implementation of the Aichi Targets," said Mr. Dias.

The conservation, restoration, and sustainable use of biodiversity can provide solutions to a range of societal challenges. For example, protecting ecosystems and ensuring access to ecosystem services by poor and vulnerable groups are an essential part of poverty eradication.

Failing to pay due attention to the global biodiversity agenda risks compromising the capacity of countries to eradicate poverty and to enhance human well-being. This also affects countries' means to adapt to climate change, reduce vulnerability to extreme natural disasters, ensure food security and access to water, and promote access to health. *SCBD News*

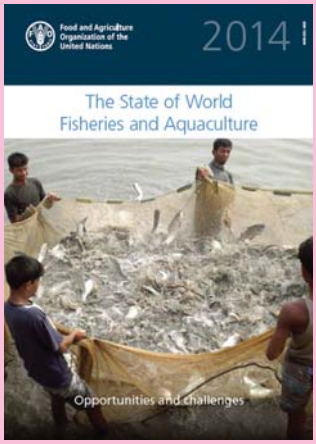
FAO report highlights growing role of fish in feeding the world

MORE people than ever before rely on fisheries and aquaculture for food and as a source of income, but harmful practices and poor management threaten the sector's sustainability, says a new Food and Agriculture Organization (FAO) report.

According to the latest edition of FAO's *The State of World* Fisheries and Aquaculture, global fisheries and aquaculture production totalled 158 million tons in 2012 – around 10 million tons more than 2010.

The rapid expansion of aquaculture, including the activities of small-scale farmers, is driving this growth in production.

Fish farming holds tremendous promise in responding to surging demand for food, which is taking place due to global population growth. At the same time, the planet's oceans – if sustainably managed – have an important role to play in providing jobs and feeding the world, according to FAO's report.



"The health of our planet as well as our own health and future food security all hinge on how we treat the blue world," FAO Director-General José Graziano da Silva said. "We need to ensure that environmental well-being is compatible with human well-being in order to make long-term sustainable prosperity a reality for all. For this reason, FAO is committed to promoting 'Blue Growth,' which is based on the sustainable and responsible management of our aquatic resources."

The renewed focus on the so-called "blue world" comes as the share of fisheries production used by humans for food has increased from about 70 percent in the 1980s to a record high of more than 85 percent (136 million tons) in 2012. At the same time, per capita fish consumption has soared from 10 kg in the 1960s to more than 19 kg in 2012.

The new report also says fish now accounts for almost 17 percent of the global population's intake of protein – in some coastal and island countries it can top 70 percent. FAO estimates that fisheries and aquaculture support the livelihoods of 10 to 12 percent of the world's population.

Since 1990, employment in the sector has grown at a faster rate than the world's population and in 2012 provided jobs for some 60 million people engaged in capture fisheries and aquaculture. Of these, 84 percent were employed in Asia, followed by Africa with about 10 percent.

Capture fisheries stable, aquaculture boom continues

Global marine capture fishery production was stable at about 80 million tons in 2012, the new report indicates. Currently, under 30 percent of the wild fish stocks regularly monitored by FAO are overfished – a reversal in trend observed during the past few years, a positive sign in the right direction. Just over 70 percent are being fished within biologically sustainable levels. Of these, fully fished stocks – meaning those at or very close to their maximum sustainable production – account for over 60 percent and underfished stocks about 10 percent.

Global aquaculture production marked a record high of more than 90 million tons in 2012, including almost 24 million tons of aquatic plants. China accounted for over 60 percent of

the total share. Aquaculture's expansion helps improve the diets of many people, especially in poor rural areas where the presence of essential nutrients in food is often scarce.

However, the report warns that to continue to grow sustainably, aquaculture needs to become less dependent on wild fish for feeds and introduce greater diversity in farmed culture species and practices. For example, small-sized species can be an excellent source of essential minerals when consumed whole. However, consumer preferences and other factors have seen a switch towards larger farmed species whose bones and heads are often discarded.

Greater market share for developing countries, more attention to small-scale fishers

Fish remains among the most traded food commodities worldwide, worth almost $130 billion in 2012 – a figure which likely will continue to increase. An important trend sees developing countries boosting their share in the fishery trade – 54 percent of total fishery exports by value in 2012 and more than 60 percent by quantity (live weight). This means fisheries and fish farming are playing an increasingly critical role for many local economies.

Some 90 percent of fishers are small scale and it is estimated that, overall, 15 percent are women. In secondary activities such as processing, this figure can be as high as 90 percent. FAO, through the 2014 International Year of Family Farming, is raising the profile of smallholder activities – including fisheries and aquaculture – with an emphasis on improving access to finance and markets, securing tenure rights and protecting the environment.

Reducing wastage, curbing harmful practices, improving traceability

An estimated 1.3 billion tons of food are lost per year – to about one-third of all food produced. This figure includes post-harvest fish losses, which tend to be greater in small-scale fisheries. In small-scale fisheries, quality losses are often far more significant than physical losses. Improved handling, processing, and value-addition methods could address the technical aspects of this issue, but it is also vital to extend good practices, build partnerships, raise awareness, and develop capacity and relevant policies and strategies.

The report also notes that illegal, unreported and unregulated (IUU) fishing remains a major threat to marine ecosystems and also impacts negatively on livelihoods, local economies, and food supplies.

Food chain traceability is increasingly a requirement in major fish markets, especially in the wake of recent scandals involving the mislabelling of food products. FAO provides technical guidelines on certification and eco labelling, which can help producers demonstrate that fish has been caught legally from a sustainably managed fishery or produced in a properly run aquaculture facility.

In particular, the report stresses the importance of the Code of Conduct for Responsible Fisheries which, since its adoption almost two decades ago, remains key to achieving sustainable fisheries and aquaculture. The Code promotes the responsible use of aquatic resources and habitat conservation to help boost the sector's contribution to food security, poverty alleviation, and human well-being.

FAO is also promoting "Blue Growth" as a framework for ensuring sustainable and socioeconomically-sensitive management of oceans and wetlands.

At the Global Oceans Action Summit on Food Security and Blue Growth held in The Hague, Netherlands, governments and other participants committed to actions focused on tackling climate change, overfishing, habitat loss, and pollution in a bid to restore productive, resilient oceans. *FAO News*

UNEP prepares GEO on SIDS

THE UN Environment Programme (UNEP) has prepared a Global Environment Outlook for Small Islands Developing States (GEO SIDS) for the Third International Conference on SIDS held in Apia, Samoa, on 1-4 September 2014. The initiative responds to the request of delegates at the Inter-regional Preparatory Meeting held in Bridgetown, Barbados, on 26-28 August 2013, for UNEP to dedicate support for a GEO specifically on SIDS.

The initiative also takes place in the context of the International Year of SIDS. UNEP invited broad participation in the process through an online 'Community of Practice' hosted on its UNEP-Live platform.

The GEO SIDS Community of Practice reviewed the main priorities for SIDS and the existing state of data; agreed on a set of core indicators for tracking progress; and analyzed needed solutions. The GEO SIDS report covers climate trends, natural disasters, chemicals, land-based pollution and marine litter, the health of marine and terrestrial protected areas, fish productivity, freshwaters, seabed and coastal mining, and renewable energy, among other topics.

GEO products aim to support environmental decision-making and facilitate science-policy interactions. They are developed through consultative, participatory processes that identify key issues and nominate advisors to provide guidance. UNEP has produced five GEO reports to date, the most recent being in 2012. *ISSD*

ACB NEWS

ACB and UP to collaborate on environmental lectures and courses

UNIVERSITY of the Philippines Vice President for Administration Maragtas S.V. Amante, together with Dr. Nina M. Cadiz, Director of the University of the Philippines Los Banos- Institute of Biological Sciences (UPLB-IBS), Dr. Juan Carlos T. Gonzalez, Deputy Director of the UPLB- IBS, Dr. Rene Rollon, Director of the UP Institute of Environmental Science and Meteorology (UP-IESM), and Dr. Benjamin Vallejo, Jr., Professor (UP- IESM), visited the ASEAN Centre for Biodiversity headquarters in UPLB to discuss possible collaborations between the UP System and ACB which include working together in a species information data management seminar and biodiversity-related lecture series and short courses.

ACB-BAR Cooperation

THE Philippines' Bureau of Agricultural Research (BAR) Director Nicomedes P. Eleazar visited the ASEAN Centre for Biodiversity (ACB) headquarters in UPLB to discuss possible collaboration between BAR and ACB, which include working together to create a database of germplasm or genetic resource centers. The proposed cooperation aims to promote sharing of biodiversity information among biodiversity conservation stakeholders. BAR is an agency of the Philippine government under the Department of Agriculture responsible for ensuring that all agricultural research is coordinated and undertaken for maximum utility to agriculture.

(L-R) Rolando Inciong, head, ACB Communication and Public Affairs; Atty. Roberto Oliva, executive director, ACB; Dr. Nicomedes P. Eleazar, director, BAR; Dr. Sheila Vergara, director, ACB Biodiversity Information Management; Lauro Punzalan, protocol officer, ACB; and Dr. Filiberto Pollisco, Jr.,policy specialist, ACB.

Biodiversity and national security discussed at PHL National Defense College

ASIDE from peace and order and the presence or absence of internal and external threats, governments should consider

biodiversity as an important element of national security. This was stressed by Rolando Inciong, head of communication and public affairs, ASEAN Centre for Biodiversity (ACB), during his lecture on "Implications of Biodiversity to National Security" at the 49th Master of National Security Administration (MNSA) Programme at the National Defense College of the Philippines. Participants in the one-year course include colonels from the Armed Forces of the Philippines, and the Malaysian, Nigerian and Sri Lankan armies; officials from national and local governments; and NGOs from the Philippines.

Inciong cited the dispute between the Philippines and China over the West Philippine Sea/South China Sea and the conflict in 2011 between the two countries over Scarborough/Panatag Shoal where Philippine authorities apprehended a Chinese fishing vessel loaded with endangered corals, giant clams, and baby sharks.

"The issue in the 2012 and 2014 cases is encroachment in territories of a sovereign state, as declared by both claimants. But the issue in these cases goes beyond territorial disputes. Why should the claimants play cat and mouse using their military and civilian vessels over some small islands and vast waters? The deeper issue could be the area's rich natural resources. The areas under dispute are rich in biodiversity – marine life, oil, and natural gas. These are key resources of a country for food and energy – all are major elements of national security. The two cases are classic examples of how biodiversity could affect national security, which, when not handled properly, could lead to international conflict," Inciong stressed.

Inciong explained that humans rely on biodiversity and ecosystem services to supply daily needs such as food, air and water, including raw materials for medicine, clothing, shelter, and various industries such as agriculture and food production, and pharmaceuticals, among many others. Important ecosystem services include soil fertilization, air and water quality regulation and purification, climate regulation and protection from harsh weather conditions, pollination, waste treatment, maintenance of soil fertility, prevention of soil erosion, recreation and tourism, and many more.

"The world is losing its biodiversity at unprecedented rates. The loss of biodiversity is one of the greatest threats that the entire human race is facing today. Biodiversity loss poses a significant threat to humankind's food security, health, livelihood, and nature's overall capacity to provide for our needs and those of future generations. All these are key elements of national security," Inciong emphasized.

Inciong enumerated the drivers of biodiversity loss, which include climate change, habitat change and destruction, invasive alien species, overexploitation, pollution, small- and large-scale mining, deforestation, inefficient consumption patterns, pressures and demands of growing population, and illegal wildlife hunting. Many drivers of biodiversity loss, Inciong said, are exacerbated by irresponsible human acts.

"The loss of biodiversity is beyond losing plants and animals. It is clearly an issue of human survival and national security. There is an urgent need to conserve the world's biodiversity in order to sustain the lives of billions of people all over the world who depend on biodiversity for food, medicine, clothing, livelihood, and shelter."

"Reducing biodiversity loss is not the sole responsibility of governments, scientific community and conservation organizations. Individuals, businesses, communities, schools, women, youth and all sectors, and national security leaders, must act individually while forming alliances to stage a common front against biodiversity loss," Inciong emphasized.

National Defense College Professor Charithie Joaquin explained that the inclusion of the environment and biodiversity as a dimension of national security underscores the urgent need to understand, analyze, and evaluate the complex dynamics between ecological and environmental systems and human population.

"Part of the MNSA course is to explore the nexus of the scientific and political agenda in the environmental sector with focus on fundamental and emerging issues on climate change, air and water pollution, solid waste management, renewable energy, land and aquatic resource management, biodiversity and urbanization."

"Using an interdisciplinary framework, this course encourages students to evaluate existing policies and develop multi-stakeholder strategies to sustainably managing natural resources at various levels in sectors such as tourism, mining, energy, food, housing and defense. This course also examines practical approaches to managing risks from natural hazards, trends in green business, the concept of environmental justice and sustainable development, the diplomacy of global environmental crisis, and private sector initiatives in reversing environmental degradation, "Professor Joaquin explained.

Stakeholders unite to conserve Mt. Makiling

Declaring their staunch support for the conservation of the Mt. Makiling Forest Reserve in the Philippines, stakeholders from national and local governments, international organizations, academe, business, and non-government organizations signed on July 30 a Memorandum of Agreement (MOA) with the University of the Philippines Los Baños (UPLB) for the creation of the Mt. Makiling Forest Reserve Stakeholders' Advisory Council (MMFR-SAC).

Signatories to the MOA include UPLB Chancellor Rex Victor Cruz; Mayor Caesar Perez of Los Baños, Laguna; Mayor Bruno Ramos of Bay, Laguna; Mayor Justin Marc Chipeco of Calamba, Laguna; Mayor Edna Sanchez of Sto. Tomas, Batangas; Governor Ramil Hernandez of Laguna; Regional Executive Director Reynulfo Juan of the Department of Environment and Natural Resources (DENR) Region IV-A; Director Rebecca Labit of the Department of Tourism (DOT), Region

Mt. Makiling stakeholders launch the Mt. Makiling Forest Reserve Stakeholders' Advisory Council to spearhead the conservation, protection and development of the Philippines' Mt. Makiling as an ASEAN Heritage Park. In photo (L to R) are Dr. Nathaniel Bantayan, director of the Makiling Center for Mountain Ecosystems; Mayor Bruno Ramos of Bay, Laguna; Executive Director Roberto Oliva of the ASEAN Centre for Biodiversity; Mayor Caesar Perez of Los Baños, Laguna; Mayor Edna Sanchez of Sto. Tomas, Batangas; and Chancellor Rex Victor Cruz of the University of the Philippines Los Baños.

IV; Director Theresa Mundita Lim of the DENR Biodiversity Management Bureau; General Manager JR Nereus Acosta of the Laguna Lake Development Authority; General Manager Pantaleon Tabanao of the Laguna Water District; General Manager Restituto Sumanga, Sr. of the Calamba Water District; Atty. Emilio Capulong, Jr., trial lawyer in Calamba City; PCSupt Jesus Gatchalian, Regional Director, Philippine National Police Region 4A; and Isidro Villanueva, President of ALAB Makiling-Farmers Association.

The MOA signing was highlighted by the unveiling of the 33rd ASEAN Heritage Park marker.

Following the declaration of Mt. Makiling Forest Reserve as the 33rd ASEAN Heritage Park in October 2013, the Makiling Center for Mountain Ecosystems (MCME) and the ASEAN Centre for Biodiversity (ACB) spearheaded a series of meetings hosted by the Municipalities of Los Baños and Sto.Tomas that led to the creation of the stakeholders' council.

According to UPLB Chancellor Rex Victor Cruz, it is time to expand and initiate more collective efforts among various stakeholders to ensure sustainability of vast ecosystem services. The MOA signing marks an important date in the history of collective action aimed at protecting Mt. Makiling.

According to MCME Director Nathaniel Bantayan, the forest reserve is rich in biodiversity and serves as an important reservoir that provides vast ecosystem services. The richness of vegetation and unique biodiversity, as well as abundant water supplied to lowland communities surrounding the forest reserve are due to favorable soil, climate, and intact forest cover in the mountain. Despite the continued efforts and collaborations to protect, conserve, and manage Mt. Makiling, there are still numerous challenges that pose threats to the reserve such as the expansion and conversion of land for the development of commercial establishments and residential infrastructure.

ACB Executive Director Roberto V. Oliva said that with the creation of the stakeholders' advisory council, the 24 stakeholders have acknowledged their responsibilities to Mt. Makiling, which they recognize as a provider of ecosystem goods and services to the communities around it.

The council is composed of UPLB as the entity with primary jurisdiction over the forest reserve by virtue of Republic Act (RA) No. 3523 as further reiterated in RA 6967 of 1990; the local government units of Los Baños, Bay, and Calamba City, all of Laguna Province; and Sto. Tomas of Batangas Province.

The council also includes the Department of Science and Technology; Provincial Environment and Natural Resources Office-Laguna; Community Environment and Natural Resources Office-Los Baños; Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development; and the Laguna Water Association of Water Districts. The council also has the following committees: biodiversity protection and law enforcement; ecotourism; water resources and sustainable use; communication, education and public awareness; resource generation; legal concerns; livelihood; and research, development and monitoring.

Members of the technical working group of the council are the heads of the MCME, the Municipal/City Environment and Natural Resources Offices of Bay, Los Baños, Sto. Tomas, and Calamba; DENR Region 4-A; and DOT Region 4-A. The MCME will serve as the secretariat while ACB and the GIZ of Germany will serve as advisers.

Building Capacity on ABS in Southeast Asia

In 2010, parties to the Convention on Biological Diversity (CBD) adopted the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. The protocol sets the parameters on how genetic resources may be accessed, and how the benefits that result from their use are shared between the people or countries using the resources (users) and the people or countries that provide them (providers).

Effective implementation of the Nagoya Protocol requires understanding the legal, institutional, administrative, scientific, and technological aspects of access and benefit sharing (ABS), as well as building capacities in developing regulatory frameworks. More importantly, indigenous and local communities (ILCs) need support to prepare them in national ABS processes. ILCs are in the forefront of ABS concerns since traditional knowledge (TK) is the key to traditional medicine, which is still the medicine of choice for 80 percent of the population in developing countries. TK on biodiversity resources, particularly medicine, food, crop and livestock production is acknowledged as a crucial part of the scientific knowledge base.

In Southeast Asia, the ASEAN Centre for Biodiversity (ACB) has been implementing capacity development initiatives on access and benefit sharing. One project is ACB's collaboration with the Asia-Pacific Network for Global Change Research (APN) through the Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries (CAPaBLE) Programme. The partnership has resulted in an ASEAN training workshop on building capacity involving ABS National Focal Points, scientists, researchers, lawyers, policy makers, representatives from academic institutions, industries, ILCs, and non-government organizations.

The training workshop aimed to build capacity in developing regulatory frameworks and mechanisms to effectively implement the Nagoya Protocol; increase understanding of the legal, institutional, administrative, scientific, and technological aspects of access and benefit sharing; and prepare ILCs in their participation in national ABS processes. The project availed of the expertise of resource persons from Japan and other developed country partner organizations and experts on recent ABS trends, developments, and best practices. The training workshop complemented the Building Capacity for Regionally Harmonized National Processes for Implementing CBD Provisions on Access to Genetic Resources and Sharing of Benefits Workshop by the regional ABS project funded by the United Nations Environment Programme-Global Environmental Facility.

Hosted by the Ministry of Natural Resources and Environment of Malaysia, the training workshop gathered 56 participants representing providers, regulators, and users of genetic resources from the ASEAN Member States and Timor Leste. Resource speakers included ABS experts from the Centre for Biodiversity Law of Malaysia, United Nations University-Institute for Advanced Studies, Environment Division of the ASEAN Secretariat, Forest Research Institute Malaysia (FRIM), Sarawak Biodiversity Centre, Third World Network, and Japan Bioindustry Association.

The training workshop enhanced the participants' understanding of the procedural aspects of ABS such as Prior Informed Consent (PIC), Mutually Agreed Terms (MAT), fair and equitable sharing of benefits, and other relevant issues. Discussions focused on the status of ratification of the Nagoya Protocol; developing national laws to implement the protocol; TK and national implementation challenges; preparation and assessment of national roadmaps; and the draft ASEAN ABS Framework. The workshop also provided a venue for participants to scrutinize ABS practices in some countries, including experiences on PIC and MAT and existing model instruments.

A visit to FRIM focused on an ABS arrangement to document TK of medicinal and aromatic plants of an indigenous community from Peninsular Malaysia.

The training workshop created a common understanding of ABS that will lead to stronger implementation of ABS in the region and greater protection for shared regional resources. There was also a greater understanding of what needs to be done to strengthen ABS, such as consultations with administrators regarding private land to clarify regulatory requirements for compliance with ABS regulations; identification of capacity building needs, public awareness activities, and updating current ABS regulations to comply with the Nagoya Protocol; clarifying processes for PIC and MAT; and integrating TK into the national system and the CBD ABS mechanism; among others.

Developing and implementing national ABS policies and relating them to regional and international ABS instruments is a complex but critical process. These will lead to stronger efforts to reduce global biodiversity loss, ensure that resources are managed sustainably, and benefits are shared by those that provide and use genetic material from biodiversity, particularly those that continue to nurture and enrich biological resources. □

BRUNEI DARUSSALAM

Brunei to review HoB initiative. Brunei Darussalam proposed a review of the Heart of Borneo (HoB) initiative to further reaffirm its members' commitment in developing practical programmes. The review will enable members to create the enabling conditions to realize inclusive and balanced development within the designated HoB area. The HoB initiative is a long-term initiative towards conserving and protecting the tropical rainforest in the heart of Borneo Island covering an area of about 220,000 sq. km. between Brunei Darussalam, Malaysia (Sabah and Sarawak) and Indonesia (Kalimantan). *Brunei Times*

Fisheries department targets 40 percent improvement of coral conditions. Brunei Darussalam has targeted a 40 percent improvement in the condition of its diverse coral reefs by 2018 through the Coral Conservation, Awareness, Rehabilitation and Enrichment (Coral CARE) Programme. The project of the Fisheries Department has set three strategic goals: to improve the overall condition of coral reefs, increase participation and awareness programmes, and increase the amount of fish output. The programme is targeted to reach a 49 percent live hard coral coverage and 40 percent of marine protected areas to promote proper management of the reefs, and will provide training for reef checks and coral propagation programmes. The project aims to strengthen fish output, currently valued at $2.3 million, to improve food security and sustainable development of fisheries. *The Brunei Times*

Green Brunei concludes Green Leaders Camp. Non-profit organization Green Brunei conducted the Green Leaders Camp at Hadfa Recreational Park in Rimba, which aimed to promote environment conservation. The five-day camp, which was supported by the Heart of Borneo Centre, the Ministry of Industry and Primary Resources (MIPR) as well as HSBC Brunei, saw more than 30 youth leaders participating in environmental talks, debates, discussions, field trips and volunteer work. Activities focused on waste management, renewable energy, biodiversity, and development of participants' knowledge and understanding of environmental issues and practices. *Brunei Times*

More forest rangers recruited to stop illegal logging. Illegal logging is still one of the major challenges in Brunei Darussalam despite recent cooperation in forestry management between Brunei and China. The Forestry Department has been working with other agencies and has reinforced forest rangers and forest patrols to deter the entry of illegal loggers and poachers. The department also works with other sectors to generate support for forest conservation activities including information and education campaigns to raise awareness on the importance of biodiversity and conservation as well as an ongoing tree planting campaign, which aims to plant trees in areas covering 15 percent of the country's total area of 5,765 square kilometers by 2020. *The Brunei Times*

CAMBODIA

Cambodia's choice: fish or electricity? Conservationists urged the government to postpone the construction of the Sambor and Stung Treng hydroelectric dams, which would be built in eastern Cambodia, 25 kilometers away from each other across the main channel of the Mekong. They would transform Cambodia from an electricity importer to an electricity exporter, but would also force the removal of about 30,000 people and block upstream and downstream fish migration. The construction of the dams is forcing Cambodia to choose between fish and cheap electricity. Energy consumption continues to increase in Cambodia as energy is a vital component for economic growth. Impacts from the dam are not seen in the short term, but scientists agreed that projected figures in 2030 show long-term negative impacts on sedimentation and water flow. There are 850 fish species in the Mekong, with 80 percent using the river for migration. *Khmer Times*

Cambodia-Asia Pacific Network co-finance partnership to benefit researchers in the region. The Ministry of Environment of Cambodia and the Asia-Pacific Network for Global Change Research (APN) entered into a co-finance partnership agreement to increase Cambodian researchers' access to financial resources and create opportunities for regional collaboration among members of the global change research community. Under the new partnership, the Ministry of Environment will provide co-funding for approved APN projects that are proposed by Cambodian researchers, which will strengthen research and capacity building to address global environmental change and help scientists and researchers address environmental issues in Cambodia. *Asia Pacific Network*

Researchers discover new species of wolf snake in Cambodia. A new species of wolf snake has been discovered in the forests of the Cardamom Mountains of southeast Cambodia. *Lycodon zoosvictoriae* is named after Zoos Victoria, a conservation group based in Parkville, Australia that has provided support to Fauna & Flora International (FFI), whose researchers — along with herpetologists from Zoological Research Museum Alexander Koenig in Germany — made the discovery. *Lycodon zoosvictoriae* is a cryptic species that is thought to be both arboreal and terrestrial. The species is characterized by long, large teeth in the front of their mouth, measures only 40 cm (16 inches), and likely hunts small lizards and frogs. The species is likely endemic to the Cardamoms, a range

that rises to more than 1,500 meters and houses some of the highest levels of biodiversity in the Indo-China region, which has suffered from large-scale forest loss. *Lycodon zoosvictoriae* is the second high profile snake discovery in the Cardamoms in the past two years, after the description of *Oligodon kampucheaensis,* the Cambodian kukri, in 2012. *Zootaxa*

Small-scale fish conservation area is a solution for fish security in the Tonle Sap Lake. As the largest lake in Southeast Asia, Cambodia's Tonle Sap directly supports the livelihoods of more than 1.2 million people. To ensure that the lake continues to contribute to national food security, an EU-supported project has been implemented by the International Union for Conservation of Nature (IUCN) in partnership with Fisheries Action Coalition Team (FACT) to help local fishers set up and manage small-scale fish conservation areas. The project collects information on project impacts and builds relationships and cooperation between the IUCN, FACT staff, and project beneficiaries. By describing changes in livelihoods and fishing, fishers provide insights that help understand the costs and benefits of the fish conservation areas. Monitoring results provide insights into challenges encountered by fishers, which help provide more realistic solutions to problems in managing the fish conservation areas.

IUCN Cambodia

INDONESIA

Elephant poaching soars as Sumatran forests turn into plantations. The Indonesian Elephant Conservation Forum (FKGI) stated there has been a spike in elephant deaths in Sumatra in 2014 mostly due to the conversion of rainforest to plantations. Twenty-two Sumatran elephants *(Elephas maximus sumatranus)* were poached in Riau in the first six months of 2014 compared to 14 for the entirety of 2013. Conversion of natural forest to industrial forest such as timber plantations has split open the ecosystem and provides hunters easy access to elephant areas. The Sumatran elephant is protected by Indonesia's Law No. 5/1990 on Sustainable Natural Resources and Ecosystem Conservation. Due to a rapidly diminishing population, in 2011 the IUCN changed the status of the subspecies from Vulnerable to Critically Endangered – just one rung above extinction. The ivory trade is thought to be the main motive of the elephant deaths as most carcasses were reported to be devoid of tusks. FKGI said that 18 out of 22 elephant corpses were discovered near Riau Andalan Pulp & Paper's concession area. FKGI called for industrial forest companies to play a more active role in protecting elephants roaming their concession by showing more responsibility, as well as pursuing poaching cases and determining the perpetrators and the motives behind the killings. The government should also enforce the law on the protection of elephants, prevent habitat fragmentation, and provide incentives and appreciation to companies and people who help save elephants. *mongabay.com*

Alarming rate of loss of Indonesian forests. According to a study published in the journal Nature Climate Change, the rate of deforestation of Indonesia was found to be twice as fast as Brazil's in 2012. The study examined satellite images from 2000 and 2012 and found that Indonesia lost 15.79 million hectares of forest cover during that period. As many as 38 percent, or 6.02 million hectares, were primary forest. The researchers also found that primary forest loss accelerated during the period under review, reaching an annual 840,000 hectares by 2012 compared with Brazil at 460,000 hectares in the same year. Causes of forest loss include the failure to implement a logging moratorium; expansion of palm plantations; forest clearance for mining, agriculture, infrastructure, and settlements; poor implementation of forest policies; and increasing demand from pulp and paper companies. Indonesian forests are among the most extensive in the world, and provide habitats for globally significant species and ecosystems, and play an important role in curbing environmental issues such as climate change. *Jakarta Globe*

Researchers find carnivorous rodent in Indonesia. Researchers have discovered a new carnivorous water rat on the island of Sulawesi that's so unique it represents an entirely new genus. It is believed many more rodent species await discovery in this relatively undisturbed part of Indonesia, but mining and other types of development may threaten vital habitat before the area is even surveyed. *Waiomys mamasae* is known by a single animal that was caught in a small stream in Western Sulawesi's mountainous interior. Local people use it as a talisman to protect their homes against fire. The researchers named the new species *Waiomys mamasae*

to honor the contributions of the Mamasan communities who helped bring the water rat to the attention of the scientific world, as well as protect its habitat. *Zootaxa*

Key problems in the preservation of Indonesia's coral reefs. The Peoples Coalition for Fishery Justice (Kiara) highlighted the three key issues of illegal fish catching equipment, coastal reclamations, and mining activities being encountered in the preservation of coral reefs. Kiara also pointed to the widespread use of trawlers and explosives, which played a significant role in the destruction of coral reefs. Illegal land reclamation is also rampant in coastal areas, occurring in 22 districts and may cause significant damage on the ecosystem. Illegal sand mining is also becoming a major conservation concern. Indonesia's coral reefs cover an area of 25,000 sq. km., which are about 50 to 60 percent of those found in Asia and the Pacific, or about 25 percent of the world's coral reefs. *Antara News*

LAO PDR

Lao PDR given a US$ 3.6 m grant to strengthen forest management. The Government of Lao PDR and the World Bank signed a grant agreement for US$ 3.6 million provided by the Forest Carbon Partnership Facility (FCPF), which aims to support the development of a national strategy for the reduction of deforestation and forest degradation. The grant will support the Ministry of Agriculture and Forestry Department of Forestry, the Ministry of Natural Resources and Environment, and other stakeholders to improve sustainable forest management. Since the Forest Carbon Partnership Facility Participants' Committee approved Lao PDR's Readiness Preparation Proposal in November 2010, the Government has been working on the institutional framework for implementing and piloting the Reduction of Emissions from Deforestation and forest Degradation activities. The grant will help Lao PDR become eligible to participate in and benefit from future incentive payment programmes to reduce greenhouse gases emissions in the forest sector. *Lao News Agency*

Lao PDR hosts 7th SEA-SRC meeting and young scientists training. Themed "Green Economy as related to the Energy Sector," a newly structured Asia Pacific Network (APN) Proposal Development Training Workshop (PDTW) was conducted in Lao PDR with 24 young scientists from APN member-countries in Southeast Asia. This is the first PDTW set in Lao PDR and was held back-to-back with the 7th Southeast Asia Sub-regional Committee meeting. The two activities were conducted in collaboration with the Ministry of Natural Resources and Environment of Lao PDR and the Low Carbon Asia Research Network. Aside from increasing the capacity of young scientists to submit proposals to the APN towards sustainable development in the Asia-Pacific region, the PDTW also creates opportunities for participants to network and establish relationships among peers promoting regional collaboration.

Asia Pacific Network

Government supports SEA for land use planning. Lao PDR is developing a decree and guidelines for strategic environmental assessments (SEA) in an effort to mainstream SEA in the country's development planning processes. Under the new decree, SEAs will be required for all provincial land use plans using a tested SEA methodology that builds on existing provincial land use planning approaches. The Asian Development Bank's Core Environment Program (CEP) will look at how SEA can be merged with an Integrated Spatial Planning (ISP) tool that is being piloted for land use planning in six provinces. ISP is a decision support tool used for mapping economic, social, and environment aspects of development plans. CEP will collaborate with the Ministry of Natural Resources and Environment (MoNRE) and its Environmental Management Support Programme, which will involve the review of policies and current practices regarding SEA, ISP, and provincial land use planning; develop tools for integrating SEA into provincial ISP and land use planning; and conduct SEA awareness raising and trainings for provincial land use planners and MoNRE staff. *ADB*

Lao PDR receives over $23.83 million in World Bank Group support for the environment. The Government of Lao PDR and the World Bank signed a $23.83 million financing agreement for the Protected Area and Wildlife Project. Specifically, the new financing commitment includes a US$12.5 million credit from the International Development Association (IDA), a US$4.5 million IDA grant, and a US$6.83 million grant from the Global Environment Facility (GEF). The project aims to strengthen management systems for national protected conservation areas and for enforcement of wildlife laws. The project will contribute to improving environmental and social outcomes by enhancing the quality of the environmental conservation management framework. The project forms a critical part of the World Bank Group's Country Partnership Strategy 2012-2016 with Lao PDR, which aims to improve sustainable natural resource management, inclusive development, public sector management, and competitiveness and connectivity, by supporting policies and institutional reforms. *The World Bank*

MALAYSIA

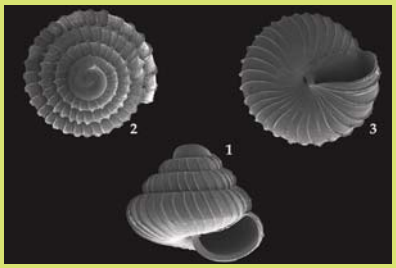
Vivid new frog species discovered in Malaysia. Scientists have identified a new species of frog on the Malay

Peninsula. Marked by yellow spots and orange stripes, *Hylarana centropeninsularis* was discovered in a peat swamp and genetic analyses revealed that it is evolutionarily distinct from its stream-dwelling cousins. The frog was originally found 10 years ago, but was unrecognized when the frog was misidentified due to striking similarities with another species *(Hylarana siberu)* living in Sumatra. Scientists suspected that the two species were different because of the distance between the two habitats. Genetic analysis confirmed that *Hylarana centropeninsularis* was a new species, although both frogs probably share a common ancestor because the Strait of Malacca, the stretch of ocean that separates the two species, was once a land bridge. *Centropeninsularis* refers to the frog's home, the center of Peninsular Malaysia and was named to raise awareness of the region's natural significance. *Herpetologica*

WWF-Malaysia signs agreement with Curtin Sarawak. World Wide Fund for Nature – Malaysia (WWF-Malaysia) signed a Memorandum of Understanding (MoU) with Curtin Sarawak Research Institute (CSRI), the multi-disciplinary research institute of Curtin University Sarawak Malaysia (Curtin Sarawak). The MoU opens the path for WWF-Malaysia and Curtin Sarawak to work together in promoting, developing and strengthening conservation, ecotourism and sustainable development efforts in Sarawak and the broader Borneo region. The two-year collaboration covers social and environmental science research within Borneo especially ecotourism-related projects and activities; nature conservation-related activities; knowledge transfer; staff training; collaborative efforts on grant proposals; media releases; letters of support; and funding support as feasible and appropriate when available. Joint research activities in various professional social science and environmental science fields will also be carried out. *WWF Malaysia*

Newly discovered snails at risk of extinction. A team of Dutch and Malaysian scientists has recently completed one part of a taxonomic revision of *Plectostoma,* a genus of tiny land snails in Southeast Asia. Unfortunately, these animals may be going extinct as fast as they are being discovered. The researchers proposed conservation statuses for all 31 species of Plectostoma and suggest that 10 of the 31 species are threatened, and one *(P. sciaphilum)* has already gone extinct. *Plectostoma sinyumensis* is listed by the IUCN as Near Threatened because one of the four limestone hills that this species inhabits is at risk of destruction from quarrying. In an effort to define the new species and honor those who have furthered conservation in Southeast Asia, the researchers derived many of the names of the new snails from well-known scientists and politicians. *Plectostoma kayiana* was named after Kay Arnold and Ian Mellsop, a couple who has devoted much of their careers to wildlife conservation around Lake Kenyir in eastern Malaysia, where the species was discovered. The scientists plan to continue describing species to better understand how these rare ecosystems function. The second part of this study will focus specifically on *Plectostoma* snails in Borneo, where many species have never before been surveyed.

Zookeys



Super-charged tropical trees: Borneo's productive trees vitally important for global carbon cycling. A team of scientists has found that the woody growth of forests in north Borneo is half as great again as in the most productive forests of north-west Amazonia, an average difference of 3.2

tons of wood per hectare per year. The new study, published in the Journal of Ecology, examined differences in above-ground wood production (one component of the total uptake of carbon by plants), which is critically important in the global cycling of carbon. Trees are taller for a given diameter in Southeast Asia compared with South America, meaning they gain more biomass per unit of diameter growth, and this in part explains the differences observed. The research team also discovered that trees in north Borneo belonging to the family *Dipterocarpaceae,* which grow to giant sizes, produced wood faster than neighboring trees of other families, or any trees in the Amazonian sites. The two regions were compared as they are climatically similar with no annual dry season, and each region has a range of soil conditions, meaning the primary difference between them is the different tree species that happen to exist in each region. With growing global datasets collected using standardized methods, further comparisons will be possible across the tropics to help elucidate the nature and causes of variation in plant biomass growth. Understanding variation in the capacity for forests to store and sequester carbon is vitally important for managing them best to keep carbon out of the atmosphere.

Centre for Ecology and Hydrology

MYANMAR

Myanmar holds Green Energy Summit 2014. The government of Myanmar recently conducted the Myanmar Green Energy Summit 2014, which gathered international green energy industry players and potential investors from all over the world. The summit provided a forum for the exchange of information and updates on market potential and development plan of the green energy sector in Myanmar; and discussed implications of new economic regulations for green energy sectors. Myanmar has abundant renewable energy potential from hydro, biomass, wind, and solar resources, with current commercial use confined to hydropower. According to the World Energy Council, in 2007 Myanmar had coal resources estimated at around 2 million tons. The hydropower potential of Myanmar's four main rivers is estimated at 100,000 megawatts, less than 10 percent of which has been harnessed. The Myanmar government is undertaking ventures to exploit these renewable energy resources, both as a basis for accelerated overall economic development and for direct social benefit to their residents. The government is broadening its strategic approaches to fully tap into the huge potential of the country's green energy sectors by inviting foreign technical expertise and foreign investment for participation in its hydropower, wind, and solar sectors; expanding the capacity of existing renewable energy plants; and implementing new green energy production projects.

Myanmar Green Energy Summit 2014

Myanmar's palm oil industry heads for a sustainable path. New research and discussions show there is hope to conserve Myanmar's unique biodiversity as its palm oil industry expands. A study by Fauna & Flora International (FFI) shows that most biodiversity-rich forests in Myanmar's Tanintharyi region are located inland along the Myanmar-Thai border, while most land suitable for palm oil cultivation is located along the coast, where forests are already too degraded to support threatened species. Myanmar's Tanintharyi region is one of the country's most important biodiversity areas with 2.5 million hectares of intact lowland rainforest that are home to globally threatened animals including tigers, leopards, elephants, tapirs, Malayan sun bears and Gurney's Pitta. Tanintharyi is also the only area with the right soil and climate conditions to grow oil palm in Myanmar. To date over 140,000 hectares of oil palm have been planted and 400,000 hectares allocated to over 40 local and three international companies. FFI and the Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI) brought together palm oil stakeholders in Yangon where they committed to set up a sustainable palm oil learning group as a next step towards creating a sustainable palm oil sector in the country. The learning group will explore the requirements and potential benefits of the Roundtable on Sustainable Palm Oil – an international sustainability standard – in Myanmar. FFI is working with government and

industry to ensure that plantation development doesn't happen at the expense of Myanmar's incredible biodiversity and rare species. These efforts are part of a wider ridge-to-reef conservation programme for the Tanintharyi landscape, implemented in collaboration with the Myanmar Forest Department and various collaborators, with support from the European Union, Helmsley Foundation, and Fondation Segré. The ridge-to-reef programme will establish two new protected areas for Myanmar (one terrestrial and one marine) while ensuring wider protection in Tanintharyi through community engagement, development of good practices for plantation development, and integrating biodiversity into planning processes.

phys.org

Deforestation prompts bees to nest in Yangon. Climate change and deforestation have prompted swarms of bees to nest in populated areas where there are more reliable food sources. The fire department has been called in to tackle the problem in Yangon, where Asian dwarf honey bees *(Apis florea)* have become increasingly common since 2013. They normally migrate from a high-rain area to a low-rain area but climate change and deforestation means there is less space in forests. So they've relocated to places near people's houses where they can find food. Since bees can grow to maturity in just 20 days, and up to 10 nests can be found in one location, they pose a particular threat in densely populated areas. *Myanmar Times*

Myanmar wakes up to climate change. Between 2008 and 2013, Myanmar suffered at least eight major natural calamities that killed more than 141,000 people and affected 3.2 million, with disastrous effects on the country's environment. Deforestation and other threats are also increasing pressures on Myanmar's pristine jungles. Myanmar has been vulnerable to increasing extreme weather events like many of its neighbors but the country's Disaster Risk Reduction Working Group stressed that the dangers have been amplified because the country has been slow to take remedial measures against changing climate patterns. In an extensive analysis of the nation's disaster preparedness levels, the group found that over 2.6 million people live in areas vulnerable to natural disasters ranging from cyclones in the south to earthquakes in the north. Since 2011, the government has been working to establish measures address challenges from changing climate patterns. In June 2013 the government unveiled the new Disaster Management Law and the National Natural Disaster Preparedness Working Committee under the President's Office. A new building code is being formulated to make sure the current building boom does not undermine standards and put more people at risk. On 1 April 2014 a total ban on exporting of unprocessed timber was put in place to control logging. Challenges remain however, including problems in coordination, and preparedness in rural areas, and these and other concerns have to be addressed to strengthen the country's disaster preparedness measures.

Inter Press Service News Agency

PHILIPPINES

Have scientists discovered a new primate in the Philippines? Scientists have discovered a population of tarsier on Dinagat Island and the very northeastern tip of Mindanao Island, which is genetically-distinct even from nearby relatives. Genetic tests are still needed to determine whether this is a new species. Prior to the discovery, scientists generally accepted three subspecies of Philippine tarsier: *Tarsius syrichta carbonarius* on Mindanao; *Tarsius syrichta syrichta* on the islands of Samar and Leyte; and *Tarsiu syrichta fraterculus* on Bohol. Upon analysis of mitochondrial and nuclear DNA, scientists uncovered three different evolutionary lineages. One lineage of tarsier makes their home on Bohol, Samar, and Leyte Islands; another has conquered the vast majority of Mindanao; while a long-cryptic branch has evolved in northeastern Mindanao and Dinagat Island. Scientists refer to the new discovery as the Dinagat-Caraga tarsier and while it is too early to claim a new species of primate, this is a real possibility with more research. Recognition of the species is important because of various threats to its habitat. According to the Global Forest Watch, from 2001-2013 Dinagat Island lost 1,357 hectares of forest and northeastern Mindanao Island lost 3,351 hectares, comprising nearly two percent of the tarsier's total range. Nine mine companies are also currently operating on the island. There are also no protected areas in the area. However, the Dinagat-Caraga tarsier

may have one lifeline: Siargao Island. Parts of Siargao Island are listed as a Protected Landscape and Seascape, potentially providing protection to the island's tarsiers. *PLoS ONE*

DA eyes Fisheries Law amendments to fulfill European Union standards. Facing a possible sanction from the European Union (EU) to its marine and aquatic products, the government is eyeing an amendment to the Philippine Fisheries Code of 1998. The European Commission recently announced the possibility of an import ban against the Philippines, notably on tuna, if it fails to curb illegal fishing. As a major exporter of fish and fish products to Europe, the Philippines stands to lose potential exports to the EU, which the Department of Agriculture (DA) estimates at €611.8 million, or an equivalent of a 12-percent increase over 2012 Philippine exports to the EU. Aside from amending Republic Act 8550 or the Fisheries Law, moves to strengthen fisheries include the evaluation of tariff reductions for EU exports; promotion and practice of sustainable fishing technologies; implementation of a closed season for sardine fishing during spawning periods; mapping of the country's vast marine and fishery resources to make more fishing sustainable; and strengthening campaigns against illegal fishing. *Business Mirror*

Reef monitoring system deployed in three pilot sites. The Department of Environment and Natural Resources (DENR) deployed state-of-the-art monitoring equipment to determine the overall health and changing status of reefs on three pilot sites to help improve the long-term protection of the country's coral reefs. Scuba divers from the DENR's Biodiversity Management Bureau (BMB) simultaneously installed one unit each of the autonomous reef monitoring system (ARMS) on underwater sites off Carabao Island in Cavite, Mactan Island in Cebu, and Snake Island in Palawan. ARMS is a device made up mostly polyvinyl chloride (PVC) material secured to coral reefs with metal weights that can mimic coral reefs and, over time, attracts or collects small reef animals referred to as cryptic reef biodiversity. These could provide a systematic and consistent method of monitoring marine life forms. They also provide data on climate change impacts such as ocean warming and acidification, or how marine ecosystems develop and maintain their resilience to these impacts. The ARMS will be used initially for educational purposes. The units will be left underwater and retrieved a year later, after which all organisms found on or within the unit will be extracted and analyzed by biologists. After retrieval, the ARMS will be redeployed for further studies. The BMB is also planning to increase the number of ARMS units in specific sites to provide additional data for research. *DENR*

Environmental protection a must as ASEAN heads for integration. Ahead of the World Economic Forum on East Asia (WEF-EA) in Manila, regional experts and groups stressed that environmental protection must be reconciled with the growth rate targets of the ASEAN economic integration, in 2015 and beyond. They proposed the development of the following measures: regional cooperation for the protection and conservation of the remaining forests and peat lands of the region; implementation tools to establish, monitor and undertake environmental impact assessments and strategic impact assessments to protect the environment from extractive and destructive business operations; harmonized policies phasing out coal, gas and oil so that renewable energies can compete with other energy sources; policy commitment and action plan to establish a network of marine reserves and an end to overfishing within ASEAN; clean production framework for industrial production; regional norms to ensure that investments in agriculture and energy do not undermine the food security, climate-resilience, livelihood and welfare of peoples and communities in the region; policies to support sustainable farming practices and agro-ecology; more progressive and united positioning of ASEAN in the United Nations Framework Convention on Climate Change negotiations; information and knowledge sharing and capacity-building on good adaptation and climate resilience-building policies, practices and programs; and regional policies aimed at concretizing a low carbon development path for ASEAN. The groups who signed the statement included Greenpeace Southeast Asia, Oxfam Grow, Asian Farmers Association, Asian Partnership for the Development of Human Resources in Rural Asia, Eastern Regional Organisation for Public Administration, Indonesia Legal Resource Center; and the Ateneo de Manila University School of Government. *Interaksyon*

SINGAPORE

New $63 million fund to boost productivity in farming. The government announced a new $63 million Agriculture Productivity Fund to help local farms boost yields and raise productivity. The fund will be divided into three schemes - basic farm capability upgrading, productivity enhancement for transformation, and research and development - and will be open for applications in October. In addition, all new farm sites tendered by the Agri-Food and Veterinary Authority and lease extensions for existing farmland will have to meet new requirements. This includes using at least 90 per cent of land for farm production and meet minimum production levels. This will also apply to non-food farms such as ornamental fish farms. *Straits Times*

Singapore gears up for climate change. Details on getting Singapore's roads, drains, airport and other infrastructure ready for climate change will be firmed up from 2016, as government agencies examine how

public infrastructure must adapt to higher temperatures, more intense rainfall, rise in sea levels, and stronger winds. The exercise will take place under a resilience framework that puts climate change risks and adaptation under sharper focus. It will take into account findings such as those of Singapore's second National Climate Change Study, which will project climate parameters in greater detail. The Ministry of the Environment and Water Resources (MEWR) said it had developed the framework to identify, assess and mitigate climate change risks in May. Southeast Asia is highly vulnerable and there is an urgent need to update the country's understanding of the climate system and its impact on future livelihoods and security. The government will have to address knowledge gaps for the region, particularly on the impact of climate change on the monsoon season; provide cost and benefit scenarios; explore business opportunities from climate change; as well as strengthen technologies in renewable energy to address energy demands.

Channel News Asia

Environmental events address urban sustainability. Three events, the World Cities Summit (WCS), the Singapore International Water Week (SIWW), and the CleanEnviro Summit (CESS) 2014, brought together over 20,000 participants in Singapore to share experiences and technological innovations, create partnerships and discuss innovative, integrated solutions for sustainable urbanization and water management. Participants at WCS 2014, with the theme, 'Livable and Sustainable Cities: Common Challenges, Shared Solutions,' discussed urban challenges, with the aim of identifying solutions applicable to cities spanning a range of development, socio-economic and political contexts. SIWW focused on delivering water from source to tap; effective and efficient wastewater management; water for livability and resilience; water quality and health; and water for industries. It also included a Young Water Leaders Summit. CESS focused on how cities can address waste management challenges, including through the water-waste-energy nexus. Participants shared innovations in waste management, clean management, environmental technology, and recycling solutions. *International Institute for Sustainable Development*

Economic interests causing 'environmental vandalism'. At the Forests Asia Summit in Jakarta, Vivian Balakrishnan, the Singaporean Minister for the Environment and Water Resources, spoke in direct terms about the causes and effects of deforestation in the region, urging greater transparency, stronger law enforcement and stricter penalties for activities related to deforestation. He called for a frank assessment and acceptance of the issues and challenges for biodiversity conservation in the region, so that governments and other stakeholders may contribute significantly environmental protection. He also emphasized that people have rights to jobs, to growth, to health, to security and to long-term safety; companies have responsibilities and are accountable for impacts local communities and the environment; there is a need for transparency and for government, NGOs and others to be more responsible players. Such changes are imperative of governments and people aim to leave a better world for the next generation. *Forests News*

THAILAND

Edible insects a boon to Thailand's farmers. Farmers in northeastern Thailand have added insect growing to farming activities to satisfy a domestic appetite for edible insects. In many farms, crickets are fed with chicken feed, pumpkins, and other vegetables before they are harvested and sold to people who are increasingly eager for a different type of dining experience. These enterprises have spawned a multimillion-dollar industry with more than 20,000 registered farms, mostly small-scale household operations, according to the U.N. Food and Agriculture Organization (FAO). Averaging an annual output of 7,500 tons in recent years, Thailand leads the world in producing edible insects. Besides generating extra income, insects have proven nutritious and farming them is easy on the environment. A 6-ounce serving of crickets has 60 percent less saturated fat and twice as much vitamin B-12 as the same amount of ground beef.

Farmers don't use antibiotics or growth hormones and — unlike crabs and lobsters — edible insects don't feed on dead animals. Insects are also kinder to the environment as it takes 2,900 gallons of water, 25 pounds of feed and extensive acreage to produce one pound of beef and just one gallon of water, two pounds of feed and a small cubicle to produce a pound of crickets. *Bangkok Times*

Thai Airways bans shark fin from cargo. Thai Airways has banned shark fin from its cargo flights as part of a growing global campaign against the popular delicacy in Asia. The carrier joins a host of other airlines in taking a stand against shark fin, highly prized by many in the region, where it is commonly served as a soup at wedding banquets and corporate parties. Booming demand for fins has put pressure on the world's shark populations, prompting calls for measures to restrict their trade. The move brings the carrier into line with a number of other Asian airlines including Philippine Airlines, Korean and Asiana airlines from South Korea, and Hong Kong's Cathay Pacific, which have all stopped shipping shark fin.

phys.org

Thai police launch operation to uproot environmental crime gangs. The Royal Thai Police's Natural Resources and Environmental Crime Suppression Division held a meeting to implement plans and strategies in combating environmental crime in the country. Invited to the conference were representatives from the Ministry of Interior, the Ministry of Natural Resources and Environment, three branches of the military, police officers from across the country and the private sector. The meeting aimed to strengthen Thailand's fight against illegal logging, encroachment and trafficking of plants and animals nationwide. The crackdown operation will be conducted for a month and the country has been color-coded into three zones - red, yellow and green - for monitoring the crimes nationwide. The red zones cover 20 northern provinces where illegal logging is widespread, especially black wood and teak wood logging, while encroachment mainly occurs in Northern and Eastern regions, and hunting wildlife is found in every province, including Bangkok's Chatuchak Market, where wild animals are sold. Prevention measures include raising public awareness and encouraging the public to get involved by reporting any related crimes to government hotline numbers.

Bangkok Post

Logging puts forest status under threat. The National Parks, Wildlife and Plant Conservation Department (DNP) is defending its record fighting illegal logging as the United Nations World Heritage Committee (WHC) threatens to remove the World Heritage Site status of the Dong Phayayen-Khao Yai Forest Complex. The International Union for the Conservation of Nature (IUCN) visited the forest complex in early 2014 and reported that illegal logging of the rare Siamese rosewood was destroying the site's outstanding universal value, since the forest complex is a habitat of rare trees found only in Southeast Asia. The IUCN invited representatives from China, Cambodia, Lao PDR, Viet Nam and Thailand to the 38th meeting of the WHC in Doha, Qatar in June 2014 and discussed solutions on how to protect the Siamese rosewood tree, as well as the status of the Dong Phayayen-Khao Yai Forest Complex.

Bangkok Post

VIET NAM

Viet Nam faces pressing need to save wild tigers. Viet Nam is one of the 13 countries that have tigers in the wild, yet it is facing an urgent challenge in protecting the species. A 2011 survey by the Institute of Ecology and Biological Resources showed that the number of wild tigers in Viet Nam fell sharply, with between 27 – 47 individuals, recorded mainly in the Muong Nhe Nature Reserve, and the Pu Mat, Vu Quang, Chu Mom Ray and Yok Don national parks, mainly due to poaching and illegal trading of tigers and their prey. The big cat's natural habitat is dwindling seriously due to forest clearance for agriculture, hydro-power plants, infrastructure, and mining. Natural forests in Viet Nam have reportedly shrunk from 43 percent in the late 20th century to 17 percent at present. Overlapping regulations, a shortage of strict punishments on tiger trading, laxity in domestic and international cooperation, and lack of long-term, large scale communication campaigns remained absent and have also hampered conservation efforts. To alter the situation, a national programme on tiger conservation from 2014 to 2022 was approved. There are also plans to monitor wild tigers and their prey, increase breeding activities, and use advanced technologies such as geographic information system and scanning radars for monitoring and research. The government will also strengthen efforts to clamp down on illegal trading of wild fauna and flora, improve personnel capacity, and encourage community engagement.

Vietnam Environment Administration

Viet Nam strives to eliminate persistent organic pollutants. Viet Nam will stop using all types of machinery and equipment containing polychlorinated biphenyl (PCB), one of the persistent organic pollutants (POPs), by 2020 and safely dispose the substance by 2028. The target has been set under a national plan aiming to realize the contents of the Stockholm Convention – a global treaty to protect human and the environment from the threats of POPs, to which Viet Nam is one of the first 14 signatory parties. In 2009, the Ministry of Natural Resources and Environment approved a PCB management project funded by the Global Environment Fund (GEF) via the World Bank. The project

is implemented nationwide from 2010 to 2014 with the GEF's non-refundable aid of US$7 million and the Vietnamese Government's corresponding capital of US$10 million. The project aims to complete a legal framework and raise public knowledge of the toxic chemicals to mitigate their risks at the lowest level. Viet Nam signed the Stockholm Convention in 2002, which targets the management and elimination of 23 dangerous groups of chemicals. Viet Nam did not produce PCB but imported electrical equipment using PCB in the past. From 1960 and 1990, the country purchased at least 27,000 tonnes of oil containing the substance. Globally, many countries have stopped producing PCB. However, a mere 4 percent of the substance has been decomposed, while 31 percent remains existent in the mainland and coast areas.

Vietnam Environment Administration

New flora, amphibian species found in Khanh Hoa. One flora and two amphibian species have been discovered in the central provinces of Khanh Hoa and Lam Dong, creating more demand for the protection of biodiversity around the provinces. Russian and Vietnamese scientists in Hanoi-based Viet Nam–Russia Tropical Centre have discovered *Miguelia cruenta,* a new orchid species, in Hon Ba Nature Reserve in Khanh Hoa. The orchid is a long plant and grows on rocks or tree trunks. The diameter of the plant's flower is 6–7 centimetres and can be found in evergreen forest, on mountain walls or granite rock cliff at a height of 1,500 metres above sea level. *M. cruenta* is the second orchid species found in the reserve in three years, and the scientists expect to find more new species at the site. At the nature reserve, the scientists have also found a new amphibian species, spotted toad *Kalophrynus honbaensis,* which is named after Hon Ba site. The toad populates in evergreen forests at a height of 1,500 metres above sea level. Each individual toad has an average body length of 26–36 millimetres and has a different complexion character compared to other toad species. In a trip to Central Highlands Province of Lam Dong, the scientists discovered another new toad species—the bamboo toad *Kalophrynus cryptophonus*—living in bamboo trees at a height of 800 metres above sea level. The toad has a body length of 23–30 millimetres, pointed mouth and prickle complexion around jaw. *Viet Nam News*

Medical opinion could help save rhinos. Traditional medicine practitioners can help save rhinos by emphasizing that rhino horn cannot cure cancer and offering alternative remedies, including various herbs. A recent consumer research commissioned as part of the WWF/TRAFFIC Global Campaign on Illegal Wildlife Trade highlighted belief in the medical properties of rhino horn as one of the underlying motivations for buying and using the illegal product. A total of 1004 rhinos were killed in 2013 and as of mid-April 2014, 277 had been killed in South Africa, according to South Africa's Department of Environmental Affairs. Consumption in Asian countries, including Viet Nam and China, has been identified as one of the main reasons for the escalating poaching numbers and the current crisis facing these animals. At a workshop organized by the Ministry of Health's Traditional Medicine Administration, TRAFFIC, and World Wide Fund for Nature - Viet Nam (WWF), participants received information on the reality of illegal trade, the current rhino poaching crisis, the historical use of rhino horn in traditional medicine, effective alternatives and Vietnamese laws covering rhino horn. The workshop provided a forum for discussion so practitioners and experts can agree upon a commitment to eliminate the use of products originating from rhino horn. *Vietnam News*

Asian Dowitcher
(Limnodromus semipalmatus)

The Asian Dowitcher is a rare medium-large wader. Adults have dark legs and a long straight dark bill. The body is brown on top and reddish underneath in breeding plumage. The tail has a black and white barred pattern. Its plumage is largely grey during winter.

It breeds in extensive freshwater wetlands in the steppe and forest steppe zones. Suitable habitats include lake shores, river deltas, flooded meadows and grassy bogs along rivers with short grass and sedge vegetation, and areas of bare mud. It is also found on the boggy shores of alkaline ponds, and has been observed in rice fields.

On the breeding grounds its diet consists of small fish, insect larvae and oligochaetes. During migration and in its wintering range, it feeds on polychaetes, insect larvae and molluscs.

This species is migratory but its movements are not well known. It breeds in small colonies of 6-20 pairs often with White-winged Terns, and although the timing and location of breeding varies considerably depending on water levels, most females lay between late-May and early-June. Birds arrive in the wintering grounds in September, returning usually in April, although some small groups remain in the wintering range during the boreal summer.

The Asian Dowitcher has been recorded as a non-breeding visitor to Japan, North Korea, South Korea, mainland China, Hong Kong, Taiwan, Kazakhstan, Uzbekistan, India, Bangladesh, Sri Lanka, Myanmar, Thailand, Viet Nam, Philippines, Malaysia, Singapore, Brunei Darussalam, Indonesia, Papua New Guinea, Australia, and New Zealand. The population size is estimated at 23,000 individuals. It is dependent on a rather small number of wetlands, notably the wintering sites at the Banyuas in Delta on Sumatra, where up to 13,000 were estimated in 1988, and Ujung Pangkah in east Java.

Reference:

BirdLife International (2014) Species factsheet: Limnodromus semipalmatus. Downloaded from http://www.birdlife.org on 10/08/2014. Recommended citation for factsheets for more than one species: BirdLife International (2014) IUCN Red List for birds.Downloaded from http://www.birdlife.org on 10/08/2014.

Bar-tailed Godwit
(Limosa lapponica)

The Bar-tailed Godwit is a distinctive wading bird with conspicuous blue-grey legs and a long, dark, slightly upturned bill with a pink base. The breeding and non-breeding plumages of the male Bar-tailed Godwit are noticeably different, changing from dull grey-brown in the winter to rich chestnut across the back and breast during the summer breeding season. The neck, breast and sides of the body are finely streaked with black and there is a dark brown and grey streaking on the back and wings. The breast returns to an off-white color once the breeding season is over, while the rest of the plumage becomes duller, with pale fringes to the back and wing feathers.

Bar-tailed Godwits nest in rolling tundra with hummocks and low shrubs. During migration and winter, they are found in tidal mudflats along the coast.

The Bar-tailed Godwit breeds between late May and August. The female Bar-tailed Godwit lays one clutch of around four eggs per year, which are olive-green in color, spotted with dark brown. The eggs are incubated for around 20 to 21 days. After the breeding season, the birds move to moulting sites before migrating to the wintering grounds between October and November.

On the breeding grounds, insects are the main diet, supplemented at times with seeds and berries. In coastal areas, Bar-tailed Godwits eat crustaceans, mollusks, worms, and other aquatic invertebrates.

The large range of the Bar-tailed Godwit extends across Europe, Asia, Africa and North America, as well as Australia and New Zealand. The extreme endurance of the Bar-tailed Godwit is illustrated in its seasonal migration, where it is known to perform the longest non-stop migration of any land bird. *L. l. baueri* has been known to fly 10,400 km from its breeding grounds in Alaska and eastern Siberia to its wintering grounds in New Zealand in around 175 hours, with an average speed of 63 kilometers per hour. This non-stop flight requires large fat reserves and the ability to shrink the internal organs to reduce weight while in flight. When post-breeding migration begins, each Bar-tailed Godwit is around twice its normal body weight.

References:

ARKive (http://www.arkive.org/bar-tailed-godwit/limosa-lapponica/)
BirdWeb (http://www.birdweb.org/birdweb/bird/bar-tailed_godwit)
New Zealand Birds Online (http://nzbirdsonline.org.nz/species/bar-tailed-godwit)

Far Eastern Curlew
(Numenius madagascariensis)

The Far Eastern Curlew measures around 63 cm and is the largest wader in New Zealand. It is greyish brown, and has a buff streaked body, and a very long down curved bill (19 cm).

Its diet on breeding grounds includes insects, such as larvae of beetles and flies, and amphipods. Berries are also consumed during the autumn migration. In non-breeding areas it feeds on marine invertebrates, preferentially taking crabs and small molluscs, but also feeding on other crustaceans and polychaete worms.

The species breeds on open mossy or transitional bogs, moss-lichen bogs, wet meadows, and swampy shores of small lakes. It is essentially coastal in the non-breeding season, and occurs in estuaries, mangrove swamps, saltmarshes, and intertidal flats, particularly those with extensive seagrass meadows. It often roosts in salt-marshes, behind mangroves, or on sandy beaches. This migratory wader nests from early May to late June, often in small colonies of 2-3 pairs, with an average clutch size of four eggs. It probably delays maturity longer than most shorebirds, perhaps not breeding until 3-4 years old.

Numenius madagascariensis breeds in eastern Russia to northeastern Mongolia. The Yellow Sea of North Korea, South Korea, and China is a particularly important stopover site in migration. It has been recorded as a passage migrant in Japan, Brunei Darussalam, Bangladesh, Thailand, Viet Nam, Philippines, Malaysia, and Singapore, with most birds wintering in Australia, China, Indonesia, Papua New Guinea, and New Zealand. The global population has recently been estimated at 38,000 individuals, including 28,000 in Australia in 2008.

This species is listed as Vulnerable as it is undergoing a rapid population decline. This is indicated by reduced numbers at stopover points in South Korea and Japan, and a significant decline in the number of non-breeding individuals wintering in northwest and southeastern Australia. The decline is suspected to have been primarily driven by habitat loss and deterioration. Threats are widespread and are projected to cause population declines in the future.

Reference:

BirdLife International (2014) Species factsheet: Numenius madagascariensis. Downloaded from http://www.birdlife.org on 10/08/2014.Recommended citation for factsheets for more than one species: BirdLife International (2014) IUCN Red List for birds.Downloaded from http://www.birdlife.org on 10/08/2014.

Terek Sandpiper
(Xenus cinereus)

The Terek Sandpiper is a medium-size (usually measuring 10 inches 25.5 cm) shorebird with a long, upturned, pale-based, dark bill. It has short orange-yellow legs with gray-brown upperparts contrasting with black scapular lines. In flight one can see the dark lead edge of wing in contrast with the white trailing edge of the inner wing.

Its main habitats are river meadows, marshes, vegetated banks of lakes, ponds, and streams, while in the winter it resides on mudflats and shallow estuaries. It generally roosts communally among mangroves or dead trees, often with related wader species. They break up into smaller flocks or even solitary birds when feeding in open intertidal mudflats.

The species is both a diurnal and nocturnal forager, but its nocturnal activities may be restricted to moonlit nights. On its breeding grounds the Terek Sandpiper feeds mainly on adult and larval midges *(Diptera)* as well as seeds. Its diet includes worms, crabs and other crustaceans, small shellfish and the adults and larvae of various flies, beetles and water-bugs. Feeding is undertaken by moving rapidly and erratically over soft, wet mud, pecking or probing at the surface.

The Terek Sandpiper breeds in central and eastern Eurasia. Breeding occurs between May and June, after which the adults depart in early-July and the juveniles depart mainly in August, and arrive in their wintering grounds between August and October. The return movement northward from Africa begins in late-March and continues throughout April.

This species is known to breed semi-colonially (as many as 10 nests have been found within a square kilometer), but is mainly solitary outside of the breeding season. Occasionally it occurs in small flocks of 5-25 individuals, or up to 300 at tidal roosting sites.

During winter it travels from the Persian Gulf, Southeast Asia, and Hainan south to South Africa, India, East Indies, New Guinea, and Australia. During migration the species may stop-over at inland freshwater wetlands, such as muddy lakes or river edges.

References:

Audobon (http://birds.audubon.org/birds/terek-sandpiper)

BirdLife International (2014) Species factsheet: Xenuscinereus.Downloaded from http://www.birdlife.org on 10/08/2014.Recommended citation for factsheets for more than one species: BirdLife International (2014) IUCN Red List for birds.Downloaded from http://www.birdlife.org on 10/08/2014.

NSW Environment and Heritage (http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10843)

Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets

United Nations Decade on Biodiversity

The Strategic Plan for Biodiversity 2011-2020 is a ten-year framework for action by all countries and stakeholders to save biodiversity and enhance its benefits for people.

The Strategic Plan is comprised of a shared vision, a mission, strategic goals and 20 ambitious yet achievable targets, collectively known as the Aichi Targets.

VISION: "By 2020, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people."

MISSION: "Take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human well-being, and poverty eradication. To ensure this, pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are effectively implemented, and decision-making is based on sound science and the precautionary approach."

THE AICHI BIODIVERSITY TARGETS

Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

1 PUBLIC AWARENESS
By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

2 MAINSTREAMING BIODIVERSITY VALUES
By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

3 ELIMINATION OF INCENTIVES HARMFUL TO BIODIVERSITY
By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

4 SUSTAINABLE PRODUCTION AND CONSUMPTION
By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use

5 HABITAT LOSS
By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

6 FISHERY RESOURCES
By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

7 AGRO-BIODIVERSITY
By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

8 POLLUTION
By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

9 INVASIVE ALIEN SPECIES
By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

10 CLIMATE CHANGE AND MARINE ECOSYSTEMS
By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Strategic Goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

11 PROTECTED AREAS
By 2020, at least 17 percent of terrestrial and inland water, and 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.

12 SPECIES EXTINCTION
By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

13 GENETIC EROSION OF AGROBIODIVERSITY
By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services

14 ECOSYSTEM SERVICES
By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local com munities, and the poor and vulnerable.

15 ECOSYSTEM RESTORATION AND CARBON STOCKS
By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 percent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

16 ACCESS AND BENEFIT SHARING
By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building

17 NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS
By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

18 TRADITIONAL KNOWLEDGE
By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

19 SCIENCE-BASED KNOWLEDGE
By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

20 RESOURCE MOBILIZATION
By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.

Convention on Biological Diversity

ASEAN CENTRE FOR BIODIVERSITY

For more information, visit:

http://www.cbd.int
http://www.aseanbiodiversity.org
http://chm.aseanbiodiversity.org