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Clearing-House
Mechanisms

Using maps
to communicate
biodiversity



Mobile apps as tools
for biodiversity
information
management

4th AHP Conference:
promoting efficient
parks management

**Facilitating biodiversity
information management and
sharing in the ASEAN region**



The ASEAN Centre for Biodiversity

The ASEAN Centre for Biodiversity (ACB) is ASEAN's response to the challenge of biodiversity loss. It is an intergovernmental regional centre of excellence that facilitates cooperation and coordination among the ten ASEAN Member States and with relevant national governments and regional and international organizations on the conservation and sustainable use of biological diversity, as well as the fair and equitable sharing of benefits arising from the use of such national treasures.



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ACB's core strategic goals

- Serve as an effective coordinative body to facilitate discussion and resolution of cross-country biodiversity conservation issues
- Provide a framework and mechanism for sharing information, experiences, best practices and lessons learned for efficient access of ASEAN Member States
- Implement a pro-active approach in monitoring and assessing biodiversity conservation status as a strategic approach towards identifying critical issues and future trends
- Deliver/facilitate conduct of capacity-building services and technology transfer through engaging relevant and appropriate expertise
- Enhance common understanding of biodiversity conservation issues, strengthening ASEAN regional positions in negotiations and in compliance with relevant multilateral environmental agreements
- Promote public and leadership awareness to develop champions and enhance support at different stakeholder levels on biodiversity concerns
- Undertake innovative resource generation and mobilization measures to pursue impact activities that will enhance biodiversity conservation in the region

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About the cover. There is a need to bridge the data and information gaps on biodiversity. One key step toward achieving this is the recognition of the importance of data sharing. ACB is employing innovative means to bridge biodiversity information gaps. Featured on the cover are mobile apps - innovative and easy-to-use tools for biodiversity information management.

Photo by Pamela Q. Reblora

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Chew Ping Ting has been working with the National Parks Board since graduating from the National University of Singapore. She started as a Research Officer in the Nature Conservation Branch (NCB) with the Nature Reserves Survey Project (1992-1997), followed by other biological surveys and fieldworks in nature areas throughout Singapore. She had also represented Singapore in ASEAN Regional Centre for Biodiversity Conservation and ASEAN meetings and workshops in the past while with NCB. Presently, she is a Senior Manager for Conservation in the Central Nature Reserve Branch where she assesses and monitors research projects and botanical collection requests carried out within the central nature reserves. Her main interest is in the native tree flora and forest vegetation ecology of the nature reserves and nature areas in Singapore.



Jeanne Tan works as a senior manager at the Central Nature Reserve. She started out in the Outreach section as a Senior Outreach Officer with the Sungei Buloh Wetland Reserve, where she worked with students, corporate groups and the public community through different nature programmes. She was also editor of "Wetlands" newsletter for two years at Sungei Buloh Wetland Reserve. Jeanne joined the Central Nature Reserve later to continue bringing an appreciation and awareness of natural heritage out to the community.



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Facilitating data sharing in the ASEAN Region

By Dr. Sheila G. Vergara

Biodiversity Information Management (BIM) is quite a mouthful and at times, intimidating. However, a broader view can give one the realization of the importance of having a BIM facility in place. What biodiversity is available? Are there any left? Where are they? How is biodiversity changing? What threatens biodiversity? Can I have these data and information accessible through my phone? There are just some of the few questions that may be answered by BIM.

Dissecting BIM

As its name denotes, BIM is a system or a group of systems that enable the management of data related to biodiversity. These data may consist of common and scientific names of living things, where they are found, when they were discovered, their threat status if any, and where data is available, the circumstances where they best sur-

vive, such as temperature and habitat type. This information can be put together in several ways and it is amazing to later find out how many species can be common among several countries, how many species are threatened in each country or across a region such as the ASEAN, and how some species can be concentrated in a few localities.

Having more information therefore can tell more stories about biodiversity. Information on recently discovered species in a country can inform about new discoveries or introductions of species from elsewhere. It is important to know the whereabouts of these recent discoveries as some species may have been brought in from other areas and may prove non-beneficial or competitive to native species.

In the opposite manner, globally changing environmental circumstances or human vectors may cause some species from the region to move to areas where they may disrupt local species interactions, modify the environment, or cause the extirpation of native species. The ASEAN Centre for Biodiversity (ACB) presents helpful information about invasive alien species on

its Clearing-House Mechanism (CHM): <http://chm.aseanbiodiversity.org>. Even the list of potentially invasive alien species can be viewed in the same CHM to allow stakeholders to come up with pro-active steps on this biodiversity concern.

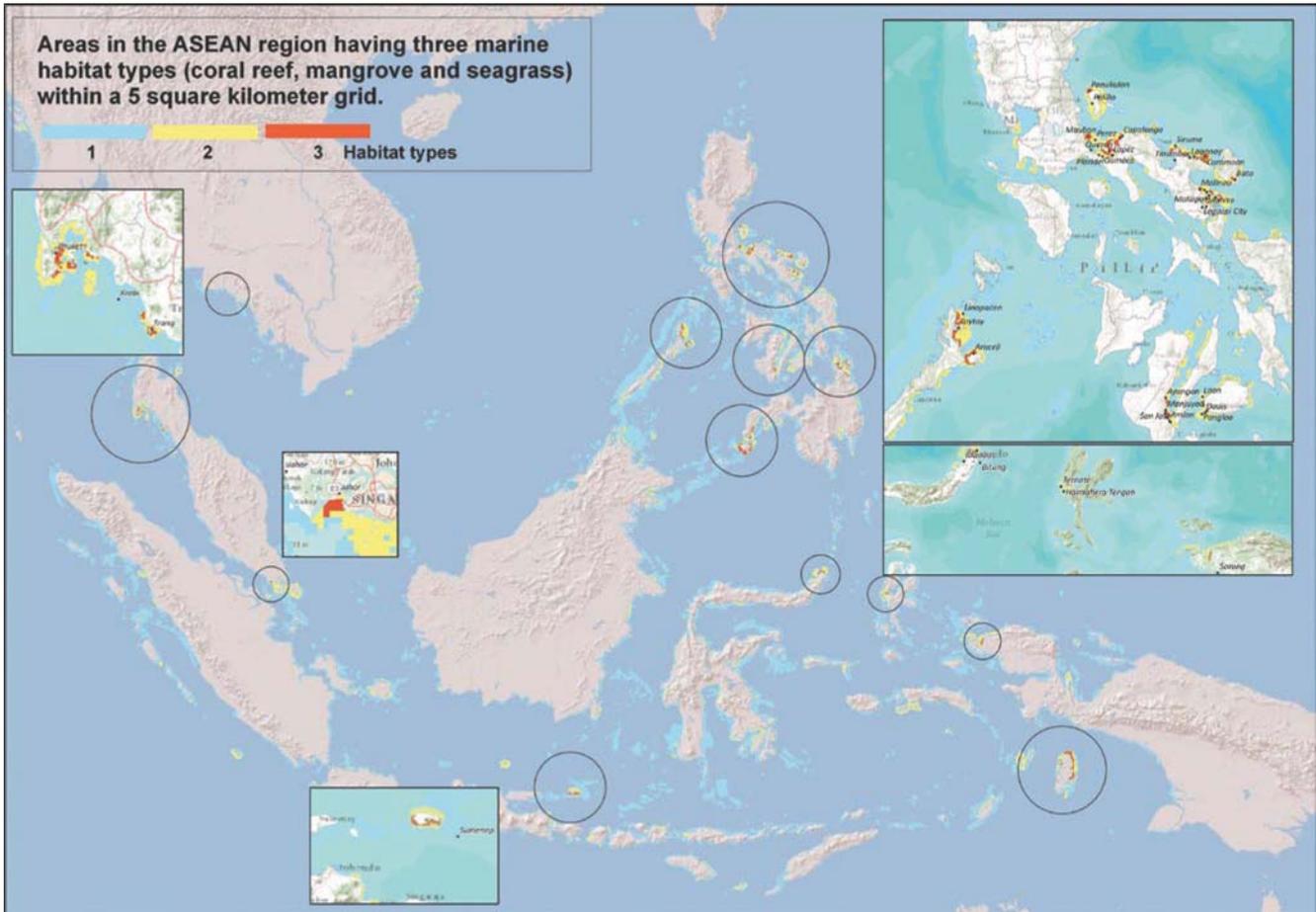
Increasing the number of species listed incrementally will provide a real time idea how diverse the biodiversity of a country is. Extremely biodiverse countries, especially those in tropical regions, may make it to the list of *megadiverse countries* defined by Conservation International as countries that harbor the majority of the earth's species.

Using biodiversity maps

Biodiversity information can also be presented through maps. Such visual representations can inform environment managers and policy makers where it

Increasing the number of species listed incrementally will provide a real time idea how diverse the biodiversity of a country is. Extremely biodiverse countries, especially those in tropical regions, may make it to the list of *megadiverse countries*.





will be ecologically feasible and most cost effective to conserve biodiversity and at the same time provide a repository of natural resources such as plants and plant parts to provide for local livelihoods, traditional medicine, materials for housing, food preparation, as well as places for worship.

ACB maps on different information can be put together to produce yet another set of information. Temperature regimes painted on a map placed over information on the distribution of hard corals in the region show where corals are most likely vulnerable to extreme temperatures.

Unsworth, et al (2008), found out that there are more fish on adjoining set of coastal habitats such as seagrasses in affinity with mangroves as opposed to more distant circumstanc-





es. BIM can take such information and develop a regional picture and locate where mangroves, sea-grasses, and coral reefs occur together to inform marine conservation prospects.

The value of the BIM team is in its ability to develop and showcase knowledge products and tools to bring about a better understanding of biodiversity and the responsibility to conserve natural resources. The e-library contains over 10,700 references, all related to biodiversity and is available for download as an E-Lib Mobile App on your Android Phone: enable downloads from 'Unknown Sources' which can be facilitated through the mobile's Application Settings, then, download the E-Lib App from <http://chm.aseanbiodiversity.org/templates/regionalchm/apps/E-Lib.apk> while using your mobile's web browser. Upon downloading, you have to locate the .apk file and install it manually.

From the collection of species and protected areas information and based on information found in the e-library, ACB produced videos on the marine and coastal environment, on threatened species, and an overview on how the ASEAN is faring. These knowledge products help in promoting the vari-



ous concerns on biodiversity to relevant stakeholders.

ACB is committed to improve capacity of ASEAN Member States to develop, populate and maintain their own CHMs. A CHM for biodiversity is a website that provides information to better contribute to the implementation of the Strategic Plan for Biodiversity 2011-2020 and the achievement of the Aichi Biodiversity Targets. The CHM is maintained by a team composed of the CHM focal point, the CHM manager, other technical team members and a stakeholder constituency to provide ideas on the CHM site development

and subsequently contribute to data to populate the databases of the CHM.

ACB's BIM team

The BIM team of ACB, composed of programmers and research and knowledge management personnel, are equipped to assist the preparation of national CHMs, specifically, support the development of CHM websites, facilitate CHM stakeholder discussions, and aid the preprocessing of species and protected areas information into common database formats and train encoders. In addition, they can provide orientation sessions on simple mapping processes

and assist in preparing draft national reports.

The advocacy of Biodiversity Information Management in the ASEAN region is for all ASEAN Member States to establish their CHMs, develop their biodiversity databases, populate them, and share the information to enable a regional analysis useful for conservation focus, alignment of national policies, and trans-boundary conservation arrangements. Effective data sharing, after all, serves as one of the pre-requisites of sustainably managing the region's rich yet threatened biodiversity. ■

Clearing things out: Clearing-House Mechanisms and their relevance to ASEAN Member States

By Karen Lapitan

Open your web browser, search for information using biodiversity-related keywords, and copy-paste the information provided by search engines.

Technology today has made things easier, especially for those who need instant results. The downside, however, is that you might end up in trouble when you happen to get information from unverified or outdated sources. This also applies to biodiversity-related researches. Getting information from online sources – no matter how credible they seem – is often not a guarantee of their accuracy.

For policymakers, researchers, and other stakeholders, biodiversity conservation starts with getting the right and comprehensive biodiversity data and information. It is within this context that ASEAN Member States are encouraged by the Convention on Biological Diversity (CBD) to establish their respective Clearing-House Mechanisms (CHMs).

CHMs play a crucial role in communicating accurate information to national biodiversity stakeholders, most importantly to policy- and decision-makers. CHMs are a perfect tool that ASEAN Member States can use in sharing data. Essentially, CHMs can help ASEAN Member States to comply with existing reporting requirements to the CBD and other multilateral environmental agreements.

A closer look at CHMs

According to the Secretariat of the CBD, “clearing-house” used to be a financial term that denotes a financial establishment where bills and checks are exchanged among member banks. In the recent decades, the meaning has evolved and broadened. It may now be used to refer to any agency that brings together both seekers and providers of services, goods or information.

In the context of the CBD, CHM serves as a platform where seekers and providers of biodiversity-related information meet. Parties to the CBD understand that knowledge and information sharing is crucial for governments and relevant stakeholders to fulfill their duties in line with biodiversity conservation.

“The clearing-house is based on the philosophy that broad participation and easy access must be a top priority. Its database can therefore be tapped through both traditional and electronic means of communication,” as explained by the Secretariat of the CBD.

Dr. Sheila G. Vergara, director for biodiversity information management of the ASEAN Centre for Biodiversity (ACB), said “the urgency of saving biodiversity in the ASEAN region calls for systematic and comprehensive tools on data sharing, which are crucial in crafting and implementing biodiversity conservation plans.” She added that without a platform such as the CHM, it would be hard to spot gaps that need attention and identify actions that should be done.

Data sharing efforts of ASEAN Member States

As Parties to the CBD, the ASEAN Member States are encouraged to establish their national CHMs to serve as

tools in sharing knowledge and facilitating cooperation on biodiversity conservation within the region.

With majority of the ASEAN Member States having their respective national CHMs, getting verified data is easier, which could make biodiversity management more efficient. ACB has been promoting the use of CHM as a tool to facilitate the exchange of biodiversity information. This tool can also help ASEAN Member States to implement their biodiversity strategies. Through a series of workshops, ACB has been working closely with ASEAN Member States recognizing the key role of information sharing in meeting each country’s obligations to CBD.

Brunei Darussalam constantly exerts efforts in improving its CHM. In October 2013, the Government of Brunei Darussalam and ACB conducted the Third Training Programme on CHM Maintenance and Data Management. The course, which was part of ACB’s capacity building support to Brunei Darussalam in the area of biodiversity information management, focused on web administration and management and data organization. The event serves as follow-up to two previously held biodiversity information management training courses, which resulted in the establishment of the Brunei Darussalam national CHM website: <http://www.bruneichm.gov.bn>.

The third training course aims to strengthen capacities of CHM staff and CHM stakeholders network of Brunei Darussalam to maintain and enhance their CHM website, as well as comply with reporting requirements of the Convention on Biological Diversity. Staff of ACB’s Biodiversity and Information Management Unit, led by its director, Dr. Sheila Vergara, will serve as resource persons. The first three days of the training course focuses on data organization and CHM enhancement and maintenance while a national CHM Steering Committee meeting will be held on the fourth day. On the fifth day, a more in-depth training on website maintenance will be conducted for the CHM core staff.

For Indonesia, its biodiversity CHM is managed by the Ministry of Environment that is tasked to ensure completeness of data sources and information through a designated Secretariat. The CHM serves as a platform where scientific and research institutes, biodiversity experts, and govern-

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ment agencies and non-government organizations access a database of biodiversity.

With the primary goal to strengthen capacity in biodiversity information exchange and transfer, Lao PDR also maintains its national CHM. In its website, it says the CHM will help facilitate the use of data and information around the world as well as promote scientific cooperation. The Lao PDR CHM also publishes relevant biodiversity news that stakeholders might find useful.

Malaysia's Biological Diversity Clearing-House Mechanism (MyCHM) website, an interactive database, can now be accessed through www.chm.frim.gov.my. The CHM houses more than 10,000 data with 3,000 photo-illustrated species.

Myanmar is still working on its CHM and has previously sought assistance from ACB. A website that will house the CHM is being improved as of this writing.

The Philippine CHM provides information on CBD and figures on local biodiversity. It runs through an information technology-based network dubbed as BIOWEB.PH that was established through the efforts of the Philippine Government and other biodiversity partners formalized through a Memorandum of Agreement.

For Singapore, the National Biodiversity Centre (NBC) serves as the CHM focal point. NBC handles all of the available information data on biodiversity within Singapore. These information and data are provided and updated by various organizations and individuals who coordinate with NBC. On its website, NBC stated, "having such a hub of biodiversity information and data at NBC will also allow knowledge gaps to be better identified and addressed."

Thailand's CHM offers an overview of the following: agricultural biodiversity, dry and sub-humid lands biodiversity, forest biodiversity, mountain biodiversity, marine and coast-

Learning from the Malaysian Biodiversity Clearing-House Mechanism

By Aslina Baharum



al biodiversity, and island biodiversity. Aside from providing statistics on biodiversity, the CHM also presents existing relevant legislative efforts in the country.

Collective steps for biodiversity information management and sharing

ACB is continuously working to engage the ten ASEAN Member States in data and information sharing on biodiversity. Through a series of capacity building initiatives on data sharing, ACB is helping each ASEAN Member State realize the importance of CHMs and their role in sustainably managing the region's rich yet threatened biodiversity.

As the landscape of information technology continues to improve, each ASEAN Member State faces the challenge of harmonizing biodiversity-related information to facilitate biodiversity conservation efforts in the regional and national scale. Establishing CHMs and harmonizing biodiversity information management and sharing can help each country to meet various global and regional commitments on various multilateral environmental agreements. In the long run, the joint efforts being conducted in the ASEAN region and other countries would contribute to the sustainable use of biological resources and management of the diverse world we live in. ■

In recent years, much interest and attention has been given to the valuation of biological diversity. The convenience of finding information through the Internet has largely motivated many in this subject. Effective biodiversity database resources allocated to the conservation of biodiversity profoundly influence the planning methods and conservation strategies of governmental and non-governmental organizations alike. A critical need that is becoming increasingly vital is a successful biodiversity database management programme. Moreover, there is an urgent need for strategic and proactive approaches to complement the costly and often reactive measures of certain approaches once species and systems become threatened or endangered.

Problems in system development

When developing a system, there are often many issues to be solved, some of which might distract focus from the particular problem. In the national Clearing-House Mechanism (CHM), development of a system that encompasses biological diversity conservation and sustainable management goals is important for effective biodiversity and conservation management plans. The CHM mission seeks to promote and facilitate technical and scientific cooperation in order to integrate information on biodiversity, and to develop capacity building in the technological network. The national CHM can play a vital role in helping to communicate the requirements to national stakeholders and decision-makers.



Being aware of these problems is a vital part of the solution process. In order to prevent larger problems, identifying these common problems in system development should be carried out at the start of the development. If these problems are ignored and allowed to become chronic, they will reverberate across all system developments, resulting in a sudden and often unexpected failure.

Realizing the importance of CHMs in attaining sustainable management goals focused on biodiversity conservation, the Government of Malaysia has taken steps to make data sharing more efficient in the national scale.

Malaysia's Clearing-House Mechanism

Under the Convention on Biological Diversity (CBD), CHM was conceived as a practical tool for translating the principles of Agenda 21 into reality. The CBD recognizes that biological diversity is about more than merely plants, animals and micro organisms and their ecosystems. It also concerns people and our need for, specifically, food security, medicines, fresh air and water, shelter, and a clean and healthy environment where one could live.

The objectives of the CBD include the conservation of

biological diversity; the sustainable use of its components; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources (including by appropriate access to genetic resources and by appropriate transfer of relevant technologies) and taking into account all rights over those resources and technologies, as well as by appropriate funding.

As signatories to the CBD, the ten ASEAN Member States, including Malaysia, are encouraged to take steps towards establishing strong and sustainable national CHMs as dedicated platform to share knowledge and facilitate scientific and technical cooperation on biodiversity conservation.

Malaysia is a country with a history rich in biological diversity research. Research that was originally instituted by the colonial authorities has been continued until today and has generated a large amount of data. The information and data were collected individually and in detail in various formats (including written or printed, hardcopy or digital, drawings and photographs), which can also exist in hardcopy or digital format. Alteration of data from multiple sources, formats and media is a complex activity and will take a long time if not maintained



and monitored closely.

As a signatory to the CBD, Malaysia is obligated to make its biological diversity information available publicly via its Malaysian Biological Diversity Clearing-House Mechanism (MyCHM) website.

Research is currently on-going for several of the flora and many of the fauna groups. In addition, development work is being undertaken for some families where data has been gathered over a period of many decades. The collection and curation of biological diversity information is the prerogative of institutions, research groups or individuals. While this method is deemed efficient in the use of resources and skills, this makes the data fragmented and difficult to access. In order to overcome this weakness, a comprehensive database has been developed to facilitate the collation, curation and accessibility of biodiversity data in Malaysia.

The objectives of the project are to develop an interactive, web-based database application concerning the biodiversity of Malaysia so as to promote the protection and conservation, as well as sustainable and wise use of indigenous biodiversity in Malaysia. Applications developed so far feature an intelligent search engine, dy-

namic management of database content and user management, as well as tracking with spatial data information. The website and interactive database for the biodiversity of Malaysia is now available at www.chm.frim.gov.my. Currently, MyCHM houses more than 10,000 data, including 3,000 photo-illustrated species with more than 10,000 photos in archived photographs, 138 online newsletters, and more than 200,000 visitors from countries worldwide.

The Forest Research Institute Malaysia (FRIM) has been directed by the Ministry of Natural Resources and Environment (NRE) to develop the national CHM for Malaysia. In doing so, FRIM will be working in close collaboration with most of the Malaysian governmental and non-governmental organizations, all of which play a role in the conservation and sustainable management of Malaysia's biological diversity.

MyCHM will facilitate information exchange and promote international technical and scientific cooperation. It will function as a mechanism for the efficient transfer and sharing of information on biological diversity, both in Malaysia, as well as internationally. Finally, it will serve as a one-stop portal for the sharing of relevant



information on the status of conservation and biodiversity management using the World Wide Web.

Challenges in MyCHM's system development

In 2001, initial efforts were made to establish a national CHM website for Malaysia. The resulting website was limited in scope due to poor funding and limited experience and expertise of the personnel in charge.

By 2005, the site was essentially non-functional as changes in government ministries, agencies and departments had rendered many of the links obsolete. This effort represented Malaysia's second attempt to make the country's biodiversity information available to the public, both on a national level as well as internationally. More importantly, a more reasonable level of funding with long-term planning and objectives has helped to ensure that the site remains up-to-date and relevant as a resource.

In 2006, under the RMK9 (2006-2010) funding, the project started again with an approved budget for five years. Hiring additional staff and purchasing of software and hardware were done right away to ensure better performance of web servers. Scheduled meetings with stakeholders, such as uni-

versities, government agencies and relevant NGOs, were held to discuss data collaborations and formats. Meetings with the database consultants (vendors) on database development were held including Content Management System (CMS) and spatial data management. These continued with regular updating of the contents of MyCHM webpage.

The technology employed for the first development, MySQL Server 2005, had been used with Dreamweaver for website management. System development was advanced using hardcode from scratch with the ideas provided. This hardcode system became unstable and required more time for databasing, which increasingly expanded. Then, with the extension funding, MyCHM used a customized and licensed software programme called the Kentico system, which was based on the project's requirements. This suits the biodiversity database because it includes such areas as the custom fields.

The website became fully functional in 2010, and the databases kept on growing. With the continuity of funding from NRE for RMK10, the project now continues with the enhancement of a back-end system display as well as additional features.

This website can be a useful reference not only for researchers, scientists and botanists, but also for students, universities, policy-makers, the management and business community, and the public. The main purpose of MyCHM for the CBD is to bring together seekers and providers of goods, services or information, thus matching demand with supply. This successful comprehensive biodiversity database of MyCHM has been driven by following the correct system development process that was mentioned before.

MyCHMi-newsletter

In December 2012, MyCHM launched the mobile application called MyCHMi-Newsletter funded by NRE. This application is the first iBook on biodiversity in Malaysia. This new innovative application will make biodiversity more palatable to the public by having a very easy-to-use interface as well as scientific information made simple. The electronic newsletter is expected to create an awareness and appreciation of Malaysia's rich biodiversity. This application is available for free download from the Apple iBookStore, Android application (Google Play) or through the MyCHM website at www.chm.frim.gov.my.

MyCHMi-Newsletter is an iBook that includes uploads of, namely, interactive animations, built-in videos, slide shows, and images illustrating the plant profiles of each of the species.

Opportunities in MyCHM

As a system of information exchange, MyCHM combines and collates information from a variety of different sources, thereby providing easy access to policy position documents, databases and a wide variety of web-based informa-

tion types as provided by the various national and international stakeholders.

A database environment has been developed that now houses checklists of three main databases for Flora (algae and vascular plants), Fauna and Fungi. The Fauna database consists of Malaysian mammals, reptiles, amphibians, birds, freshwater crabs, marine and freshwater fish, beetles, ants, butterflies, bats and FRIM's entomology type collection catalogue. The database also houses interactive Malaysian protected areas, a list of resource individuals for specific flora or fauna groups, biodiversity and biodiversity information managers, as well as biodiversity collections in Malaysia. An intelligent search engine permits rapid searches and swift acquisition of data reports. The content management system allows resource individuals to update and edit data regularly.

At present, more than 70 web pages of information are accessible through this portal. MyCHM plans to continually add and refine the information and databases accessible through this portal. It also aims to improve the functionality and user-friendliness of the portal through the use of search tools and a newsletter.

The establishment of MyCHM will function as a mechanism for the efficient exchange and sharing of information on biological diversity in Malaysia as well as internationally. It will serve as a one-stop repository for all biodiversity-related information in Malaysia. MyCHM also aims to promote its use as a policy planning and decision-making tool for biodiversity conservation. In addition, a build-up of user-friendly content management system can always ensure that data are frequently updated and current. ■



Using maps to communicate biodiversity trends

By Jerome Alano

When going to unfamiliar places, we often find ourselves consulting a traditional map or checking out the built-in Global Positioning System (GPS) of mobile phones. Maps bring much help for those who need directions. And believe or not, maps also have a great role in biodiversity conservation.

One of the apparent challenges in monitoring the status of biodiversity is keeping updated information available for evaluation and analyses. Currently, there are huge data gaps that hamper the process of conducting regional analyses. Many national institutions across the ASEAN region lack the resources and capacity to do their own biodiversity assessment in time. This is where maps have a role to play as they can help in doing timely biodiversity inventory and assessment.

Biodiversity maps in the ASEAN region

To address the challenge of existing data gaps in the region, the ASEAN Centre for Biodiversity's (ACB) Biodiversity Information Management (BIM) team conducts capacity-building workshops that aim to expand the existing skill and capacity of ASEAN Member States to do timely biodiversity inventory and assessment. One of these training programme teaches the ASEAN Member States how to map their data.

Maps help visualize the available data and identify where the gaps occur. It is also a very flexible tool that can be used in a wide range of analyses across many thematic layers or categorical data. But

these analytical processes will not happen when you don't have anything to map about. Thus, as part of the Clearing-House Mechanism (CHM) training, ACB teaches its participants how to map, which tackle species and wildlife trafficking incidents, and other relevant concerns through their mobile phones. The Centre also shares some freely downloadable mobile applications and free online mapping platforms that ASEAN Member States can use in monitoring biodiversity data.

GPS: a handy biodiversity tracking tool

Many biodiversity researchers such as foresters, botanists, wildlife scientists, and others have been used to having handheld GPS with brands such

as Garmin, Magellan, and Trimble. They often procure these to be able to do field surveys. And these gadgets are more expensive than regular mobile phones. More often than not, organizations only keep a few of these gadgets.

Some are not aware that even mobile phones, which are more affordable and accessible, are also equipped with GPS receivers and use the same GPS technology present in expensive dedicated GPS hardware. And these mobile phones with their "internal GPS" need to evolve from their "call, text, and internet" functions to a more scientifically productive role. All it takes is a quick download of GPS apps, and a little knowledge about GPS and users will be up and running collecting GPS data such as spe-

cies occurrence and points of interests.

Sharing data online

In one of the trainings conducted by BIM on GPS and mapping, many of the participants were excitedly surprised about learning the extra "high-tech" function on their phone. But what made them more excited is that they can actually make an online map similar to those made by National Geographic, and plot the very points they have collected so that they can show them to anybody without having to learn GIS or use complicated mapping programmes.

Many online mapping platforms are available for free. All you have to do is sign up for the free online service, upload your GPS collection and your mate-



Mobile apps as tools for biodiversity information management

By Pauline Carmel Joy Eje and Christian Kit Elloran

rials will be automatically plotted on a map which you can customize, save and share. You can even put the very map you created in your own organization's website using a simple iFrame code that is also automatically generated for that purpose from the online mapping website.

Making data GIS-ready

Using these basic mapping training is an important step to help the ASEAN Member States produce data that are ready to be analyzed and processed using more advanced techniques such as GIS and Spatial Analyses. It will address the data gaps, which is one of the greatest challenges in biodiversity conservation. It will enable anybody to do biodiversity assessment and mapping without having to wait for or procure dedicated GPS hardware, and without having to install and learn complicated mapping software or learn higher technologies like Geographic Information Systems.

During the CHM trainings that ACB has been conducting across the ASEAN region, the participants are able to get GPS readings, record data, and upload and share online maps very quick (in one day) using mobile phones, simple mobile app, and a free online mapping account.

The convenience of using maps is an opportunity that should be taken advantage of in communicating biodiversity trends such as habitat loss, changes in ecosystems, and species distribution—all of which are crucial information in taking bold steps towards the sustainable management of the ASEAN region's biodiversity. ■

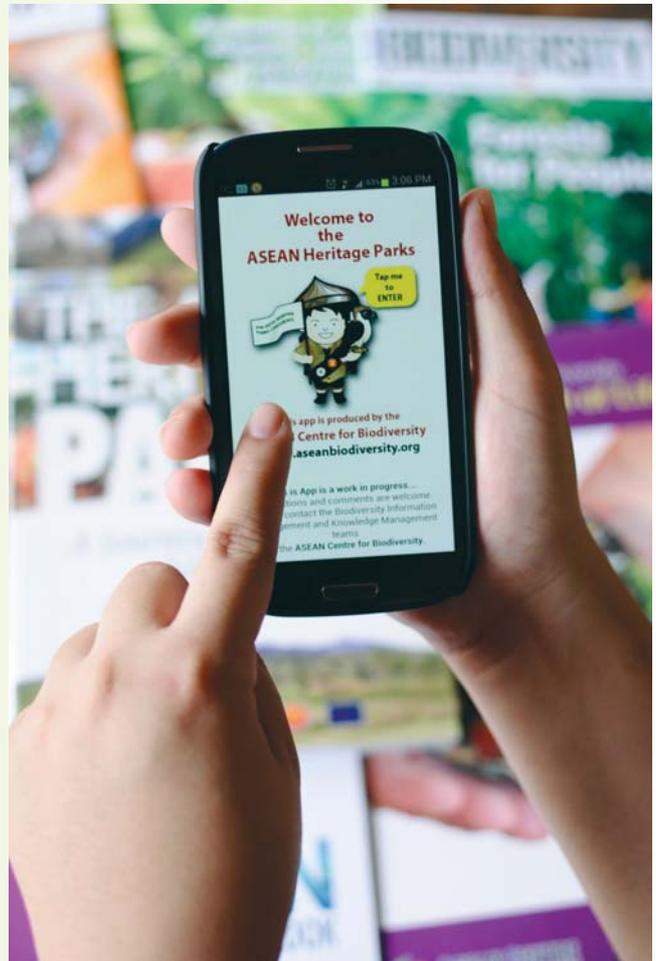
If you happen to have a smartphone or a similar gadget, you probably enjoy the convenience it brings whenever you need to get directions of places, play games, check the weather, or get updates on current events. Getting such important and nitty-gritty information has become easier through the introduction of mobile applications commonly called as "mobile apps".

Believe it or not, mobile apps can also be used in collecting or retrieving knowledge concerning biodiversity.

Understanding mobile apps

Mobile apps are software applications developed for portable use on smart phones, tablets, and mobile devices. These are made available on different mobile operating systems like the Apple App Store, Google Play, Windows Phone Store, and Blackberry App World. Most apps are available for free while others need to be bought. Mobile apps are developed mainly to increase general productivity of the public and to access or retrieve users' information; these include emails, contacts, stock market and weather information.

Some mobile apps available these days are very innovative and are creating waves of changes in the world. Their purposes have surpassed personal convenience and mobility needs of the users. Through the years, mobile apps have gone beyond the normal uses that the developers have foreseen.



As technology improves along with the increasing availability of developer tools, as well as the public demand, rapid expansion occurred and the uses of the apps widened and now include mobile games, GPS and location-based services, banking, order tracking, factory automation, and ticket purchases. The fast-paced improvement in technology use also involves quick growth in number and variety of these apps.

Along with the new uses of the mobile apps, they are now being used as informative tools for public awareness on issues and this

includes biodiversity conservation. One popular mobile app by the Convention on Biological Diversity (CBD) is the Aichi passport, which is the flagship publication of the Biodiversity Indicators Partnership. This essentially provides updates each year on each biodiversity indicators that help in monitoring progress on Aichi Biodiversity targets and the Strategic Plan for Biodiversity for 2011-2020. The Aichi passport serves as a handy monitoring tool that decision-makers and other stakeholders could find useful in assessing their progress in the field of biodiversity conservation. ■

ACB mobile apps

The Biodiversity Information Management (BIM) Unit of the ASEAN Centre for Biodiversity (ACB) has taken advantage of apps technology advancement and has created mobile apps that will also relay the Centre's mission to promote biodiversity conservation to the general audience.

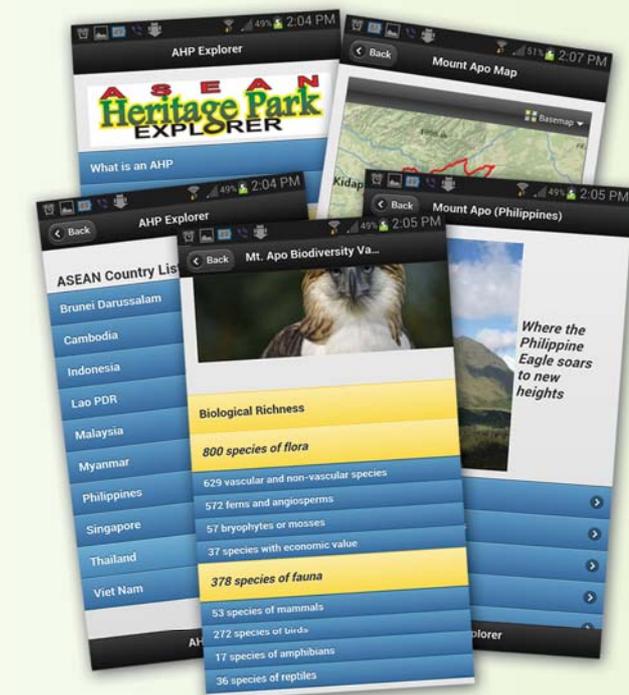
Two ACB mobile apps are currently available for the public's use:

E-Library Mobile App. The E-library is one of the knowledge management resource services of ACB's ASEAN Clearing House Mechanism website. Development started during the second quarter of 2013. It was developed in Android version 4.0.3 (ICE_CREAM_SANDWICH_MR1) and iOS version, thus, can be used in Android and Apple gadgets.

This mobile app provides a compilation of biodiversity-related references in various thematic areas of the CBD. These include cross-cutting

concerns on biodiversity such as invasive alien species, climate change, the Global Taxonomy Initiative, access and benefit sharing, and payment for ecosystem services, among others. Researches on species, ecosystems, and assessment studies are also available. The target users of this App are researchers, students, policy makers, and other relevant stakeholders. This is an app that they can access if they want to know more about biodiversity policies and knowledge management, along with the wide array of topics that mainly points to biodiversity conservation.

Users can easily access the references through the downloadable file in pdf format or through a link to the main source where they can purchase the reference for full access. One advantage of this app is the accessibility provided to the users, since they can research through it anytime, with or without the Internet connection.



AHP Mobile App. The ASEAN Heritage Parks (AHP) app was conceptualized in the first quarter of 2013 as one of the knowledge management products that will cater to both general public and park authorities.

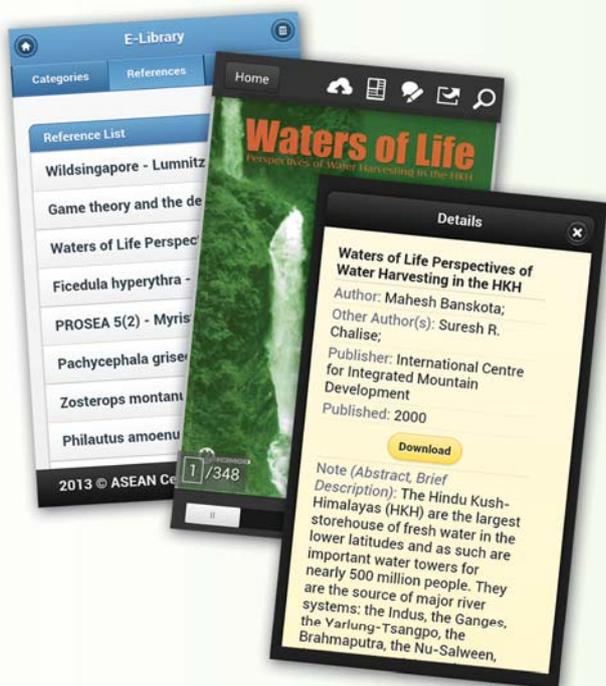
The preliminary use of the AHP App is as pocket reference version of the AHP book that ACB published earlier. In addition, the app is capable of displaying live and interactive map of the ASEAN Heritage Parks. The app can also be used as an ecotourism promotion tool because it features tourism information guide (how to get there, what to do, where to stay, etc.), and as the app is integrated into the mobile phone's system, it displays the AHP site's contact information that the users can just tap to call or compose and send email immediately.

The app is in the Android platform and is now available to be used on Android gadgets. Improvement of this app is in progress. In future developments, the app will be able to link to ACB's database to actively pull out

updated information, but it will retain its offline usability on basic AHP information. The developer also would like to incorporate tools that will enable researchers and park managers to monitor the AHPs and gather information which includes map overlays on nearest threats, key species status, and policy developments.

With the use of this app as a readily available AHP reference, the general public and researchers will be more aware of the values and management status of these ASEAN Heritage Parks. It will reach out to more people as it strongly highlights the importance of biodiversity conservation. It will also encourage and help park managers to improve their management policies and strategies.

Improvements still have to be done for these mobile apps to be fully of service to the concerned stakeholders in the ASEAN region. The development of such, however, is already a big leap that could help accomplish efforts on biodiversity conservation. ■



Fourth AHP Conference: promoting efficient parks management

As a hub of protected areas and the 33 ASEAN Heritage Parks, Southeast Asia boasts of a long list of natural wonders. Beyond the prestige of being included in the ASEAN Heritage Parks Programme, these natural wonders, however, are challenged with a responsibility to implement efficient parks management. In this context, the Fourth ASEAN Heritage Parks (AHP) Conference held on October 1-4, 2013 in Tagaytay City, Philippines focused on efficiency in parks management.

The conference was spearheaded by the ASEAN Centre for Biodiversity (ACB), hosted by the Philippines' Department of Environment and Natural Resources (DENR), and supported by the ACB-GIZ Biodiversity and Climate Change Project; and the Philippines' Department of Tourism, and the Tourism Infrastructure and Enterprise Zone Authority.

More than 200 delegates from Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam participated in the event. The conference served as a gathering of AHP man-

agers, biodiversity experts, policy makers and scientists; and representatives from NGOs, indigenous and local communities, and relevant international and regional organizations.

The conference also provided an avenue for the participants to share good practices on parks management and gather recommendations to boost parks management in the ASEAN region.

Stakeholders with a common goal

Many partners expressed support to ACB in implementing measures that will promote regional collaboration in effectively and efficiently managing

the AHPs and other parks in the region. Various representatives of government and non-government organizations affirmed to have a common goal towards biodiversity conservation, particularly on better parks management in the region.

In the keynote address by DENR Secretary Ramon Jesus P. Paje as read by Mr. Manuel D. Gerochi, Undersecretary for Policy and Planning, DENR, Secretary Paje stressed the importance of discussing the urgency of strengthening biodiversity conservation in the ASEAN region. He also cited some achievements of the Philippines in the field of protected area management.

Ms. Alicia dela Rosa-Bala, Deputy Secretary-General, Socio-Cultural Community Department, ASEAN, emphasized that ASEAN is committed to addressing challenges to sustainable development and biodiversity, through its commitment to the Convention on Biological Diversity (CBD), and the implementation of the ASEAN Socio-Cultural Community Blueprint 2009-2015. ASEAN will also continue to work with ACB for the conserva-

tion of the region's unique resources, and strengthen collaborations with partners such as the Federal Republic of Germany, which continues to support ASEAN efforts through GIZ.

Mr. Robert Kressirer, Country Director of the Deutsche Gesellschaft fuer Internationale Zusammenarbeit GmbH (GIZ) for the Philippines and the South Pacific, said "The global threats to biodiversity could best be addressed by countries through combined efforts using the entire knowledge from local stakeholders up to the national institutional levels. GIZ, with its regional structure, implements bilateral and regional projects related to biodiversity management, ecosystem services and climate change in Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Thailand, and Viet Nam. Connecting these efforts to the goals of the CBD is one of the main aims of the global GIZ portfolio related to biodiversity conservation."

Atty. Roberto V. Oliva, Executive Director of ACB, stated that while biodiversity conservation is the focus of the AHPs, conservation managers should also attend to the needs of people who directly depend on the resources of protected areas. These include indigenous peoples, whose traditional knowledge and expertise in biodiversity make them the best partners in conservation. He emphasized that AHPs are prime areas for ecotourism, but require great investments and collaboration to generate incomes and sustain conservation actions. He





Ramon Jesus P. Paje
Secretary
DENR



Alicia dela Rosa-Bala
Deputy
Secretary-General ASEAN



Robert Kressirer
Country Director
GIZ



Roberto V. Oliva
Deputy
Executive Director
ACB



Celso O. de Castro
Vice-Mayor
Tagaytay City

also stressed that the AHPs have the best potential to address the Aichi Targets of the CBD.

Mr. Celso O. de Castro, Vice-Mayor of Tagaytay City, stated that Tagaytay strongly advocates biodiversity and forest conservation. Tree planting, nurturing and conservation are integral parts of the life of the residents. The city's Comprehensive Land Use Plan ensures environmental protection particularly in the areas of infrastructure; the educational system requires students to plant three trees before graduating from high school; and tree planting is also required before acquiring permits to marry, or set up businesses. Forest degradation is thus not a major problem in the city. The vice-mayor reiterated his city's commitment to forest and biodiversity conservation and climate change mitigation, and expressed his optimism that the participants continue to strengthen biodiversity conservation in their respective countries and the region.

Ways forward

The highlight of the Fourth AHP Conference was the presentation of the recommendations gathered during the four-day event.

The recommendations include building capacities of PA management groups to become self-financing; developing PA

business plans as basis for government fund allocations; increasing allocation from national budgets for PA conservation; engaging private sector support for conservation activities; managing and controlling invasive alien species in AHPs; implementing sustainable financing schemes for PAs; involving of indigenous and local communities in PA management; and balancing conflicting land use interests. As the Secretariat of the AHP programme, ACB packaged the recommendations into a conference report that will be circulated to the AHP Committee and to the ASEAN Working Group on Nature Conservation and Biodiversity. The report, along with other documentations of the 4th AHP Conference, will serve as basis in preparing the AHP Regional Action Plan (AHP-RAP) 2014-2020 while the recommendations will serve as basis in elaborating the AHP-RAP.

The AHP-RAP, which will be used to update the management plans of the AHPs, will be submitted for consideration by the ACB Governing Board and the ASEAN Senior Officials on the Environment. The conference recommendations will serve as inputs to the ASEAN statement and ACB positions at the 12th Meeting of the Conference of Parties to the CBD; and will serve

as basis, among others, to develop new programmes and projects in support of the AHP programme; and in general, to address the loss of biodiversity through support to achieving the Aichi Biodiversity Targets.

ACB will promote the conference results and recommendations in various international fora (e.g., Asia Parks Congress and World Parks Congress) to seek support and partnership with relevant organizations and donor partners.

Eventually, the recommendations are expected to benefit the entire ASEAN region once these are put in place. The results of such recommendations do not end in having a better protected area or AHP, but a sustainably managed biodiversity as well.

The recommendations will directly benefit the region's protected areas and the 33 AHPs: Tasek Merimbun Heritage Park in Brunei Darussalam; Preah Monivong (Bokor) National Park and Virachey National Park in Cambodia; Leuser National Park, Kerinci Seblat National Park and Lorentz National Park in Indonesia; Nam Ha National Protected Area in Lao PDR; Kinabalu National Park, Gunung Mulu National Park and Taman Negara National Park in Malaysia; Alaungdaw Kathapa National Park, Inlay Lake Wildlife Sanctuary, Indawgyi Lake Wildlife

Sanctuary, Khakaborazi National Park, Lampi Marine National Park, Meinmahla Kyun Wildlife Sanctuary and Nat Ma Taung National Park in Myanmar; Mt. Apo Natural Park, Mts. Iglit-Baco National Park, Mt. Kitanglad Range National Park, Mt. Malindang Range National Park and Mt. Makiling Forest Reserve in the Philippines; Sungei Buloh Wetland Reserve and Bukit Timah Nature Reserve Wetland in Singapore; Khao Yai National Park, Tarutao National Park, Ao Phang Nga - Mu Koh Surin- Mu Koh Similan Marine National Parks and Kaeng Krachan Forest Complex in Thailand; and Ba Be National Park, Chu Mom Ray National Park, Hoang Lien Sa Pa National Park, Kon Ka Kinh National Park and U Minh Thuong National Park in Viet Nam.

AHP conferences are conducted every three years. The first conference was held in Khao Yai National Park in Thailand in 2004; the second in Kota Kinabalu in Sabah in 2007; and the third in Brunei Darussalam in 2010.

More than just a plain gathering of park managers, policy makers, conservationists, scientists and, relevant stakeholders, the Fourth AHP Conference served as an opportunity to identify concrete steps in protecting biodiversity, which is crucial to everyone's survival. ■

Key Messages and Recommendations: 4th ASEAN Heritage Parks Conference

Key Messages: Considerations from Plenary Presentations

- The wealth of biodiversity in the ASEAN region is immense. However, the region has been facing severe habitat degradation. For example, the pressure on the region's forests comes from rising populations, increasing agricultural production (including traditional shifting cultivation), logging and mining. There is a need to discard the conventional means of development and growth – a model that is based on excessive exploitation of natural resources and degradation of environmental services, a model that is putting pressure on the planet's life support systems, a model that is fast depleting the natural resources that sustains economic growth itself.
- Biodiversity loss and climate change are challenges of equal dimension and urgency. Effectively managed and equitably governed protected areas are well positioned to provide solutions to global environmental change such as ecosystem-based adaptation options.
- Ecotourism has proven to be an effective tool in protecting the environment and culture, and biodiversity and ecological conservation. Various government and private sector initiatives and partnerships have led to the establishment of successful ecotourism businesses and activities that provide economic opportunities for the locals, and at the same time, promote environmental and biodiversity conservation.
- Indigenous peoples' ways of managing and protecting their territories should inform ways of protected areas governance as developed by governments and the international community. The global initiative on "The Economics of Ecosystems and Biodiversity" (TEEB) provides a framework and a way of thinking to integrate biodiversity values to influence policy and decision makers on the importance of conserving biodiversity. TEEB has contributed towards a wider evidence base and appreciation of ecosystem values in decision-making and planning. TEEB has also seen an increasing application within the ASEAN region. Biodiversity loss will essentially have economic consequences; therefore there is a need to move towards recognizing and demonstrating the value of ecosystems and biodiversity.
- There is a need to enhance networking and communication among park managers and consider protected areas as islands of biodiversity, but with spaces that are well connected to the surrounding landscape and seascape to contribute significantly

to the Aichi Biodiversity Targets in effectively managing protected areas.

- There is a need to identify and analyze the challenges in managing ASEAN Heritage Parks (AHPs) and finding means to address them, as well as to develop sustainable development models and options for selected ecosystems that incorporate concept and strategy to address climate change issues.
- ASEAN is committed to fully implement various measures to address sustainable management of natural resources and biodiversity and climate change as outlined in the strategy and actions of the ASEAN Socio-Cultural Community Blueprint 2009 – 2015. Among these efforts was the establishment of the ASEAN Centre for Biodiversity in 2005 to assist ASEAN Member States (AMS) to protect and conserve their valuable and unique resources and to function as an effective regional centre of excellence in promoting biodiversity conservation and management.

Key Messages: Considerations from AHP Panel Discussions

The primary drivers of habitat loss in AHPs include: encroachment, poaching, illegal mining, illegal logging, lack of funds to implement conservation activities, and weak or poor public awareness.

Lessons learned to address and/or mitigate the impacts of these drivers are: increasing public awareness through community involvement in conservation activities in the parks; implementing alternative economic and income generating activities such as eco-tourism and production of non-timber products; resource mobilizing; and fund sourcing from local governments, national and international organizations and private sector (through corporate social responsibility programmes).

Key issues and considerations in effectively managing AHPs:

- Build capacities of protected area (PA) management groups to become self-financing and develop PA business plans as basis for government fund allocations.
- Increase allocation from national budget for PA conservation.
- Engage the private sector in conservation activities.
- Manage and control invasive alien species in AHP sites.
- Implement sustainable financing schemes for PAs.
- Involve the indigenous and local communities (ILCs) in managing AHPs.
- Balance conflicting land use interest.

Enhancing ACB's Secretariat Support to the AHP Programme

As Secretariat of the AHP, the ASEAN Centre for Biodiversity supports the AHP Programme through the following: development and implementation of regional conservation and management programmes and initiatives; support to developing and updating actions plans, including capacity building; promotion of education, public awareness and ecotourism; exchange of information; partnership; and development and maintenance of information database of AHPs.

Recommendations for enhancement of support services:

- Develop improved reporting and management guidelines for AHPs.
- Develop standards and specific guidelines for the effective management of terrestrial, marine, wetlands AHPs.
- Enhance capacities of PA managers and staff in AHPs through continued conduct of training courses and exchange programme in the various aspects of Programme of Work for Protected Areas including sharing and learning of best practices and lessons.
- Enhance species and protected area databases for AHPs through supporting science-based listing of species and ecosystems assessment. AHP Managers to develop a science-based species listing of biodiversity in AHPs in collaboration with national universities and research institutions.
- Continue production of knowledge products to share examples of successful implementation.
- Strengthen collaboration and information exchange between and among AHPs and other protected areas.

Increasing Coverage of AHP Sites

- Continue to promote the AHP Programme and increase coverage of the number of AHPs considering balance of ecosystems representation, particularly for coastal and marine, wetlands including flyway network sites and biodiversity corridors.

Mainstreaming PA management

- Set standards for sustainable management of ecotourism sites and develop policies to facilitate investments in AHPs.
- Facilitate working with organizations focused on climate change, agriculture, ecotourism and other biodiversity-related issues, and key stakeholders in biodiversity.
- Develop AHPs into demonstration sites wherein activities to address issues on biodiversity and climate change may be piloted.

Engaging Various Stakeholders in AHP Management

- Recognize the rights of ILCs to their resources and traditional knowledge (TK), including clarifying various ownership schemes.
- Recognize the role of women and youth and engage them in conservation activities and promot-

ing biodiversity awareness.

- Engage ILCs while balancing other concerns; the instruments on free and prior informed consent including the community protocol were seen as useful tools in facilitating this engagement.
- Engage private sector and business to finance and support conservation activities through CSR and CER programmes.

Partnership with International Organizations

- Continue partnership with the Secretariat of the Convention on Biological Diversity (CBD) in providing support to ASEAN Member States and AHPs through facilitating regional activities to enhance PA management capacities and through developing proposals for consideration by existing funding facilities for PA management.
- ASEAN countries through AHP managers to develop proposals to LifeWeb to strengthen management effectiveness of AHPs.
- ACB to facilitate this process and coordinate with CBD LifeWeb and other partners.
- Continue and enhance collaboration with the Ramsar Convention Secretariat in effectively managing wetlands in the ASEAN region through developing standard guidelines for site management of AHPs and updating the directory of Asian Wetlands.

Ways Forward

ACB as Secretariat of the AHP Programme shall finalize and circulate the Conference Report to the AHP Committee and to the ASEAN Working Group on Nature Conservation and Biodiversity.

The Conference Report, along with the other documentations of the 4th AHP Conference, shall serve as basis in preparing the AHP Regional Action Plan (2014-2020). The Conference recommendations, as outlined in Session Reports, shall form as basis in elaborating the AHP Regional Action Plan (AHP-RAP). The AHP questionnaire discussed and filled out by the AHP managers and AHP Committee Members shall further be analyzed by ACB and serve as input into the AHP-RAP.

- The AHP-RAP shall be submitted for consideration by the ACB Governing Board and the ASEAN Senior Officials on the Environment. The Conference recommendations shall serve as input in the ASEAN statement and ACB positions at the 12th Meeting of Conference of the Parties to the CBD. ACB shall likewise actively engage in international fora (e.g., Asia Parks Congress and World Parks Congress) to seek support and partnerships.
- The AHP-RAP shall be used to update the management plans of the AHPs.
- The Conference recommendations shall serve as basis, among others, to develop new programmes and projects in support of the AHP programme and in general, to address the loss of biodiversity through support to achieving the Aichi Biodiversity Targets. ■

Saving nature's aesthetic value through art

By Philipp Gassner

The world's true artist one could deem is Nature herself – the primal creator. And “standing at the junction of art and nature are environmental artists, who are often balanced on an intermediary edge, searching and synthesizing creative, unimagined new ways to re-define our relationship with nature,” writes art blogger Kimberley Mok.

Environmental art is as old as nature. Whenever artists painted on site, they developed a deep connection with the surrounding environment and captured these close observations into their canvases. Just think Monet's impressionist or Henri Rousseau's naive accounts of the environment. In the 1970s, environmental art turned into a movement which critiqued a society out of harmony with the natural environment. This critique opposed out-moded sculpture with new site specific forms, such as land art, an avant garde notion about sculpture, the landscape and our relationship with it. Land artists were not only portraying the landscape, but engaging it; their art was not simply of the environment, but in it as well. European sculptor Christo gave just one example, when he famously wrapped the coastline at Little Bay, south of Sydney, in 1969.

Carvings and paintings to save the forest

A long history of sculpture can also be found in Paete, province of Laguna in the Philippines. As the Wood Carving Capital of the Philippines, it is famous for its *pag-ukit* or sculptures which are now found all over the world including

those in the St. Peter's Basilica in Rome.

It is therefore not a surprise that a scene from the Philippines' treasure trove of biodiversity was created from a storm-struck 100 year-old Narra tree by environmental artist Yvette Co and Paete sculptors Romeo and Roel Lazaro and Cesar Cagayat. As a

representative of South-east Asia's biodiversity, just like Cristo's coastline, the Narra tree itself transforms into environmental art: a six foot Philippine eagle in a lush and rich forest habitat chases after a snake coiled on a trunk, poised to prey on the eagle's treasure, her one offspring. The scene shows

the intricate and delicate web of life which the spectator himself depends on. Who could articulate our out-of-tune relationship with, and utter reliance on nature any purer than environmental art?

The artwork entitled *Inakay sa Gubat* is part of the *Carvings and Paintings to Save the Forest*, an art exhibit by Yvette Co. It is also presented in collaboration with the Municipality of Los Baños, headed by its Mayor, Cesar Perez; University of the Philippines at Los Baños; UPLB College of Forestry and Natural Resources; UPLB Alumni Association and other partners in environmental conservation. The event is suitably placed next to Mount Makiling, a vital habitat harboring the rich biodiversity depicted in the artworks. Mt. Makiling was inaugurated as the 33rd ASEAN Heritage Park in October 2013.

Through sculptures and paintings, the exhibit also supports the work of the ASEAN Centre for Biodiversity (ACB), an inter-governmental organization and secretariat to the ASEAN Heritage Parks Programme, to ensure the promotion of biodiversity conservation and address the urgent need for the protection of nature's plentiful values: its natural resources we can eat, breathe or drink; its economic assets we can sell or trade; and like environmental artists, remind us of its pure aesthetic value we can simply enjoy and marvel!

The art exhibit was on displayed from November 24 to 30, 2013 at the Bagong Los Baños Municipal Atrium, at Anos, Los Baños. ■



Inakay sa Gubat by Yvette Co and Paete sculptors Romeo Lazaro, Roel Lazaro and Cesar Cagayat.



Nature lets us rest and refresh. Designed by environmental Artist Yvette Co and executed by sculptors from the Philippine's Wood Carving Capital Paete – Romeo Lazaro, Roel Lazaro and Cesar Cagayat.

Born to be wild in a warming world

By Philipp Gassner

Ridden a Tamaraw lately? Then consider yourself lucky, as there are only two options for this unique experience: either as an old timer exploring Asia's wilderness in a Tamaraw Asian utility vehicle built by Toyota in the 1970s; or on the back of its namesake Tamaraw, the Mindoro dwarf buffalo.

What both share are their ruggedness and their minuscule number of lasting examples. The former lives on in the successor car models Revo or Innova; while the latter, and its 350 remaining peers, can only be found on Mts. Iglit-Baco in the outback of the Philippine Island of Occidental Mindoro, as its name *Bubalus mindorensis* already suggests. A bit further south, likewise, the Indonesian Toyota Kijang shares its design with the Toyota Tamaraw. Yet the name lending Barking Deer Kijang looks quite different from the Tamaraw, the largest land mammal endemic to the Philippines.

The one-meter tall and compact Tamaraw is slightly hairier and has shorter horns than the national animal of the Philippines, the water buffalo Carabao. The Carabao, however, only dwarfs the Tamaraw a little, both in size and fame. Toyota aside, the Tamaraw is also a mascot of many sport teams, a feature story in the TV show 'Born to be Wild', and can be found on the old Philippine one-peso coin.

Nevertheless, this national symbol of the Philippines not only disappeared from the coin but also from the wild. The Tamaraw is now listed as one of the world's most endangered animals. In the early 1900s, around

10,000 of these fierce and solitary individuals, truly born to be wild, grazed the tropical highland forests of Mindoro. But this forest has been lost more and more during the last century to farming and high human population growth. Now, there is yet another factor in the equation endangering the iconic animal: climate change, which is ironically sped up by the emissions of the many Tamaraws and Kijangs on Asia's roads.

Escaping the final nail in the coffin

Climate change adds to the global challenge of biodiversity conservation. It is threatening individual species - like the Tamaraw - as well as entire ecosystems, with negative consequences for human well-being. Increasing temperatures and altered precipitation regimes already result in distribution changes of species. When it is getting warmer - uncomfortably warm - animals and plants have two escape options to more pleasant climates: moving polewards, or moving upwards. Both options are very limited for the Tamaraw, once they reached the southern end of their habitat or the peak of Mt. Iglit-Baco. Also drier conditions, as predicted for the Philippines, can make it quite un-intimate for the dwarf buffalo, which appreciates the proximity of waterholes. This is true for many other animals and plants. Twenty to 30 percent of species assessed in a current global review could be wiped off the face of the planet if climate change leads to global average temperature rises greater than 1.5 to 2.5 degrees - a very likely scenario.



Furry, adorable and locking away carbon

In order to avoid this scenario and the final nail in the coffin of the Tamaraw and its millions of contemporaries, let's drill down on what is called mitigation, the reduction of climate change. And a very peculiar contemporary might be able to give an answer how exactly this mitigation can look like.

Slapping the water with their broad furry tail, these adorable semi-aquatic rodents do not exactly seem to be the saviors of the world but they are very busy in trying so. Beavers are doing their bit for carbon capture and storage. *'The dams they build, and the wetlands produced as a result, lock away a surprising amount of carbon'* says Ellen Wohl of Colorado State University in an interview with the New Scientist. *'Beaver dams cause water to breach river banks, creating areas of wetland known as beaver meadows, which contain large amounts of sediment and organic material. If the dam breaks the meadows dry out, exposing the material to the air and releasing some of the carbon stored*

within them.' In her study in the US Rocky Mountain National Park, beavers accounted for eight percent of the carbon stored in the landscape.

Albeit not living in Southeast Asia's landscapes, beavers remarkably show how one species can have a key role in the functioning of a whole terrestrial ecosystem. Combined, these ecosystems sequester about three billion tons of atmospheric carbon annually, approximately 30 percent of all anthropogenic CO₂ emissions. On the flipside, the current loss of such ecosystems and their species, results in 10 percent of all human greenhouse gas emissions. For these emissions, primarily, deforestation is to blame, but also other land use change triggering soils and peatlands to release their stored carbon - five billion tons of carbon in Indonesia's peatlands alone.

Stumped for an answer how to reduce their third highest carbon emissions worldwide, Indonesian decision makers, among others, should consider the role of their ecosystems and species very carefully in their policies. Accord-

ingly, the most widespread land-use based mitigation policy is the United Nations' Reduced Emissions from Deforestation and Degradation (REDD) scheme. This scheme develops 'win-win' mitigation policies that are beneficial for both the climate and biodiversity. Especially important for the biodiverse ASEAN region, such win-win situation is high up on the agenda of the Biodiversity and Climate Change Project (BCCP) implemented by the ASEAN Centre for Biodiversity (ACB) and GIZ, the German agency for international cooperation. ACB is the Philippine-based ASEAN centre of excellence which coordinates conservation and sustainable management of Southeast Asia's vibrant richness in species.

To learn how to learn to live with climatic change

Having seen that species like the busy beaver make an important contribution to climate change mitigation, this is not enough. Supporting the beaver and its peers with win-win strategies can only slow and halter future warming. The currently occurring warming, however, can already be felt with all its consequences, like more frequent storms or droughts. To learn to live with such consequences requires ad-

aptation, complementing mitigation efforts.

To learn how to live with climatic change, another wild creature might shed some light. The North American Painted Turtle *Chrysemys picta* can tell a story about the need for adaptation. *Chrysemys picta* is one of the many reptile species whose sex is determined by temperature. Eggs in warm nests are likely to hatch as females, while males hatch in cooler nests. In a nutshell, males do not stand a chance in a warmer world, if they happen to be painted turtles. A temperature rise of just around 1°C is all it would take for the species to become 100 percent female and earmarked for extinction.

This is very unfortunate for the turtle, as well as all crocodylians, a bunch of turtles and lizards, and some fishes, living in a world about to fail the two degree target. Not to fail too, females adapt: they can shift their nesting dates by about ten days to ensure their eggs develop at temperatures that produce an even mix of males and females. If that does not do the trick, they might lay their eggs in shadier locations. In case that even the shade gets too hot, reptiles need to evolve to have the ability to cope with warmer

conditions. However, climate change is happening so rapidly that an evolutionary response, especially in long-lived organisms, is not likely.

What is true for our little turtle also works for an entire ecosystem. Ecosystems can adapt to a warming world. But only to a slowly and not too much warming world, and only if such systems are healthy. Like the Tamaraw's encroached highlands, other weakened habitats are just overwhelmed by yet another pressure. Take the decades-long overfishing of Southeast Asia's rich coral reefs, for which climate change could be the literal final nail in the coffin, too. On the other hand, most healthy ecosystems have a rather high natural capacity to adapt to climate change – a capacity many countries could benefit from, which are now starting to develop and implement adaptation policies to cope with impacts. So far, adaptation strategies tend to focus on technological, structural, social, and economic developments, while the linkages between biodiversity and adaptation are often overlooked.

However, ecosystem-based adaptation can be a cost-effective alternative to very expensive measures.

Just take the habitat of the painted turtle. In order to adapt to more floods from rivers and wetlands in a warmer climate, one could build pricey dams possibly endangering the turtle and its contemporaries even more and taking away other goods and services like fisheries. Particularly relevant to the poor, such goods and services can be, however, maintained with an ecosystem based adaptation mechanism, while providing the same flood protection. Possible preventive strategies, such as reduced deforestation, afforestation or soil conservation are much cheaper than dams and the like.

And cheaper is the buzz word if we want to stick with economic lingo. Now 'triple win' policies are possible. Let's bring the stories of the conservation of the iconic Tamaraw and Kijang, the mitigation efforts of the busy Beaver, and the adaptation of the Painted Turtle together. Unmistakably, links between biodiversity and climate change flow both ways and are interconnected. Only by aligning the conservation of biodiversity with climate change mitigation and adaptation, can the world's species, born to be wild, stand a chance to stay wild. Including our very own species, *Homo sapiens*. ■





Sungei Buloh: a refuge for migratory birds and Singapore's native biodiversity

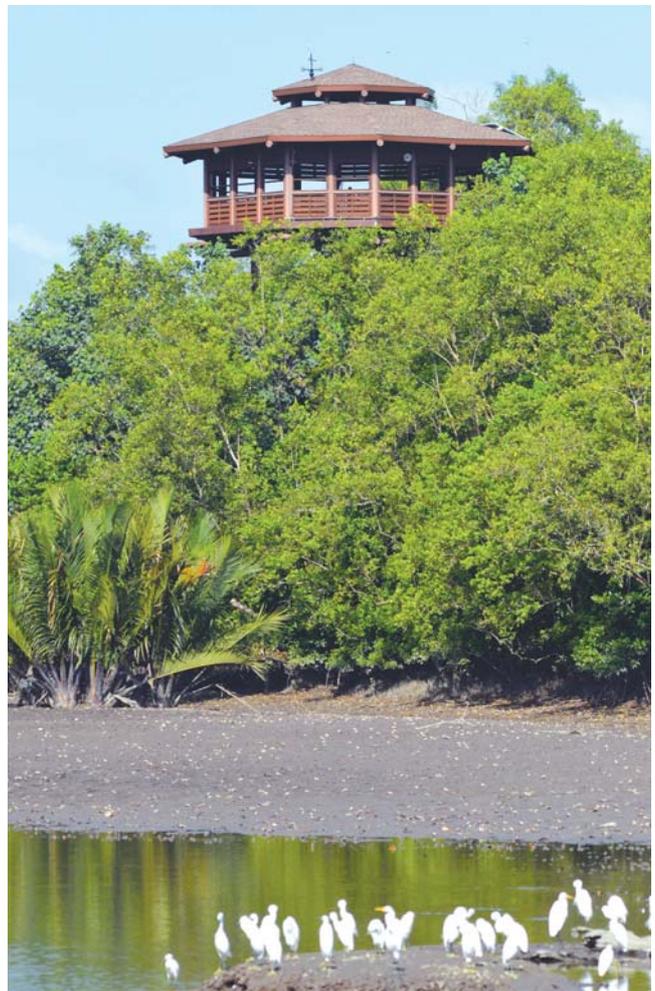
By James Gan, Joey Gan, HadzLindaSamri, Chew Ping Ting and Jeanne Tan

Despite having lost much of its original mangrove forest cover, Singapore still retains a high diversity of mangrove species, which survives in small pockets mostly situated along the northern coastline. One important area is found in the northwest, at Sungei Buloh Wetland Reserve. Gazetted as a nature reserve in January 2002, and recognized as an ASEAN Heritage Park in December 2003, the park covers 130 hectares of wetland habitats such as mangroves, mudflats, and freshwater marshes.

The main attraction of Sungei Buloh is its birds, as it serves as a site of international importance for migratory shorebirds that utilize the East Asian-Australasian Flyway. During the northern winter, Sungei Buloh plays host to large flocks of waders and other waterbirds, such as whimbrel (*Numenius phaeopus*), common redshank (*Tringa totanus*), Pacific golden plover (*Pluvialis fulva*), and little egret

(*Egretta garzetta*). Other species are present in smaller numbers, or may not necessarily be present at Sungei Buloh every year, but their arrival is greeted with much enthusiasm and excitement from birdwatchers and bird photographers. Such rarer guests include the Asian dowitcher (*Limnodromus semipalmatus*), Nordmann's greenshank (*Tringa guttifer*), or Chinese egret (*Egretta eulophotes*). These birds rely on mudflats located both within and outside of the nature reserve for food, and roost in the mangroves. As many sites within the flyway have been cleared for development or become degraded, Sungei Buloh has become increasingly important as a staging site to rest and refuel, and a wintering site for spending the winter in.

Sungei Buloh is also home to many species of resident birds that favor mangrove and associated coastal habitats, such as stork-billed kingfisher (*Pel-*



argopsis capensis), grey heron (*Ardea cinerea*), copper-throated sunbird (*Nectarinia calcostetha*), and ashy tailorbird (*Orthotomus ruficeps*). In all, 212 local and migratory bird species have been recorded in Sungei Buloh, a number that represents more than 60 percent of avifauna.

However, there is more to the nature reserve than just birds; out of 36 species of true mangroves known to occur in Singapore, 30 of them are present in Sungei Buloh. Epiphytes and climbers indicate the maturity of some of these stands of mangrove trees.

The Malayan water monitor (*Varanus salvator*) is the most commonly encountered representative of the area's reptile species, although even this largest of lizards has to be wary of the undisputed lord of the mangroves, the estuarine crocodile (*Crocodylus porosus*). Along with fireflies, mudskippers, orchids, and countless other species, Sungei Buloh stands out as an important area not just for migratory birds, but also as a refuge for Singapore's native biodiversity.

Sungei Buloh has proven to be a popular destination, not just among birdwatchers and nature photographers, but is also visited by school and corporate groups and grassroots organizations. However, increasing visitorship does present challenges and constraints. The current infrastructure is not always able to comfortably accommodate large numbers of people during peak periods. This not only diminishes the visitor experience, but can prove to be too disturbing for the wildlife.

To address some of these challenges, such as the need to balance visitorship and human impact to the reserve, increasing the area's potential for educa-



tion and conservation, and enriching local communities, the Sungei Buloh Wetland Reserve Master Plan was launched in 2008.

One of the key thrusts of the Master Plan is to link up pockets of nature around Sungei Buloh, such as Lim Chu Kang mangroves, Kranji Reservoir Park, and Kranji Marshes. Habitats for various species of native wildlife along this belt will be enhanced, with reforestation carried out in suitable areas. By forming a corridor of complementary habitats and biodiversity, this provides the opportunity to plan for mangrove and associated coastal ecosystem conservation in a more strategic manner.

The expansion of Sungei Buloh and linkage with nearby pockets of habitat will create a biodiversity corridor, improving dispersal and gene flow for native species, which is especially important for the continued survival of threatened animals and plants such as the lesser adjutant stork (*Leptoptilos javanicus*), smooth otter (*Lutrogale perspicillata*), and bakaumatabuaya (*Bruquiera hainesii*), which are considered locally endangered and have restricted distributions in Singapore.

An existing trail that leads out from the reserve will also be expanded. Called the Kranji Nature Trail, coastal boardwalks, viewing decks and shelters will be installed

on this route, with educational stations and signages located along points of interest. These developments will provide a new destination for nature recreation users, which form the majority of visitors to SBWR. More importantly, the trail will act as a buffer to the wetland reserve. Concentrating the bulk of activities at the fringe means that increased visitorship will not be at the cost of the mangroves elsewhere within the reserve, and with fewer disturbances in the core, the wildlife that relies on this fragile habitat for survival will be given the chance to continue to flourish and prosper. With its focus on nature learning and recreation, this new trail will help to diversify the visitor experience, and also divert visitorship from Sungei Buloh.

Work for the Master Plan has already commenced, and the Kranji Nature Trail is expected to be completed in 2014. Once completed, Sungei Buloh Wetland Reserve will be able to reach out to more people, inspiring them to take a more active role in conservation and environmental stewardship, and safeguarding the future of Singapore's natural heritage. ■



Understanding the legal framework of access and benefit sharing of genetic resources

By Ana Maria Tolentino and Karen Lapitan

Southeast Asia, also known as the ASEAN region, is home to a wide range of plant and animal species that people use as sources of food, shelter, livelihood, and medicine, among others. The natural richness of the region explains the seemingly endless tug-of-war on biological resources among technology-rich and industrialized countries and countries providing genetic resources. While accessing biological resources brings an impression of development, the benefits arising from such use do not often reach the original owners of the resources, limiting progress to those who reap the profits. This situation gave birth to access to and benefit sharing (ABS) of genetic resources.

The concept of ABS can be traced from the provisions of the UN Convention on Biological Diversity (CBD, 1992). Aside from the CBD, the importance of ABS is also reflected in the Bonn Guidelines on Access to Genetic Resources and the Fair and Equitable Sharing of the Benefits Arising from their Utilization (2004), and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefit Arising from their Utilization (2010).

While there are existing international instruments, the need to bring ABS into the national level remains a challenge. If the lack of national legal frameworks on ABS will not be addressed, many countries in the ASEAN region might remain economically poor, and only



the users will gain the benefits. In the long run, the sustainability of the ASEAN region's biological diversity might also suffer.

The key elements in establishing a legal framework on ABS are Principles of *Prior Informed Consent (PIC)*, *Mutually Agreed Terms (MAT)*, *Traditional Knowledge (TK)*, and *Compliance*.

A closer look on the key elements

ABS policies would only serve their cause if the key elements are considered. *PIC*, *MAT*, *TK* and *Compliance* are all necessary to ensure that the goals of ABS would be attained. Governments may decide if *PIC* is required for parties to access and use genetic resources in a given area. If *PIC* is necessary, domestic laws must be passed that will require users to get *PIC* from relevant stakeholders, which may include indigenous and local communities. *MATs*, meanwhile, should be administered by competent national authorities (*CNAs*).

Protection of *TK* varies from one country to another. Despite this, *CNAs* must

be consulted before standards are put in place.

Lastly, *Compliance* refers to meeting the requirements enumerated on domestic laws before one can access genetic resources in an area or country.

Initial steps

Most countries in the ASEAN region are still in the process of introducing legal frameworks relevant to ABS. There are efforts, however, that are worth recognizing while national instruments are still being worked on.

At the state level, for instance, Sarawak in Malaysia is considered one of the pioneers in the ASEAN region to come up with an institutional framework that concerns ABS on biological resources. As early as 1997, Sarawak passed and implemented a law that established the Sarawak Biodiversity Centre and Sarawak Biodiversity Council, which was eventually amended in 2003. In 2004, the Sarawak Biodiversity Regulations was also introduced.

At the national level, Malaysia's work on ABS law started as early as 1995. This national law aims to en-

sure that the process of *PIC* would be practical enough for those who need it. Collection activities are also centralized in Malaysia.

In the Philippines, the government enacted an ABS policy through Executive Order 247, which prescribes guidelines and procedures for bio-prospecting; and Republic Act 9174, or the Wildlife Resources Protection and Conservation Act that amended EO 247, addressing the feedback of researchers and researches on the tedious process that has hampered their work.

More ASEAN Member States are now realizing the importance of an ABS legal framework given the long-term benefits it can give them. The results now depend on the ability to integrate these elements into the legal framework.

Way forward

The effectiveness of implementing ABS in the ASEAN region certainly relies on a number of factors. Aside from the actual crafting of legislations on ABS, governments may also continue holding capacity building activities that highlight the role of various stakeholders in the process.

Ultimately, heightened awareness on ABS is necessary to make sure that the concerned stakeholders are well-informed on the different aspects of ABS.

The road towards the effective implementation of ABS may be full of humps, but the sustainable outcome would certainly benefit not just the users and sources, but the environment as well. ■

On a shopping spree – how much is the value of nature?

By Philipp Gassner

*‘This is where we make most of our planets, you see’, Arthur Dent, protagonist of the Sci-Fi classic *Hitchhiker’s Guide to the Galaxy*, is welcomed to a planet factory, moving through massive chunks of whole worlds being built. Fiction aside, what would it take to build such a world? The occasional ocean, a couple of cows and fish, many mountains, a few fluffy clouds on top, a bunch of bushes and trees with apples and pears, et voilà. A quick run to the mall should do.*

At the latest in front of the checkout, you might wonder how much your shopping spree will be. Let’s see: five billion liters of oceans, two million tons of trees, 500 cows, and 67 cubic kilometers of clouds? Hard to sum up, isn’t it? Well, if we want to compare different forms of capital, apples and pears so to say, we obviously require a common measurement standard. That’s why they came up with money, no need to reinvent the wheel. So how much would the ocean be, or the forest? Easy as that, just look up the price for the ocean’s fish or the forest’s timber. But timber is not all a forest embraces. It provides many other benefits to society: the mere pleasure of wandering about it, the carbon it stores, or the oxygen it produces. Unfortunately, oxygen does not have a price or a market – it is an externality.

Chocolate externalities

To get a better grasp of this economic lingo, just imagine living next to a



Source: ASEAN Biodiversity Outlook 2010, ACB

A dollar sign in Brunei’s jungle waters and mangroves?

chocolate factory. Every morning you wake up to the divine smell of chocolate, nonetheless you surely won’t pay the factory for this joy. On the flipside of this positive externality, the factory can also produce negative ones, for instance poisoning a river with its chocolate sludge. For this, society will have to pay, not the factory, since pollution is not traded on a market and therefore doesn’t have a price. No price means no cost for the company and no incentive for its manager to reduce the pollution of

the river. Likewise, most environmental goods and externalities do not have a market.

The creation of an artificial market is the only solution to generate a price, which can then guide decision makers. For decision makers in climate change, this is already being done. After hearing the renowned Stern Review ‘damages from global warming are way more expensive than its prevention’, formerly priceless CO₂ is now traded on the stock markets, at

least in some parts of the world, like the European Union. For carbon, this is fairly easy. One ton costs a few dollars. But how much is the wide array of values of ecosystem services and biodiversity?

Sufficient reason to value

The answer is more than 1 trillion – close to the combined Gross Domestic Product of all ASEAN Member States. And this is just one year’s worth of biodiversity loss, as Dr. Luke Brander, a lead author of the study on ‘The Economics of Ecosystem Services and Biodiversity’ (TEEB) explained. You see, externalities sum up. Only after identifying these, they can be demonstrated and captured. On its way to do so, the TEEB initiative is hosted by the United Nations Environment Programme and supported by the European Commission and many countries. Germany’s development cooperation arm, GIZ, for instance, has been a global player in TEEB from the start and translates it to a regional level now. And what better region than Southeast Asia, where externalities – not from chocolate factories but from deforestation, overfishing and pollution – threaten a third of world-wide coral reefs and mangrove forests among other unique ecosystems. These sustain the livelihoods for some 600 million people – sufficient reason for GIZ and the ASEAN Centre for Biodiversity (ACB) to support the valuing of the services of the region’s biodiverse ecosystems.

Worth a journey through Southeast Asia

Many of these can be found in the 33 ASEAN Heritage Parks (AHP), which were the focus of the 4th AHP Conference, October 1-4, 2013 in Tagaytay, Philippines. During the conference, Mr. Norman Ramirez of ACB introduced the ASEAN TEEB study, showing specific case studies in Southeast Asia's key ecosystems. On a brief journey along them, and other regional studies, the listeners were taken to learn what came to light.

Departure in Thailand: If you ask Thai shrimp farmers how much they can make of a coastal strip, they will readily tell you that nine years' worth of timber harvest from mangroves merely generates US\$ 500 per hectare, while a shrimp farm in its place will bring in US\$ 10,000. A clear business case for cutting the mangroves. Wait a minute, what about externalities? Factoring in positive externalities, like storm protection from mangroves, and negative ones of the shrimp farm, like restoration costs, it looks quite differently:

mangroves create benefits of US\$ 12,000 per hectare while shrimp farms even cost society, US \$10,000 per hectare.

This is no news to Thailand, guided for the past three decades by its King Bhumibol Adulyadej's philosophy of Sufficiency Economy. This Economy is very similar to The Economics of Ecosystem Services and Biodiversity in its attempt of happiness development, balancing economic activities with their negative externalities. As Thais would say, TEEB is 'Old whisky in a new bottle', Ms. Piyathip Eawpanich, GIZ Co-Director of the ECO-BEST Project remarked. Still, the project, aiming to enhance and communicate the TEEB idea in Thailand, has no easy task in selling to the variety of park rangers, economists and people this 'new bottle' of the valuation of ecosystem services.

Moving on to the Mekong region, such services even include Elephant Draught Power, narrated Dr. Lucy Emerton, Chief Economist of the Environment Management Group, Sri Lanka. Since elephants are com-

monly used to transport timber from the forest, they are a so-called provisioning service of the ecosystem, and sure enough economically valuable. Together with supporting services like seed dispersal, cultural services like ecotourism and regulation services like crop pollination, the Mekong's biodiversity adds US\$ 7.3 billion to the region's economy per year. Emerton's study impressively shows that every dollar spent on conservation leverages US\$ 40 of payback. This is confirmed by studies in Indonesia's AHP Leuser Forest or Vietnam's Hon Mun Marine Protected Area, which make it very clear: short term gains of unsustainable resource exploitation are always dwarfed by long term losses. In 2050, lost mangroves could cost US\$ 2 billion, loss of reef related fisheries even US\$ 5.6 billion to the region – a year.

It pays

That conservation pays off, Vietnam indeed realized, where the ASEAN trip ended. The country successfully internalized externalities of deforestation by introducing PES. Yet a new acronym? What is behind it then? 'Payment for Ecosystem Services' essentially means getting paid to do nothing, said Emerton. Her colleague Pham Hong Luong of VNFOREST agreed and explained how this scheme works: every landowner gets paid US\$ 20 per hectare of forest if they don't cut clear the trees, hence avoid externalities. A small, but fruitful incentive that resulted in significant national forest cover increases. That such incentive can work on a much bigger scale shows a glance to the North. Since 1999, the Chinese government has invested more than \$100 billion in PES after realizing that environ-

mental damage detracted three to ten percent from the country's GDP. Identifying, demonstrating and capturing these externalities, China is now on track for its goal of restoring 40 million hectares of forest – an area bigger than Japan – by 2020, via paying 120 million farmers to plant trees. The country has clearly understood the message of TEEB: at the dentist or with climate change, prevention and conservation pay off.

This holds good globally: a study, recently published in the journal Science estimates the costs of the maintenance and establishment of conservation areas to effectively protect the world's biodiversity: \$80 billion a year. Sounds enormous? Only at a first glance. It is less than 20 percent of global spending on soft drinks, and only a tiny fraction of the value of these ecosystems.

The value of valuation becomes clear: non-valuation automatically means the attribution of zero value to goods – be it chocolate sludge, elephant draught power, or oxygen from a tree. If you don't value it, you won't save it.

Or rather, 'if you don't love it, you won't save it' as Noralindabinti Haji Ibrahim, Senior Forestry Officer in Brunei Darussalam, concluded the TEEB session of the AHP conference, pointing to the critique of the monetization of nature. Beyond doubt, TEEB is an important tool, but biodiversity needs clear thresholds, given that it cannot be simply substituted. As the saying goes: 'When the last tree is cut down, the last fish eaten and the last stream poisoned, you will realize that you cannot eat money.' Mind you, manufacturing a new planet remains science fiction and nature is clearly not a shopping mall. ■





Photo courtesy of Wikimedia Commons

Dumpsites are common sources of marine debris that comes from land.

International Coastal Clean Day, September 15

Every litter bit hurts

By Philipp Gassner

What do space and the ocean have in common? Their vastness, that we know little about it, and that both resemble the mess in a teenager's room. Rather than piles of tossed out toys, used underwear and dirty dishes, in space one will find a junkyard of spent rocket stages and dead spacecraft. These end up in Earth's orbit ever since the Soviet Union launched Sputnik 1 in 1957. The number of pieces of space debris has risen to a burgeoning blizzard of over 500,000 fragments in orbit. Even though this space garbage is going to have a major impact on the future economics of space flight, it is of somewhat less concerning to humanity than the equally messy oceans.

A beachcomber's paradise

Just how messy they are, an unintentional experiment showed when the Japanese tsunami in March 2011 swept about 4.8 million tons of debris into the sea. *You don't often get a chance to take an entire city, put it in the ocean, and see what happens to all the stuff,* Marcus Eriksen says. The scientist and adventurer sailed after the tsunami garbage on its 7,000-km journey across the Pacific to find out all about marine debris. This debris included a rusting Japanese Harley-Davidson motorcycle, a set of golf clubs, and a 50-meter fishing boat, found by a beachcomber in British Columbia.

But beachcombers can only comb five percent of

the floating debris. The much bigger part ends up in the Earth's five great subtropical gyres – enormous, slow-moving whirlpools on the ocean's surface which accumulate debris for years from currents and winds. Thousands of kilometers across, the biggest of these gyres is known as The Great Pacific Garbage Patch. Located between two huge population and industrial centers – Asia and North America – the patch serves as Earth's mighty bellybutton, covered in thin confetti of plastic; more than three million tons of confetti. In the world's oceans, that sums up to hundreds of million tons. And indeed the marine garbage problem is a problem of plastic, making up 85 percent of all debris in the sea.

Six million tons of trash to our Web of Life

Our economy is based on the one-time use of throw-away plastics. *'Instead of hunting and gathering, we now shop. And every time we shop, we accumulate plastic: a toothbrush, a vat of butter, a bag of chips, and a candy bar wrapper, there are all made of plastic,'* illustrates another sailing environmentalist, Josh Berry. Over six million tons a day make their way to the sea, 80 percent of it from land. The rest stems from the 10,000 containers lost by container ships each year or ghost nets, fishing nets left in the ocean, and the like. Once waterborne, debris becomes mobile blown by the wind, or following the flow of ocean currents, ending up in gyres and after

decades on the seabed.

Problem solved? Not quite. Unlike in the deep space, the trash in the oceans is of a bigger concern than the threat to the odd satellite orbiting the blue planet. Its name is well deserved, since blue oceans cover two thirds of the Earth and provide over a billion people with food. You wouldn't want to trash the place where your food comes from, would you?

Beyond global food security, oceans are essential to the health and survival of all life, power our climate, and are a critical ecosystem of the biosphere. The marine ecosystem makes up a large part of biodiversity, the global web of life. Just take the ASEAN region, harboring the mega-diverse coral triangle. It supports six of the world's seven marine turtle species, 51 of the 70 mangrove species, and 75 percent of global coral species. The ecosystem services such reefs provide globally come to an estimated annual value of \$112.5 billion.

Beyond this money, the region is also crucial to the global cycle of plankton, tiny floating marine creatures, which regulate the global climate and feed all other marine animals. But now, for every kilo of plankton per cubic meter of seawater, the great garbage patches contain approximately six kilos of plastic. That means that there is more trash in the oceans than living beings and, even worse, it is passed up the food chain to reach all marine life. A sad fact which endangers the vital biodiversity, the very same beings make up.

Hitching a hike on a floating motorcycle

Coral is smothered by plastic, fish get trapped in drifting ghost nets, and birds die from eating plastic.

Ninety-five percent of the sea bird Northern Fulmar, found dead on beaches, has plastic in their stomachs. Marine debris harms an estimated 100,000 sea turtles and marine mammals, and millions of other sea creatures each year. For instance, plastic shopping bags can clog digestive tracts; causing starvation tricking the animal into thinking it is full.

However, much of the plastic is ending up as microplastic – fragments less than five millimeters across. On the bright side, this microplastic is hosting life, creating a new niche in the vast oceans. The tiny fragments in the Atlantic Ocean have been colonized by microbes not found in open water, a community dubbed as *plastisphere*.

Trashing is a good thing then? Hardly, since on the flipside, the *plastisphere* can also work as a mini raft, transporting dangerous species around the world, like the *Vibrio* bacteria causing cholera. And such rafts can be much bigger, like our Japanese Harley-Davidson, on which invasive species can be hitching rides around the globe. Hotspots like the bays of San Francisco or

Manila amount to global zoos of invasive species, which break the earth's natural barriers, muck up the area's marine environments, cost billions of dollars to manage, and endanger local biodiversity.

Another way, biodiversity is put at peril with a thin layer of industrial chemicals and petroleum, coating the plastic particles, creating little poison pills that fish eat and absorb. And if fish are feasting on these toxic morsels, then be sure, we are too.

Clean up the World

To avoid feeding on poison and to protect the marine web of life, there is a very easy way: reducing and preventing trash from entering our waterways. It is critical to manage man-made debris at every point, from its manufacture to a product's consumption. Slowly this is recognized by the plastic industry, meeting on International Marine Debris Conferences to address the ocean garbage issue - with what results remains to be seen.

On a regional level, the ASEAN Centre for Biodiversity - in cooperation with GIZ, the German development cooperation arm

- has a strong emphasis on marine topics. The centre, based in the Philippine university town Los Baños, coordinates networks of marine protected areas and takes marine debris seriously.

From Los Baños comes also a clear solution on the local level as the first Philippine town to enforce a ban on plastic bags in 2008; now followed by 60 other Philippine municipalities - but lobbied against by the plastic industries. Perhaps making the business case is more convincing: increasing the recycling rate by 14 percent in a few years - thus lowering plastic waste. The Republic of Korea already created economic benefits of \$1.6 billion a year.

Until this trickles down, join the global anti-litter movement. True to the motto *Clean Up the World*, an astounding 35 million people volunteer in 130 countries each year. Engage already, the 15th of September is the *27th International Coastal Cleanup*. Last year, the global effort on 28,516 kilometers of global waterways and beaches netted a staggering five million kg of trash, equivalent to the weight of 41 blue whales. What to do with all this garbage showed activist David de Rothschild. He built a raft, the *Plastiki*, from old plastic bottles and sailed into, where else but the Great Pacific Garbage Patch.

If that is too adventurous for you, perhaps you are lucky and find a friendly floatee – 350,000 of them are travelling the world's oceans since 1992 when some containers with child's bath toy were washed overboard a cargo ship. As friendly as the red beavers, green frogs, blue turtles and yellow ducks might seem, they still are among the ocean's silent killers. ■



International Day for Preventing the Exploitation of the Environment in War and Armed Conflict, 6 November

Giving nature a voice in times of conflict

By Sahlee B. Barrer

There are no winners in war, only victims. Everyone in the crosshairs of war will have to endure the effects of armed conflict, including death of loved ones; physical disability and trauma; exploitation and abuse; loss of property, income and livelihood; and others, for many years.

There are many voices that need to be heard in war. Women, children, and indigenous communities need special attention, as their issues are complex and need to be highlighted in normal times, and more so during times of conflict. However, some sectors have no voice at all, and cannot fight for themselves when war breaks out. While casualties are often counted in terms of the number of dead and injured, destruction of properties and livelihood, and derailed economies, the impacts of conflict on nature, environment, and wildlife are rarely heard.

The environment has remained a silent victim after centuries of war and armed conflict. In the wake of destruction and sometimes as a matter of strategy, water sources and wells are polluted, crops and forests are torched, soils are poisoned, and livestock murdered. Biodiversity is inevitably lost. Habitats are destroyed, and wildlife killed. Species lose their homes and sources of food, and those that are already rare and endangered may be pushed to the brink of extinction. Vital ecosystem services are compromised, leading to poor quality or loss of food



Photo courtesy of Wikipedia

and water sources, erosion and poor soil productivity, among others.

In many cases, natural resources themselves have triggered conflicts among communities and nations. According to the United Nations Environment Programme (UNEP), over the last 60 years, at least 40 percent of all internal conflicts have been linked to the exploitation of natural resources, whether high-value resources such as timber, diamonds, gold and oil, or scarce resources such as fertile land and water.

Every year on November 6, the *International Day for Preventing the Exploitation of the Environment in War and Armed Conflict* is an opportunity to give voice to the environment, and ensure that habitats, ecosystems and the protection of increasingly rare flora and fauna are given attention, particularly in times of war.

UNEP and many other environmental and peace-building organizations have emphasized the importance of action on the environment as part of conflict prevention, peacekeeping, and peace building strategies. This is often because durable peace cannot be attained if the natural resources that sustain livelihoods and ecosystems are destroyed. Development organizations recognize peace and security as a critical pillar of sustainable development. Environmental protection and good governance of natural resources must be considered part of national development strategies to ensure that biodiversity is maintained, and that ecosystem services remain intact so that they will continue to provide the vital services that ensure the health and well-being of people and communities.

In more recent times, some attention has been

brought to the impacts of war on cultural, historical and geological sites; historical buildings; museums and artwork; the plight of zoo animals; and effects of conflict on wildlife. These, however, are simply not enough. Conflicts, unfortunately, will continue to plague humankind, and policies have to be set in place to ensure the protection of peoples' cultural and natural heritage.

Rebuilding and reconstruction of lives, communities, infrastructure and industry will take the concerted effort and collaboration of a wide array of stakeholders and relevant organizations, before communities can move on from periods of and hope to lead more normal lives. The environment has no say in the matter, and need to be provided with a voice so that species and ecosystems, too, can survive and endure beyond war and armed conflict. ■

International Day for the Eradication of Poverty, 17 October

Poverty and biodiversity

By **Braulio Ferreira de Souza Dias**, Executive Secretary, Convention on Biological Diversity

A large number of people are presently living in poverty, with the majority of these being women and children. Protecting biodiversity and a healthy planet and productive ecosystems with the full and effective participation of the poor is essential to achieve poverty eradication and provide justice and dignity for all.

As the Rio+20 outcome document (The Future We Want) indicates, global biodiversity loss and ecosystem degradation affect food security and nutrition, and the provision of, and access to, water and the health of the rural poor.

The biodiversity and poverty relationship is complex, multi-dimensional and multi-scale, and requires the involvement of a broad range of actors at the local, national, regional and international levels.

It is now widely recognized that the poor depend disproportionately on biodiversity, not only for their subsistence needs and income, but also as insurance against risks such as the impacts of climate change. For example, 98 percent of households in South Africa use wild herbs and 72 percent of households in Southeast Asia depend on forest products.

Therefore, safeguarding biological and cultural diversity is essential to build socio-economic and ecological resilience, eradicate poverty and meet sustainable development objectives, including the Millennium Development Goals.

This safeguarding also needs to ensure the inclusion of traditional knowl-



edge and practices of the poor, including practices of customary sustainable use of biodiversity, particularly of indigenous and local communities. The Convention on Biological Diversity (CBD) is finalizing a plan of action on customary sustainable use that recognizes these issues, and seeks a just implementation of the relevant articles of the Convention.

The CBD also supports and promotes a broad range of initiatives to facilitate the integration of biodiversity into development planning and its mainstreaming approaches in different environmental and non-environmental strategies, including

those on poverty eradication. Working collaboratively with a broad range of partners, the Convention's Biodiversity for Poverty Eradication and Development Initiative is developing tools to increase the capacity of governments to develop national accounting systems that take depreciation of natural capital into consideration.

Poverty eradication is also a cross-cutting issue of the Strategic Plan for Biodiversity 2011-2020 and its 20 internationally agreed time-bound Aichi Biodiversity Targets. Together, these were welcomed by the sixty-fifth session of the United Nations General Assembly as the overarching ten-year global framework to conserve and sustainably use biodiversity, and its importance was reaffirmed in the Rio+20 outcomes. The Strategic Plan's mission statement for 2020 foresees that actions have been taken to halt biodiversity loss and to ensure that ecosystems are resilient and contribute to poverty eradication and human well-being.

As such, several Aichi

Targets are relevant to poverty eradication, in particular: Target 2, which seeks, by 2020, at least, to integrate biodiversity values into national and local development and poverty reduction strategies and planning processes as well as into national accounting and reporting systems; and Target 14, which aims, by 2020, to restore and safeguard services provided by ecosystems including those related to water, health, livelihoods and well-being, taking into account the needs of women, as well as poor, vulnerable and indigenous and local communities.

In the context of the post-2015 development agenda, biodiversity is not simply another problem to be solved. It is an important opportunity to help achieve broader social and economic goals and to address many of the current challenges and concerns for the future in proactive, coherent and cost-effective ways, including issues such as food security, access to water, sustainable energy, health and human well-being.

As we do this, it is important to listen to the voices of the poor, who frequently are indigenous and local communities, that possess traditional knowledge related to the conservation and sustainable use of biodiversity. Their knowledge, practices and culture is the basis for protecting biodiversity, and therefore for eradicating poverty. Let us work together to bring justice and dignity to the poorest of the planet. ■





Photo courtesy of ACB

Tree replanting is an urgent activity to protect our habitats, be it forests or mountains. Taken by 17 years old Yohana R. Frias in Gumaca, Quezon, Philippines.

International Mountain Day, Dec 11

No place like home: habitats from oceans deep to mountains high

By Philipp Gassner

“Mid pleasures and palaces though we may roam, be it ever so humble, there’s no place like home,” knows already the famous 19th century song “Home! Sweet Home!”. Just how sweet and valuable a home is – as with many things – you might not realize until you lose it. The millions of currently homeless typhoon victims in the Philippines can tell you a thing or two about it. But not only for us humans a place to call home is essential, also to every other species on God’s green Earth. Animals or plants call the area they populate ‘habitat’. But what makes habitat a home? Nice furniture and a cozy fire place? Let’s see and go

on an expedition across our green Earth’s habitats.

Shelter on flotsam fragments

Habitats can be tiny: less than five millimeters across is perhaps the most peculiar and modern-day habitat. Despite their miniature size, millions of bacteria find a home here, and water striders even lay their eggs on it. Curious what that could be? By accident, humans have created a new home, the ‘Plastisphere’. As we dump millions of tons of plastic waste into the ocean every year, much of them end up as microplastic. Don’t be fooled, it cruelly harms most marine animals that unintention-

ally swallow them, but they are also hosting microbes not found in open water; among them also the nasty ones, like *Vibrio* bacteria that cause cholera. In this fashion, such plastic microrafts impressively show one feature of habitats: providing shelter.

The oldest habitat?

Shelter to a diverse community of organisms, which could even include fish, might also be provided by the Earth’s possibly oldest habitat. If not the oldest then it is at least the most extreme: Lake Vostok was buried quietly underneath 3,700 meters of Antarctic ice for 15 million years, till scientists shouted ‘*Drill*

baby, drill!’ in the 1990s. And drilling they did, most recently last year. The possible habitat they found was ice cold, pitch-black, under extreme pressure from the ice above and showed toxically high levels of oxygen. Doesn’t sound much like a cozy habitat, does it? Indeed, scientists are still not sure whether the genetic traces of microorganisms and fish they drilled upon are just contaminations. If the lake was indeed sterile, it would make the only body of water on Earth empty of life. Life always demands for some basic environmental factors like soil, moisture, range of temperature, and availability of light, as well as biotic factors such

as the availability of food, which habitats provide.

Habitats driving wind and weather

Habitats can provide much more. Their own weather, for instance. Wouldn't it be odd to need a private weather forecast for your living room? Well, the weather forecast for the world's second biggest living room is not too exiting: slightly overcast, 365 days a year. Weather makes its way into Cloud Ladder Hall, a gigantic cave in China and gets trapped inside. Anyway, the clouds don't matter that much, as the six million-cubic meter hall is equally dark as Lake Vostok. It shows, however, that habitat crucially provide a climate for the species inhabiting it. And not only the climate inside but also way beyond a habitat, as the next stop on the expedition will show.

Like motherhood and apple pie, all species need water. Water from rain that is recycled by one of the worlds' biggest habitats: forests. In forests, water evaporates, rises to the air, rains again, and creates winds, which bring even more water with them. If forest habitats are lost, the rainfall in the continental interiors may decline by up to 90 percent. To remind you, Sahara, the world's biggest desert, was a lush wetland habitat just 6000 years ago.

Beyond the regional environment, forest habitats support a stable climate for the whole wide world as storage of incredible amounts of CO₂. What happens when our climate losses this stability was dreadfully witnessed by the sufferers of Typhoon Haiyan. While tropical storms are likely to get more powerful in a warming world, they ironically speed up the

warming themselves. Take Hurricane Katrina, tearing up around 320 million trees when hitting the US east coast in 2005, thus, releasing over half the amount of carbon absorbed annually by forests in the US. A percentage likely to be much higher in the tropical Philippines.

Luckily, there is a cure offered – how could it be otherwise – by a habitat. Mangroves in Southeast Asia are cutting greenhouse gas emissions while protecting against deadly tsunamis or typhoons. Shielding mangrove habitats in Northern Samar, Philippines helped reduce damage from the November 8 storm, as they did during the 2004 tsunami all over the region. Considering this, it is worthwhile investing in such habitats, in addition to immediate disaster relief, to reverse the trend of the Philippines losing about one percent of mangroves a year. Mind you, these regional habitats harbor 51 of the global 70 mangrove species diversity.

Diversity in potential and threats

Diversity is also the buzzword of the last habitat on our journey: from evergreen rain forests to perpetual ice and snow, from more than 12 m of annual precipitation to high deserts, and from sea level to almost 9,000 m in altitude. It covers around 27 percent of the earth's land surface, occurs on all continents, in all latitude zones. Of the 20 plant species that provide 80 percent of the world's food, six originated here: maize, potatoes, barley, sorghum, quinoa, tomatoes and apples.

You name it, this habitat has it. But how is this even possible? By adding another dimension, altitude, compressing a wide

range of environmental conditions into a relatively short distance. Often this habitat provide islands, suitable to species which only occur here – so called endemics – isolated from surrounding unfavorable conditions.

We are of course talking about mountains. This diversity in mountain habitats is also home to very distinctive human communities. Seven hundred twenty million mountain people are directly dependent on the habitat for their sustenance and well-being, but also billions of lowland people benefit from mountain energy, timber, biodiversity, recreation and spiritual values. And water: as the water towers of the world, mountains provide freshwater to more than half of humanity.

At the same time, humanity must learn not to take their homes for granted. Mountain habitats expose why: while they naturally are high-risk environments with avalanches, landslides, volcanic eruptions or earthquakes, over generations mountain people, as well as plants and animals, have learned how to live with such difficulties. After all, it takes time to make a home. But now, their well-adapted existence is at peril. Habitat degradation caused by unsustainable clearing of land or effects of climate change; for instance, disturb the delicate balance within and beyond the habitats. As result, rare species of plants and animals face extinction, global and regional climates conditions are distorted and mountain people, already among the world's poorest and most disadvantaged, face further hardship. As this is symptomatic for many habitats of our green Earth, action is urgent to protect our homes.

Habitats as key

Doing so and underscoring that *'Mountains are the key to a sustainable future'* the International Mountain Day is held on December 11 with the identical motto. *'To create awareness about the importance of mountains to life, to highlight the opportunities and constraints in mountain development and to build partnerships that will bring positive change to the world's mountains'* says the UN. A good example how this can be done is provided by Mount Makiling, a dormant volcano in Laguna province on the island of Luzon, Philippines. The 1,090 m high mountain is a vital habitat, harboring rich biodiversity and providing water and geothermal energy to many. Already in 1933, people realized the importance of their very own habitat and declared Mount Makiling a National Park. Now, in October 2013 the mountain was inaugurated as the 33rd of the ASEAN Heritage Parks, representatives of Southeast Asia's ecosystems and an urgent contribution to the protection of its plentiful values. The declaration was supported by the ASEAN Centre for Biodiversity (ACB), suitably based at the foot of Makiling, and through the Biodiversity and Climate Change Project of GIZ, the German development cooperation. Both stress the parks as a roadmap for all aspects of sustainable mountain development, be it infrastructure, tourism, water or biodiversity. To achieve this, all concerned stakeholders need to be involved, knowing about the fragility of their mountain habitat, as well as all the other places people, plants and animals call home. As the song aptly ends:

'Sweet, sweet home!

*There's no place like home,
there's no place like home!'* ■

World Food Day, 16 October

Building systems that bring food to the table

By Sahlee B. Barrer

Do people ever think about where their food comes from and how they get to one's table? When people buy products from the market, eat at a restaurant, or have fast food delivered, little thought often goes to the sources and processes that bring food from the point of purchase to one's plate. World Food Day, October 16, aims to bring attention to the importance of food systems with the theme *Sustainable Food Systems for Food Security and Nutrition*.

Each year, World Food Day focuses on issues that increase understanding of problems and solutions in the drive to end hunger. According to the United Nations Food and Agriculture Organization (FAO), 842 million people worldwide are chronically undernourished. Unsustainable models of development are degrading the natural environment and threatening ecosystems and biodiversity needed for the world's future food supply.

One of the measures that may address global malnutrition, maintain biodiversity, and ensure food security is the development of sustainable food systems. A food system is made up of the environment, people, institutions and processes by which agricultural products are produced, processed and brought to consumers. Every aspect of the food system has an effect on the availability and accessibility of diverse and nutritious foods. This has tremendous impact on consumers' ability to choose healthy diets, and provides more choices for people with limited means.

Addressing the interlinked issues of malnutrition, biodiversity and food security requires integrated action and complementary interventions in agriculture and the food system, natural resource management, public health and education, and broader policy domains. Various sectors and concerns have to be considered in policy and decision making to ensure a rich biodiversity that will provide the basis for sustainable food systems.

Impacts of environmental degradation

Nature and food-based industries such as agriculture, aquaculture, fishing and others are both drivers and victims of various environmental threats. Major land clearing for crop production, mono-cropping, use of chemical fertilizers, and other agricultural practices have contributed to deforestation, erosion and siltation, loss of soil productivity, loss of biodiversity, freshwater scarcity, climate change impacts, and flooding. Pollution, overfishing, and the use of destructive fishing practices also have tremendous impacts on marine resources.

The scarcity of water, land, poor soil quality, and poisoned seas pose serious threats to food security and nutrition. These threats and the measures needed to counter them underline the importance of maintaining biodiversity to continue to provide food for a steadily growing population, most of which are poor and need strong food systems to ensure their health and well-being.

Supporting sustainable food systems

According to FAO, sustainable food systems produce nutritious diets for all people while also protecting the capacity of future generations to feed them.

Sustainable food systems use resources efficiently at every stage along the way from the source to the plate. This means getting the most out of every drop of water, plot of land, speck of fertilizer, and minute of labor. This saves resources for the future and makes systems more sustainable. All resources should be used efficiently and nothing is wasted. Waste products such as manure and food scraps can be turned into fertilizer or energy to improve sustainability. Safe and environment friendly methods can be used to address pests and diseases in food and livestock production.

Consumers can also contribute to sustainable food systems by supporting producers that advocate green practices and technology; purchasing natural as opposed to overly processed foods; choosing balanced diets; and minimizing food waste.

Changing priorities in the food industry

While many governments continue to focus on quantity, there is a greater need to emphasize quality if preventing hunger, protecting the environment, and sustaining food sources are to be addressed. For instance, policies in the food industry have to prioritize nutrition, and the availability of nutrition-dense foods such as fruits, vegetables, legumes and animal-source foods.

Diversification of food, use of environment friendly practices, and support for small-scale farmers must be encouraged.

Integrated farming systems must also be supported where all resources, including food scraps and waste, are used efficiently.

These changes will also be more effective when combined with health and environmental education.

Start somewhere

With a variety of players and various complex issues at hand, are sustainable food systems actually possible? Measures to address increasingly urgent global concerns may push governments in the right direction.

There are fewer natural resources at hand, and policy makers are pressed to make sure that these are used efficiently, and yet bring benefits to the most number of people. Both governments and non-government organizations are thinking of creative ways to bring the issue of health, biodiversity, and food security to the general public to generate support for environmental causes such as biodiversity conservation and climate change mitigation. Greater awareness and better business sense are spurring businesses to be more environment-friendly and generate less waste. Food producers are embracing organic production and crop and livestock diversification. Restaurants are going back to slow food, focusing on fertilizer-free ingredients and foods in season. Consumers are also becoming more careful of their food choices. ■



• Indonesia

Lore Lindu National Park

Lore Lindu National Park, a huge forested protected area covering

217,991.18 hectares,

is located south of the town of Paluin the districts of Donggala and Poso in Central Sulawesi. Its lush forests and varying altitudes have led to the development of multiple ecosystems and habitats and rich biodiversity.



Lore Lindu was declared a UNESCO Biosphere Reserve in 1978, and was formed through the unification of three existing reserves, specifically Lore Kalamanta Nature Reserve, Lake Lindu Recreation and Protection Forest, and Lore Lindu Wildlife Reserve.

Aside from its rich wildlife and picturesque landscapes, the Lore Lindu National Park contains over 400 granite megaliths in the Bada Valley, varying in size from just a few centimeters to 4.5 meters tall, the largest found in Indonesia. Various archaeological studies have dated the monuments from between 3000 BC to 1300 AD.

Habitats

Altitudes in the park range from 200 to 2,300 meters above sea-level, resulting in a variety of multiple ecosystems. The main types of forests in the park are lowland montane and alpine forest. There are also areas with secondary forests, which had previously been cleared for shifting cultivation.

Flora

Lowland forests are dominated by rattan (*Calamus* spp.), banyan (*Ficus* spp.), Leda giant tree (*Eucalyptus deglupta*), palm sugar (*Arenga pinnata*), and kepayang (*Pangium medule*).

The types of flora found in the montane forests include different epiphytes including 88 species of orchids, and a variety of ferns.

Various *Nepenthes* species can be found in the alpine forest. Secondary forests, on the other hand, include species such as casuarina (*Casuarina sumatrana*) and mixed stands of wanga (*Figafetta filans*) and leda (*Eucalyptus deglupta*).

Studies also show that the park contains 287 plants with medicinal value.

Fauna

Lore Lindu National Park is the largest habitat of native mammals in Sulawesi. Hundreds of species of mammal, fish, bird and amphibian call this park home. These include the hog deer or babirusa (*Babirusa* spp), rare Sulawesi monkeys (*Macacaton keana*), anoa (*Bubalus Bubalus depressicomis* and *quarlessi*), gold snakes, three species of tarsier, and racoons, which are the largest meat-eating animals in Sulawesi.

The park is home to 227 bird species, of which 77 are found nowhere else in the world. Key bird species include the small sparrow hawk, bare-faced rail, Sulawesi woodcock, metallic pigeon, ornate lorikeet, yellow-and-green lorikeet, ochre-bellied hawk-owl, cinnabar hawk-owl, speckled hawk-owl, diabolical nightjar, scaly kingfisher, purple-beard-

ed bee-eater, cerulean cuckoo-shrike, pygmy cuckoo-shrike, chestnut-backed bush-warbler, blue-fronted flycatcher, Sulawesi blue-flycatcher, geomalia, Sulawesi thrush, great shortwing, olive-flanked whistler, maroon-backed whistler, malia, white-backed woodswallow, Sulawesi myna, fiery-browed myna, and mountain serin.

There are at least 55 species of bats and five types of squirrel.

There are 64 types of snakes including pythons, king cobra, and racer snake, and 21 species of large lizards in the park.

The park also has a variety of beetles, some of which are larger than a human hand.

Threats

This national park contains one of the largest intact forests in Indonesia, but it also faces a variety of threats, including a rapidly growing population in and around the park. Deforestation remains a problem as a result of

illegal logging and land encroachment for agricultural activities.

Conservation activities

One of the organizations that has contributed to the conservation of Lore Lindu National Park is The Nature Conservancy, which has been helping to preserve the rain forests of this national park in partnership with the Directorate General of Protection and Conservation of Nature (PKA) since 1992.

The Conservancy has established a comprehensive programme in the park, where it is working with PKA to involve local communities in park management. Key aspects of the programme include developing 5- and 25-year management plans for the park; conducting consultations with communities, a planning technique that helps prioritize conservation targets and build community support; carrying out vegetation and biodiversity studies; and introducing sustain-



able agriculture projects to reduce pressure on park boundaries.

Culture and Ecotourism

There are many natural attractions within and in the vicinity of Lore Lindu National Park. These include the following:

1. Pakuli – village at the vicinity of Lore Lindu National Park in the district of Gumbasa, Sigi Regency, 40 km away from Palu. The local people are well known for their use of herbs for traditional medication. Bird species that can be found in the village include maleo, red jungle fowl, Sulawesi nightjar, Sulawesi thrasher, and white-rumped cuckoo-shrike.
2. Saluki – located at Tuva Village approximately 50 km away from Palu. The park's largest male nesting ground can be found here. Several endemic bird species can also be found, such as the green-backed kingfisher, maroon-chinned fruit-dove, silver-tripped imperial pigeon, red knobbed hornbill, and Sulawesi dwarf kingfisher.
3. Lake Lindu – located at the centre of the park. The lake can be found 1000 meters above sea level with surface of 3.2 ha surrounded by extensive swamps. Bola island can be found at the centre of the lake, and covers an area of about five hectares. A feature of the island is the Maradindo burial site, which was built in the 18th century.
4. Toro – located at the vicinity of the park, approximately 115 km away from Palu. Local people form the Tondo Ngata, which guards the forest. Traditional houses known as *Lobocan* can still be found in Toro, which were formerly used for traditional meetings.
5. Lake Taming – located 55 km away from Palu, the lake is 1,700 meters above sea level and is an amazing bird-spotting site. The lake is about 10 meters deep and contains several kinds of endemic fishes. This beautiful natural environment can be enjoyed by using a traditional canoe (*katinting*) to cross the lake.
6. Nokilalaki-Anaso-Rorekatimbu – these three peaks, Mt. Nokilalaki, Anaso and Rorekatimbu are characterized by montane and alpine forests and are great sites for birdwatching and trekking. A variety of bird species can be found, as well as pitcher plants. The formidable diabolical nightjar, a rare species first documented in 1931, and never again spotted till 1993, was recorded on Anaso.
7. Napu Valley - located about 105 km away



from Palu, Napu Valley is an extensive wetlands area, with mountains surrounded by forests and good farming lands. A good bird watching site can be found at Wuasa, where one can view species such as blue-faced rail, various eagles, white-bellied imperial pigeon, and rusty-bellied fantail.

A unique feature of the park is the presence of megaliths or the large stone age prehistoric relics. There are about 419 megalith statues widely spread in Besoa and Bada Valley-District of South Lore, Poso Regency. These artifacts are considered one of the finest stone monuments of their kind in Indonesia. Marked by good craftsmanship and simplicity, these megalithic stone statues are graceful and were carved from granite.

Archeological research dates them back to 3000 years BC with more recent ones from 1300 AD. It is also believed that these megalithic statues are worshipped by ancestors of the local indigenous peoples. They come in

variety of sizes, with the tallest at about 4 meters in height while most measure 1.5 to 2.5 meters.

The best time to visit would be during the dry season which is between July and September. The heaviest rain period occurs during the monsoon season which lasts from November to April.

How to get there

The nearest air transport hubs are Makassar in South Sulawesi and Manado in North Sulawesi, both of which have domestic flights to the towns of Palu, Poso and Luwuk in Central Sulawesi, from Jakarta and all the major cities around Indonesia, and a few International flights. There are international flights to Manado from Singapore, and from Singapore and Kuala Lumpur, Malaysia, to Makassar.

Both airports have flights to Palu, a small city in Central Sulawesi. Mutiara Airport in Palu is a domestic only airport with flights available from Jakarta, Surabaya, Balikpapan, Manado and Makassar.

From Palu, you can hire a car or jeep for a drive to the park which is about 50 kilometers away. The drive will take approximately 2 ½ hours. ■

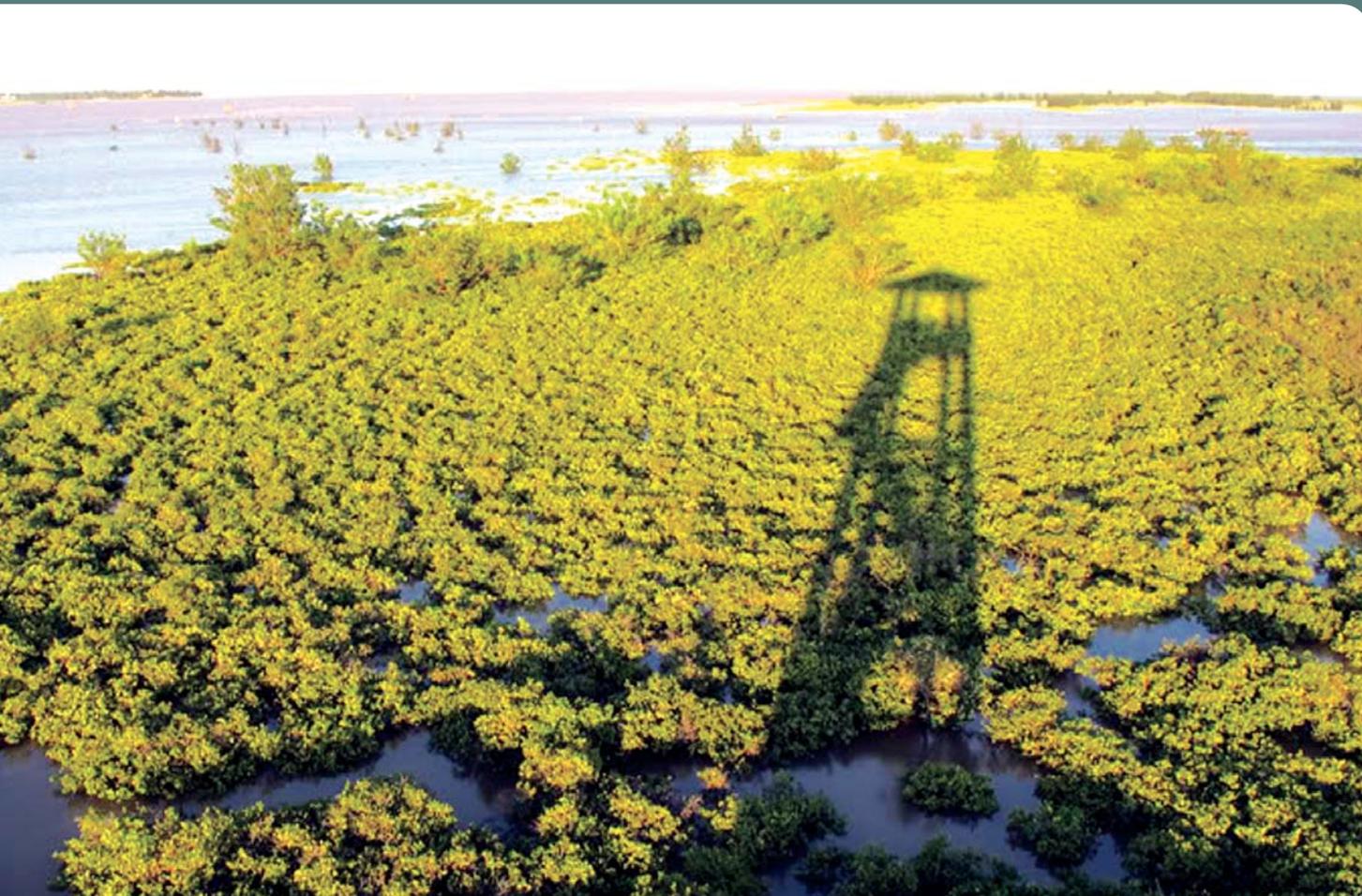
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- Viet Nam

Xuan Thuy National Park

Xuan Thuy National Park (XTNP) is 150 km south-west of Hanoi in the coastal zone of the Red River Delta. Located in the Giao Thuy District, Nam Dinh Province, the park covers 7,100 hectares plus an 8,000-ha buffer zone. Xuan Thuy National Park comprises three islands and mudflats, the most important habitat being the intertidal mudflats and natural mangroves.



VIET NAM

Xuan Thuy National Park is an internationally important wintering area for migratory birds and was declared Viet Nam's first Ramsar site in January 1989.

Due to the presence of vital ecosystems and habitats for many rare and important species, XTNP plays an important role in preserving ecological system and developing eco-tourism of the Red River Delta.

Flora

Xuan Thuy National Park is an area rich in biodiversity. It has 150 species of vascular plants, 120 of which thrive particularly well in the wetland habitat. The mangrove forest helps stabilize the alluvium soil as well as provides food and shelter for marine life and other fauna, storm and flood protection, biochemical cycling, and others.

Surveys have recorded around 111 aquatic plant species. Certain species of seaweed in particular are of high economic value.

Fauna

Xuan Thuy National Park provides habitats for many rare animal species, including otters, porpoises and whales. The park is also home to 30 species of reptiles and countless species of insects.

XTNP is best known for the diversity of bird species in the park. The park is home to 219 species of birds from 41 families and 13 orders. It is a significant resting and feeding site for migratory waterbirds as they head from the north to the south, especially during November and December. Without stopping in Xuan Thuy, they would not be able to complete their flight, which is often thousands of kilometers long. At the peak of the migratory season, there may be 30,000

to 40,000 birds staying in Xuan Thuy before they continue their long migratory journey. XTNP is also noted as having the largest wintering population of Còthia (black-faced spoonbills) in Viet Nam.

The migratory birds include a number of endangered bird species, such as the western curlew, Saunder's gull, painted stork, Asian dowitcher, spoon-billed sandpiper, Nordmann's greenshank, Chinese egret, black-tailed godwit, and spotted redshank. Other significant bird species include Baer's pochard, great knot, black-tailed gull, Heuglin's gull, Saunders's gull, and light-vented bulbul.

XuanThuy is also an important migratory stop-over for non-waterbirds, with large numbers of passerines and cuckoos passing through the site during the spring and autumn migrations. During the summer months, small numbers of painted stork and spot-billed pelican occur as non-breeding visitors.

More than one quarter of the park is covered with mangroves that support many aquatic species - including over 500 species of benthos and zooplankton (shrimp, fish, crab, oysters, and others). These species provide food and livelihoods for local people. The park houses the CáMòi Co (*Clupanodon thrissa*), a fish listed in Viet Nam's Red

Book as vulnerable and at risk of extinction.

Threats

Xuan Thuy's biodiversity is under threat from the spread of aquaculture and unsustainable levels of fishing and shellfish harvesting within the park boundaries.

Conservation activities

The Government of Viet Nam has worked to preserve the value of this area through the establishment of new laws, policies and investments. In 2003, it was upgraded from its status as a nature reserve and approved as a national park, and was also included as part of the Red River Delta World Biosphere Heritage Site by UNESCO in October 2004.

The objectives and tasks of park management include the following:

1. Preserve the typical submerged land ecosystem of the Red river delta region and its flora and fauna, particularly aquatic species, water birds and migratory birds.
2. Build material and technical bases to support training, scientific research, environmental education and eco-tourism development and thus contribute to socio-economic development and creating jobs for local population communities.
3. Maintain Xuan Thuy

National Park as a Ramsar site through biodiversity conservation and responsible fisheries.

4. Raise public awareness and also recognize local community efforts in the conservation of Xuan Thuy National Park, the sustainable and wise use of the park's resources, and responsible fisheries and management.

A major concern for park management has been the conflict between conservation and resource use, particularly by poor communities living in the vicinity of the park. Every day, hundreds of local fisherwomen enter the mangrove forest in Xuan Thuy National Park to collect shells, mollusks, crabs, and other aquatic products. Although the law prohibits any kind of resource extraction in the core zone, the poor women who depend on these natural resources for sustenance and livelihood have no other choice. The overexploitation of aquatic products has resulted in increased scarcity and growing competition among the fisherwomen.

To resolve this issue, park management, with the assistance of Mangroves for the Future, piloted a co-management initiative to ensure the more sustainable use of natural resources. The project aimed to develop and integrate a model of mangrove co-management into the Xuan Thuy National Park management system for the protection of a 1,000-hectare area on Lu islet, as well as develop a benefit sharing mechanism with the poor fisherwomen.

The park now officially accepts the presence of the fisherwomen in the core zone and involves them in preparing regulations over what species can be col-





lected, how (no mechanical devices), where, and when (no harvesting in reproductive season). Cutting mangroves and trapping birds are forbidden.

By working with the fisherwomen, the park has been able to register more than 500 of them and can now provide some oversight. The women take part in dialogues in decision making over resources of the park. The collection of aquatic products is monitored by a committee that includes representatives from the park, local authorities, and communities. Through peer monitoring, collecting practices have been made less damaging.

On a rotational basis, fisherwomen can access small loans from a livelihood fund set up by the park. These can be used to raise chicken and pigs.

Discussions were conducted to increase awareness of the significance of mangroves and to encourage the use of sustainable fisheries methods. Fisherwomen have also been taught to effectively communicate conservation messages among their peers to encourage other members of the group to comply with new regulations.

The project also supported local institutions by providing a platform for cooperation to reduce the over exploitation of park and lo-

cal fishery resources.

The pilot co-management arrangement in Xuan Thuy National Park has already made a real difference in improving living standards of local women and reducing overexploitation of its natural resources. Future activities may focus on resolving other issues between conservation and resource use among communities in the park; providing support for sustainable livelihood activities; and establishing payments for ecosystem services schemes to help park management and the community in conserving the biodiversity of the park while contributing to local welfare.

People and culture

There are five buffer communities surrounding XuanThuy, specifically Giao Thien, Giao An, Giao Lac, Giao Xuan, and Giao Hai. Their livelihood is primarily tied to wet rice cultivation, raising of livestock, and cultivation and harvest of aquatic products (fish, crab, shrimp, clam, and others). The livelihoods of the local people are intrinsically tied to the health of the mangrove forest. Consequently, park management is working to promote sustainable livelihood practices from agro-forestry to ecologically friendly shrimp ponds.

These communities show a strong Catholic

and/or Buddhist influence. As such, several pagodas and churches dot the landscape, adding to the eclectic beauty of the region.

Traditional performing arts include the art of Cheo and Chau Van as well as the dragon dance. Other notable cultural activities are sculling and cock fighting.

Ecotourism

As a staging and wintering site on the East Asian-Australian flyway, the Xuan Thuy National Park attracts birdwatchers from all over the world. The best time to visit is September to April. In August and September, it is still possible to see the non-breeding painted stork, as well as early migrants such as the black-winged Stilt. From October onwards, it is relatively easy to find wintering black-faced spoonbills, particularly at their roost sites in the shrimp ponds. Guides are available and can assist visitors on where to watch for particular bird species.

There are a number of hiking routes in the park. Visitors can walk through habitats along the dike system in Con Ngan Island, where the park headquarters is located. During high tide, there are numerous birds roosting in the shrimp ponds, including spoonbills, gulls, ducks and waders.

During high tide, visitors can also use boats to reach the offshore mudflats and sandy flats, where the spoon-billed sandpiper can be found among large flocks of waders. An alternative boat route involves visiting Con Xanh island, which are favored by some migrating non-waterbirds. On the island, one can find pittas and other passerines during the migratory season.

Visitors can also take a boat to the off shore mud-

flats and sandy flats areas of Giao Xuan Commune, which is the best area for watching shorebirds. Here, one can find large flocks of waders including the Nordmann's Greenshank, many species of gulls including Saunders's gull, duck species, and sometimes the black-faced spoonbill and black-headed ibis.

In terms of accommodations, there are basic lodges within the park. There are guesthouses in Ngo Dong town (20 km from Xuan Thuy) and a resort area in Quat Lam (40 km from Xuan Thuy), where there are many hotels and restaurants.

How to get there

Xuan Thuy National Park is about 150 km by road from Hanoi or three and half hours by car. From the national park headquarters, the site can be visited by boat or by foot. It is important to take account of tide times when planning a trip to Xuan Thuy, as some of the best birdwatching areas can only be reached at high tide. ■

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ACB NEWS



ACB holds biodiversity information management training for Brunei Darussalam

AS part of the continuing collaboration between the ASEAN Centre for Biodiversity (ACB) and the Government of Brunei Darussalam, the Third Training Programme on Clearing-House Mechanism (CHM) Maintenance and Data Management was held on October 28 to November 2, 2013 in Bandar Seri Begawan.

The course, which was part of ACB's capacity building support to Brunei Darussalam in the area of biodiversity information management, focused on web administration and management and data organization. The event served as follow-up to two previously-held biodiversity information management training courses, which resulted in the establishment of the Brunei Darussalam national CHM website: <http://www.bruneichm.gov.ph>.

The third training course strengthened capacities of CHM staff and CHM stakeholders' network of Brunei Darussalam to maintain and enhance their CHM website, as well as comply with reporting requirements of the Convention on Biological Diversity.

Staff of ACB's Biodiversity and Information Management unit, led by its director, Dr. Sheila Vergara, served as resource persons.

ACB holds dialogue with donors and partners

WITH the aim of briefing the donor community on the importance of the ASEAN region's biodiversity and identifying means towards sustainability, ACB organized a Partners' Forum on October 4, 2013 in Tagaytay City, Philippines.

Atty. Roberto Oliva, ACB Executive Director, appealed to donors and partners to support ACB in its mandate to promote regional cooperation in biodiversity conservation as "all our efforts today will contribute to the survival of future generations".

Undersecretary for Field Operations of the Department of Environment and Natural Resources of the Philippines, Mr. Demetrio Ignacio, Jr., said it is in the interest of the Philip-

ines and ASEAN for ACB to be financially sustainable. He lauded the ability of ACB to organize events efficiently. "The Philippines is a proud host of the ACB and a proud member of the ASEAN community," he added.

Meanwhile, Dr. Raman Letchumanan, head of environment of the ASEAN Secretariat, recognized the Philippine Government's role in the sustainability of ACB. He emphasized that "countries have to take charge of their destiny," adding that "national mechanisms are important to manage foreign or donor funds."

Mr. Robert LeBlanc, GIZ consultant with the ACB-GIZ Biodiversity and Climate Change Project (BCCP), presented the initial assessment on the funding needs of ACB. He underscored the crucial role of ACB in the region, and the challenge to meet the Centre's financial sustainability.

"It is hoped that the forum provided great insights and valuable contribution in enhancing ACB influence and valuable contribution in the region," said Dr. Berthold Seibert, Project Coordinator of the BCCP, who officially closed the forum.

Organizations present during the forum were: ASEAN Secretariat, GIZ, KfW, United Nations Development Programme, Delegation of the European Union to the Philippines, Secretariat for the Convention on Biological Diversity, Partnerships in Environmental Management of the Seas of East Asia, Myanmar's Ministry of Environmental Conservation and Forestry, Philippines' Department of Environment and Natural Resources, and Department of Foreign Affairs.



ASEAN declares Mt. Makiling Forest Reserve as 33rd ASEAN Heritage Park

MINISTERS responsible for the environment from the ten ASEAN Member States have approved the nomination of Mount Makiling Forest Reserve (MMFR) as ASEAN's 33rd Heritage Park. The nomination was approved at the 14th Informal ASEAN Ministerial Meeting on the Environment held on September 25, 2013 in Surabaya, Indonesia.

The declaration was officially announced by Secretary Ramon J.P. Paje of the Philippines' Department of Environment and Natural Resources in his keynote address during the four-day Fourth ASEAN Heritage Parks (AHP) Conference which opened in Tagaytay City, Philippines on October 1, 2013. MMFR in Los Baños, Laguna joins four other AHPs

in the Philippines, which include Mt. Apo Natural Park, Mts. Iglit-Baco National Park, Mt. Kitanglad Range Natural Park, and Mt. Malindang Range Natural Park.

In approving the nomination, the ASEAN Environment Ministers noted that MMFR is a well-known destination for scientists and tourists alike, because of the reserve's prominence as an outdoor laboratory for forestry and its mountain peaks, and boiling mud and hot springs. The reserve is also recognized for its high conservation importance and is one of the Philippines' 18 centers of plant diversity and 32 key ecotourism sites.

Dr. Nathaniel Bantayan, Director of the Makiling Center for Mountain Ecosystems, said MMFR is known as a legendary mountain and habitat of many important plant and animal species. The reserve manages to protect and conserve its diverse species.

Dr. John Pulhin, Dean of the College of Forestry and Natural Resources of the University of the Philippines at



Los Baños (UPLB), whose campus is at the MMFR, said the reserve is home to internationally famous organizations of various concerns and has become a unique national and international center for higher education, science, arts, natural resources conservation and utilization, and tourism.

The certification of declaration as an AHP was presented during a ceremony held at the Makiling Botanic Gardens on October 3, 2013. The event was witnessed by the park managers of ASEAN's 32 ASEAN Heritage Parks.

ACB serves as secretariat of the AHP Programme. ACB Executive Director Roberto V. Oliva said the AHPs serve as a regional network of national protected areas of high conservation importance preserving a complete spectrum of representative ecosystem to generate greater awareness, pride, appreciation, enjoyment, and conservation of ASEAN's rich natural heritage.

ACB launches taxonomy publications, opens AHP exhibit

THE ASEAN Centre for Biodiversity (ACB), in cooperation with the Philippines' Department of Foreign Affairs and the University of the Philippines (UP) Diliman, launched new publications on taxonomy and opened an exhibit on the ASEAN Heritage Parks (AHP) on October 14, 2013 at the UP Diliman Main Library. The events were part of the celebration of the 46th founding anniversary of the ASEAN.

The new publications included: *Field Guide on Selected Monocot Plants of Northern Thailand and Southeast Asia*; *Training Manual on Freshwater and Brackish Water Fish Taxonomy*; *Training Manual on Biodiversity Data Organization and Mapping of Taxonomic Information*; *Training Manual on Taxonomy of Terrestrial Plants*; and *Training Manual on Corals Taxonomy in Southeast Asia*.

The publications were products of training workshops on taxonomy facilitated by ACB and funded by the ASEAN-



Japan Integration Fund. The books were published under the *Taxonomic Capacity Building and Governance for Conservation and the Sustainable Use of Biodiversity Project* in partnership with the East and Southeast Asia Biodiversity Information Initiative (ESABII) and Japan's Ministry of Environment.

Atty. Roberto V. Oliva, executive director of ACB, said the new publications hope to contribute to boost the dying profession of taxonomy. He emphasized the importance of taxonomy in conservation efforts in the ASEAN region.

“There is a dire need to revive interest in taxonomy. The diminishing status of this science and profession is crippling the ASEAN Member States’ and other Asian countries’ capacity to effectively catalogue their biological resources. We are all aware that without knowledge and understanding of species, it would be difficult to plan and implement biodiversity conservation efforts. What we don’t know, we can’t protect,” Director Oliva explained.

Mr. Kentaro Yamane, Second Secretary of the Economic Section, Embassy of Japan to the Philippines, affirmed that Japan will continue to support biodiversity-related initiatives not just in the ASEAN region, but in many parts of the world as well.

Copies of the new publications were turned over to UP Diliman and UP Los Baños to make them accessible to taxonomists, students, teachers, researchers, scientists, and experts.

The exhibit featured the 33 ASEAN Heritage Parks (AHPs), which are protected areas of high conservation importance, preserving in total a complete spectrum of representative ecosystems of the ASEAN region. These areas are regarded as such to generate awareness, pride, appreciation, and conservation of ASEAN’s rich natural heritage through a regional network of representative protected areas.

UP Los Baños Chancellor Rex Victor Cruz lauded ACB for its communication efforts focused on the protection of AHPs. He said the university will continue doing its part to protect Mount Makiling and other AHPs. UP Los Baños is home to the recently declared AHP, the Mount Makiling Forest Reserve.

Director Julius Flores of the Department of Foreign Affairs reiterated his agency’s support to the programmes and projects of ACB. “We share the hope of the ACB that members of the ASEAN will contribute more to protect biodiversity,” he said.

Representatives from the Embassies of Cambodia, Indonesia, Lao PDR, and Singapore also graced the event.

Asia-Pacific countries discuss biodiversity information sharing

SHARING of biodiversity information among countries, conservation organizations and relevant stakeholders took centre stage at the Fifth Meeting of the Asia-Pacific Biodiversity Observation Network (AP-BON) held on November 26- 27, 2013 in Los Baños, Philippines.

Hosted by the ASEAN Centre for Biodiversity (ACB) in collaboration with the APBON Secretariat-Ministry of Environment of Japan, the meeting discussed ways on how to promote sharing of biodiversity information in the Asia-Pacific region.

The meeting was opened by Atty. Roberto V. Oliva, executive director of ACB; Dr. Theresa Mundita Lim, director, Protected Areas and Wildlife Bureau (PAWB) of the Philippines’ Department of Environment and Natural Resources; and Mr. Ryuji Nakayama, director, Biodiversity Centre, Ministry of Environment, Japan.



According to Director Oliva, the Asia-Pacific region hosts 13 biodiversity hotspots and accounts for nearly one third of all threatened species in the world. “It is unfortunate that the environmental circumstances of the region barely assure the persistence of its rich biodiversity. These circumstances call for interactions and partnerships on data sharing,” Director Oliva said. He added that APBON essentially brings synergy in conservation of biological diversity at the local, national, regional, and global levels.

Director Lim lauded AP-BON for its role in the fulfillment of the Aichi Biodiversity targets. “There is indeed a great challenge to promote sharing and delivery of biodiversity information resources, especially in our region. The outputs of this meeting will help promote the resilience of ecosystems in the Asia-Pacific region,” Director Lim said.

Director Nakayama, who initiated a silent prayer for the victims of Typhoon Haiyan, said the urgent issue is to provide adequate information on biodiversity to decision-makers in order to allow them to make appropriate decisions based on such information.

Dr. Sheila Vergara, director for biodiversity information management at ACB, said the Fifth APBON Meeting enabled the members of the network to identify the gaps in biodiversity information organization and sharing; agree on measures and partnerships to enhance biodiversity information sharing; and draw recommendations for systematic data sharing in the Asia-Pacific region, among others.

Dr. Vergara said the APBON was established as a regional network with a specific interest in supporting the objectives of the Global Earth Observation: Biodiversity Observation Network (GEO BON), covering most countries of the Asia-Pacific region and all levels of biodiversity and ecosystems. The network’s approaches for biodiversity observation focus on three levels: remote sensing, ecological process research, and species/genetic research. AP-BON tries to link the outcomes of each level observation with the aim of contributing to policy-making for the conservation of biodiversity. The geographic coverage of AP-BON encompasses over 28 million square kilometers across several time zones, experiencing the complete range of climatic conditions.

“The rich natural resources of the Asia-Pacific region face ever increasing pressures and threats. The urgency of protecting its biodiversity calls for interactions and partnerships that will integrate available biodiversity information; appropriately document new knowledge and discoveries in species and ecosystems; and promote the exchange and

use of such information in biodiversity conservation and policy development. AP-BON promotes networking activities directed at biodiversity observation and will bring synergy in conservation of biological diversity at local, national, regional and global levels,” Dr. Vergara explained.

Participants in the AP-BON meeting include: Dr. Tet-sukazu Yahara, Center for Asian Conservation Ecology, Kyushu University, Japan; Ms. Armida Andres and Ms. Sarah Jane Tagtag, PAWB, Philippines; Dr. Mariano Duya, Diliman Science Research Foundation; Dr. Tsuyoshi Hoso-ya, National Museum of Nature and Science, Japan; Dr. Dedy Darnaedi, Indonesian Institute of Sciences; Dr. Mangal Man Shakya, Wildlife Watch Group, Nepal; Dr. Motomi Ito, University of Tokyo, Japan; Dr. Saw Leng Guan, Forest Research Institute, Malaysia; Dr. Eun-Shik Kim, Kookmin University; Republic of Korea; Mr. Suman Jaiswal, International Center for Integrated Mountain Development, Nepal; Dr. K.N. Ganeshaiyah, University of Agricultural Sciences, India; Dr. Ibrahim Djamaluddin and Dr. Yuichi Kano, Kyushu University, Japan; Dr. Keping Ma, Institute of Botany, Chinese Academy of Science, China; Dr. Edwino Fernando, University of the Philippines Los Banos; Ms. Emily Capuli, Fishbase Information and Research Group, Inc.; Dr. Benito Tan, National University of Singapore; Dr. Yusuke Miyazaki, Kanagawa Prefectural Museum of Natural History, Japan; Dr. Yukiku Hasegawa and Dr. Norihiro Matsushima, OMC Inc., Japan; Dr. Hidetsugu Miwa, Biodiversity Center of Japan; Dr. Takeshi Osawa, National Institute for Agro-Environmental Sciences, Japan; Ms. So Hee Lee, Kookmin University, Republic of Korea; Dr. Yu Huan Wang, Taiwan Forest Research Institute; and Dr. Sheila Vergara, ACB.

Germany grants Euro 10M for biodiversity conservation in ASEAN Heritage Parks

GERMANY, through the German Development Bank KfW, will provide Euro 10 million as financial support to the ASEAN Centre for Biodiversity (ACB) for a five-year Small Grants Programme (SGP) for Biodiversity Conservation. The grant will support biodiversity conservation in selected ASEAN Heritage Parks (AHPs).

The ACB acts as Secretariat of the AHP Programme and provides technical support to the ASEAN Heritage Parks. AHPs are protected areas of high conservation importance, preserving in total a complete spectrum of representative ecosystems in the ASEAN region. To date, 33 protected areas have been designated as AHPs.

There are ten AHPs that will be initially covered by the SGP; three in Indonesia and seven in Myanmar. ACB will be responsible for the implementation of the project and act as the Project Executing Agency, cooperating and coordinating with the governments of the participating ASEAN Member States.

The core problem to be addressed by the SGP is how globally important biodiversity is being threatened by unsustainable livelihoods and overexploitation of scarce natural resources in protected areas throughout the ASEAN region.

“The SGP aims to improve biodiversity protection in line with the interest of local populations directly dependent on selected AHPs and adjacent areas; improve the livelihood of



AGREEMENT SIGNING. ACB Executive Director Roberto V. Oliva signed the ACB-KfW Agreement on 2 August 2013 at the ACB Headquarters, University of the Philippines Los Baños, Laguna, Philippines. (from left to right: Ana Maria Tolentino, ACB Technical Specialist/Assistant; Dicky Simorangkir, GIZ International Advisor; Dr. Sheila Vergara, ACB Biodiversity Information Management Unit Director; Olga Caday-Asana, KfW Local Expert; Atty. Roberto Oliva, ACB Executive Director; Clarissa Arida, ACB Programme Development and Implementation Unit Director; and Dr. Filiberto Pollisco Jr, ACB Programme Development Specialist)

local communities directly dependent on these areas; and strengthen the role of ACB in promoting biodiversity conservation protection among the ASEAN Member States,” said ACB Executive Director Roberto V. Oliva. *A.M. Tolentino*

ASEAN launches secondment programme on biodiversity

THE ASEAN Centre for Biodiversity (ACB) has launched a secondment programme that will enable young environmental workers from the ten ASEAN Member States to participate in the planning and implementation of biodiversity conservation projects; and promote collaboration among countries in reducing the rate of biodiversity loss and achieving the Aichi Targets on biodiversity.

The first participating country was Viet Nam which sent two young environmental workers to the Philippines-based ACB.

Norman Ramirez, capacity building specialist with ACB, said the two Vietnamese civil servants were based in the Philippines for two months where they had an opportunity to exchange learning and experiences with biodiversity experts from ACB.

“The Secondment Programme provides opportunities to foster shared understanding and appreciation of ACB biodiversity activities and the capacity building needs of ASEAN



Member States; familiarize the participants on the institutional setup and work processes of ACB; bolster mutual learning through active exchange of information, expertise, and lessons learned; and enhance biodiversity coordination and interaction processes between ACB and the ASEAN Member States,” Ramirez explained.

The Vietnamese participants were welcomed by ACB Executive Director Roberto V. Oliva. He said that through the secondment programme, ACB can work in a more targeted, demand-oriented, efficient manner through country-specific inputs that will be shared by the participants.

The Vietnamese participants were Huyen Anh Phan and Le Anh Dung, both officials at the Viet Nam Environment Administration (VEA). Le Anh Dung earned his degree in Bachelor of International Law at the Hanoi University of Law, and eventually obtained a Master’s degree in Science in Business with Financial Management from the Northumbria University, Newcastle, United Kingdom. He works at the Biodiversity Conservation Agency at the VEA, Ministry of Natural Resources and Environment.

Phan Anh Huyen, who also works at the VEA, finished her degree in Biology at the Hanoi University of Science, and Master of Science in Environmental Assessment and Management at the University of East Anglia, England. Before joining the VEA, she worked for the Vietnam Young Physicians Association in Hanoi.

Winners of Zooming in on Biodiversity and Climate Change photo tilt announced

First Prize winners



Student Category
Mr. Dimas Dwi Adiansyah
(Indonesia)
Working together for the future



Amateur Category
Mr. Jose Melencio
“Bimbo” M. Brillo
(Philippines)
No Fly Zone



Professional Category
Mr. Kyaw Kyaw Winn
(Myanmar)
Hope

THE ASEAN Centre for Biodiversity (ACB) and GIZ announced the winners of the ASEAN-wide photo contest “Zooming in on Biodiversity and Climate Change” at the 4th ASEAN Heritage Parks Conference on October 1, 2013 in Tagaytay City, Philippines.

The awarding ceremony was led by Atty. Roberto V. Oliva, executive director of ACB; and Dr. Berthold Seibert, project director of the ACB-GIZ Biodiversity and Climate Change Project (BCCP).

The contest, which was conducted from December 2012 to July 2013, drew public attention to the twin issues of biodiversity climate change, and the need for both global and local action to address these issues.

ACB and GIZ received 798 entries from Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam.

The three First Prize winners are: Youth Category – Mr. Dimas Dwi Adiansyah (Indonesia) for his photograph “Working Together for the Future”; Amateur Category – Mr. Jose Melencio “Bimbo” M. Brillo (Philippines) for his photograph “No Fly Zone”; and Professional Category – Mr. Kyaw Kyaw Winn (Myanmar) for his photograph “Hope.”

The other winners include: Student Category, 2nd Prize – Mr. Jan Brendan Singlador (Philippines) for his entry “Mangrove Planting”; Amateur Category, 2nd Prize – Mr. Aldrin Cuadra (Philippines) for his entry “Hopeful”; Amateur Category, 3rd Prize – Mr. Aditya Nugraha (Indonesia) for his entry “Mudskipper Fight”; Professional Category, 2nd Prize – Mr. Nikki Sandino Victoriano (Philippines) for his entry “Man-made Forest”; and 3rd Prize – Fahreza Ahmad (Indonesia) for the photo entitled “Flood.”

Mr. Wilfredo Leonado won the People’s Choice Award for his entry “Surviving Drought,” which bagged the highest number of likes on Facebook. A total of US\$4,000 was received by winners in all categories.

“Biodiversity loss and climate change pose a daunting challenge to the ASEAN region and the rest of the world. To address these issues, we need all hands on deck. This photo contest has given us the opportunity to engage professional, amateur and student photographers in generating awareness for biodiversity and climate change. Their photos will be used as educational tools so that people may learn about these key issues,” Atty. Oliva said.

Other winners



Student Category
2nd Prize
Mr. Jan Brendan Singlador
(Philippines)
Mangrove Planting



Amateur Category
2nd Prize
Mr. Aldrin Cuadra
(Philippines)
Hopeful



Professional Category
2nd Prize
Mr. Nikki Sandino Victoriano
(Philippines)
Man-made Forest



Amateur Category
3rd Prize
Mr. Aditya Nugraha
(Indonesia)
Mudskipper Fight



Professional Category
3rd Prize
Fahreza Ahmad
(Indonesia)
Flood



People’s Choice Award
Mr. Wilfredo Leonado
Surviving Drought

According to Dr. Berthold Seibert, BCCP project director, the crucial relationship between biodiversity and climate is among the least understood, yet one of the most important. "The lack of knowledge often translates to indifference and lack of action. The winning photos have captured the urgent need to address biodiversity loss and climate change," he explained.

Looking for youth volunteers for biodiversity



THE ASEAN Centre for Biodiversity (ACB) encourages youth organizations and individuals from the ten ASEAN Member States to join the Global Youth Biodiversity Network's (GYBN). Atty. Roberto V. Oliva, executive director of ACB, said joining GYBN will provide a vehicle for young people to voice out their views and opinions and contribute to the global efforts to conserve biodiversity.

The GYBN Steering Committee said that free membership registration is ongoing. GYBN is an international network of youth organizations and individuals from all over the world whose common goal is to prevent the loss of biodiversity. As an officially recognized youth constituency, GYBN is representing the voice of global youth in the negotiations under the Convention on Biological Diversity. The network raises awareness among young people of the values of biodiversity and connects individuals and youth organizations in order to build a global coalition to halt the loss of biodiversity.

Christian Schwarzer, Youth Ambassador for the UN Decade on Biodiversity, said GYBN is committed to bringing the opinions and positions of young people into the political arena, empowering young people to take action. GYBN seeks to inspire global youth and future leaders to work for sustainable use and conservation of biodiversity for a healthy environment and society.

To actively take part in GYBN, you may join its mailing list at <https://listi.jpberlin.de/mailman/listinfo/gybn>. You can also become a fan of GYBN on Facebook: <https://www.facebook.com/thegybn>. For more information about GYBN check out www.gybn.net. Further inquiries about GYBN may be sent to: gybnsteeringcommittee@gmail.com. The membership registration forms can be found here: Individuals: <http://bit.ly/gybn-indv> and Organizations: <http://bit.ly/gybn-orgs>.

INTERNATIONAL NEWS

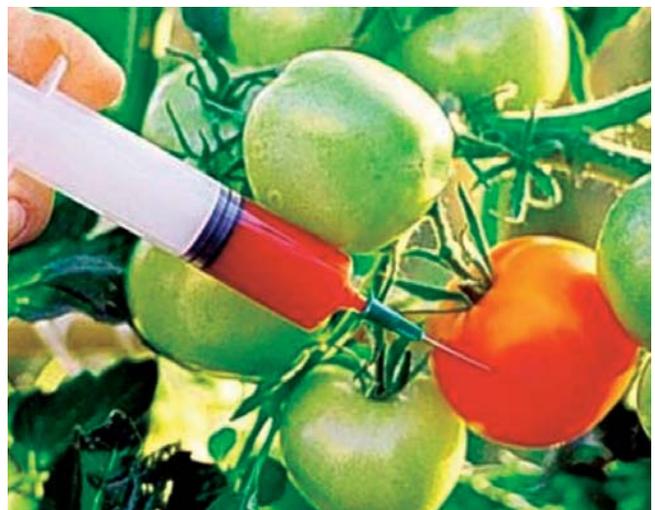
International treaty on biosafety marks 10th year

UNDER the theme, 10 Years of *Promoting Safety in the Use of Biotechnology*, the international community marked the tenth anniversary of the entry into force of the international agreement governing the movement of living modified organisms (LMOs) across national borders – the Cartagena Protocol on Biosafety. The Protocol entered into force on September 11, 2003, ninety days after 50 countries agreed to be bound by it.

As a supplementary treaty to the Convention on Biological Diversity, the Cartagena Protocol on Biosafety aims to ensure the safe handling, transfer and use of LMOs resulting from modern biotechnology, commonly known as genetically modified organisms (GMOs) that may have adverse effects on biological diversity.

Modern biotechnology has potentials to improve human well-being, for example, through enhancing agricultural productivity, but there is concern about potential risks that LMOs may pose to biological diversity and human health. The Cartagena Protocol is the global community's response to this concern. The Cartagena Protocol provides a framework that can enable humans to derive maximum benefit from modern biotechnology without compromising the environment and human health.

Over the past 10 years, a lot of progress has been made towards the implementation of the Protocol. Today, over 100 countries have developed national legal frameworks and administrative systems tailored to handle applications and facilitate decision-making regarding the export and import of LMOs. These systems require risk assessments to be conducted to inform any decisions on the imports of LMOs. Contracting Parties to the Cartagena Protocol have also developed systems to ensure that LMOs are handled, packaged and transported across borders under safe conditions. At the international level, a robust information exchange mechanism on LMOs, the Biosafety Clearing-House, is fully functional and being used as an authoritative source of information on LMOs.



Another notable achievement came in 2010 with the adoption by Parties of the Kuala-Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety. The Supplementary Protocol establishes international rules and procedures on liability and redress for potential damage resulting from the export and import of LMOs.

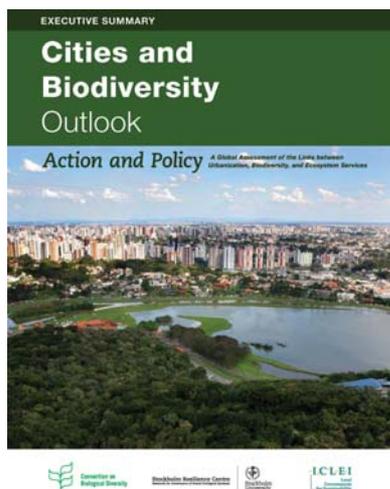
Braulio Ferreira de Souza Dias, Executive Secretary of the Convention on Biological Diversity, said: “We have certainly come a long way. With 166 Parties, the Cartagena Protocol is clearly one of the fastest growing treaties of the United Nations. However, for the Protocol to be fully effective, we need to work towards achieving its universal membership and foster a better understanding among all stakeholders on how the Protocol contributes to sustainable development. I call upon all countries that have not yet done so to fast track their national processes to ratify or accede to the Cartagena Protocol and its Supplementary Protocol on Liability and Redress as soon as possible.”

Maintaining rich biodiversity in and around cities is possible and can improve global sustainable development

(MONTREAL/New York, 4 October 2013) – Increasing urbanization over the next decades presents not only unprecedented challenges for humanity, but also opportunities to curb climate change, reduce water scarcity, and improve food security, according to the world’s first global assessment on the relationship between urbanization and biodiversity loss, released today in New York.

The assessment, entitled Cities and Biodiversity Outlook (CBO), argues that cities should facilitate for a rich biodiversity and take stewardship of crucial ecosystem services rather than being sources of large ecological footprints. The volume of research was produced by Stockholm Resilience Centre together with the Secretariat of the Convention on Biological Diversity (CBD), in partnership with UN-Habitat and ICLEI - Local Governments for Sustainability.

The detailed scientific foundation of the CBO, Urbanization, Biodiversity and Ecosystem Services: Challenges and Opportunities – A Global Assessment, which was launched today in New York as part of local celebrations to mark World Habitat Day, has involved more than 200 scientists worldwide. It states that over 60 percent of the land projected to become urban by 2030 has yet to be built. It further states that if current trends continue, 70 percent of the global urban population will be urban by 2050.



This presents a major opportunity to greatly improve global sustainability by promoting low-carbon, resource-efficient urban development that can reduce adverse effects on biodiversity and improve quality of life, it says.

From emitters to carbon sinks

Production and consumption activities heavily concentrated in cities have contributed to some 80 percent of all greenhouse gas emissions; yet innovative solutions to combating climate change will also come from cities. With rich biodiversity, cities have enormous potential to mitigate climate change.

Preservation of larger outlying green areas, green corridors that connect larger green patches, green roofs and “brownfields”, or land previously used for industrial purposes or certain commercial uses, can also be used as carbon sinks rather than emission sources.

The Japanese district of Yokohama, for instance, which emitted almost 20 million tons of CO₂ in 2007, has recognized the importance of biodiversity in stabilizing the local climate. Revenues from a new tax system have since been used to conserve green areas, and roof tops and walls were fitted with greenery. Yokohama now aims to reduce per capita carbon emissions by at least 60 percent by 2050.

What is important, according to the assessment, is to develop and incorporate already existing green spaces into the functional infrastructure of a city.

“The innovation lies not so much in developing new infrastructural technologies but to work with what we already have. The results are often far cheaper and more sustainable as well,” said Professor Thomas Elmqvist, scientific editor of the assessment.

Dr. Braulio Ferreira de Souza Dias, Executive Secretary of the CBD, added that “the sphere of influence of city leaders goes well beyond urban habitats. The decisions taken by local authorities affect ecosystems near and elsewhere, with important feedback effects. By taking the steps to conserve and sustainably use biodiversity, local authorities can ensure that biodiversity will continue to provide cities and their inhabitants with much needed services including freshwater, clean air, food security and protection and resilience against extreme weather, floods and other environmental risks.”

Biodiversity increases food security

Among a number of other important points, the assessment also highlights the potential for cities to become more self-reliant when it comes to securing sufficient access to water and food.

“Cities need to learn how to better protect and enhance biodiversity, because there is a direct relationship between biodiversity and food security in cities,” Elmqvist said.

The study highlights a wide range of successful initiatives by cities, local authorities, and sub-national governments in both developed and developing countries.

For instance, Kampala, the capital and Uganda’s largest city, has found a way to preserve its vast and highly visible agriculture, even in densely populated areas. Similarly, Cuba has since 1987 focused on urban and suburban agriculture to counter its crisis of lack of imports as well as malnutrition and iron deficiency in the population.

“This locally based approach looks at ways to build diverse supplies of food close to population centers and to

strengthen local decision-making and management of food production,” Elmqvist said.

He argues that development of urban food systems needs to be considered on neighborhood level, city level and city-region level – but it needs to come with proper legislation, training and financial support or economic incentives. Without this, Elmqvist warns, sustainable food systems in urban areas remain on paper only.

The book is a more detailed scientific background to the shorter report *Cities and Biodiversity Outlook – Action and Policy*, which was launched at the UN CBD COP11 in Hyderabad, October 2012.

Coral Triangle Atlas presents maps of regional change



THE Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI) has released an online GIS database of maps on environmental and economic change in the coastal and marine zones of Indonesia, Malaysia, Papua New Guinea, Solomon Islands and Timor-Leste.

The Coral Triangle (CT) Atlas (<http://ctatlas.reefbase.org/>) presents decades worth of fisheries, biodiversity, natural resources and socio-economic information. The Atlas was developed through collaboration between WorldFish, The Nature Conservancy, World Wildlife Fund, Wildlife Conservation and the International Union for Conservation of Nature, and was supported by the US Government's US CTI Support Programme. The future success of the Atlas as a management planning tool will be contingent on the engagement of the CTI partner countries in contributing and validating data. Long-term maintenance will be the responsibility of WorldFish, which is a member of the Consultative Group on International Agricultural Research. *ISSD News*

UNCCD sets theme for 2014 World Day to Combat Desertification

THE Secretariat of the UN Convention to Combat Desertification (UNCCD) has announced that, on June 17, 2014, the World Day to Combat Desertification (WDCD) will focus on the theme of ecosystem-based adaptation with the slogan *Land belongs to the future, let's climate proof it!*

In announcing the selection of the theme, Monique Barbut, UNCCD Executive Secretary, highlighted that, "Land is the basis of all life on Earth and the source of livelihood

for over two billion people. But every year, over 12 million productive hectares are transformed into wasteland through desertification and drought alone."



She called attention to links between ecosystem collapse and political instability or conflict, and said, "Either we take the measures needed to enhance resilience and enable land-dependent communities to adapt or we prepare for the political consequences of our inaction. The choice is ours and 2014 is the year we are calling on every country to do its part."

The theme of ecosystem-based adaptation will include a focus on issues related to land and soil in the context of climate change adaptation and food security. The focus will also seek to mobilize public action for sustainable land management. *UNCCD News*

IFPRI considers socioeconomic impacts of GM crops

THE International Food Policy Research Institute (IFPRI) has published a report offering guidance to practitioners, regulators, policy-makers and researchers on incorporating socioeconomic considerations in biosafety regulations and approval processes for genetically modified (GM) crops.

The report, titled *Socioeconomic Considerations in Biosafety Decision-making: Methods and Implementation*, notes the need for new methods to account for socioeconomic considerations of GM crops after Indonesia, South Africa and other developing country partners to the Cartagena Protocol on Biosafety have opted to go beyond the risk assessment requirements under Article 26.1 of the Protocol to include socioeconomic considerations in the development of their national biosafety regulatory systems.

Individual chapters in the report explore the socioeconomic considerations of GM crops in a number of Ugandan cases, including potential constraints on technological delivery and adoption, economic impacts on farmers, and alternatives for the coexistence of GM and organic crops. The cases take into account the national institutional and sectoral contexts of Uganda to underline critical considerations for the socioeconomic assessment of GM crops. These encompass: the stage of the regulatory process at which such assessments should be included; the proper scope of analysis; and relevant procedures for their inclusion in the decision-making process.

The report highlights the need to address the particular budgetary, human resource, and time constraints developing countries face in the implementation of socioeconomic assessments. The report further recommends tools and methods that can deliver robust results while not adding additional costs and delays to the regulatory process. Specific



recommendations include: collection of ex-ante information on the institutional setting relevant to the technology's deployment; careful selection of sites for ex-post farm-level analyses; and the use of a range of values when evaluating uncertain prices, yields, or other factors.

IDB 2014 to focus on island biodiversity

THE Secretariat of the Convention on Biological Diversity (CBD) is pleased to announce that the theme of the International Day for Biological Diversity (IDB) on 22 May 2014 will be "Island Biodiversity". The theme carries special significance, coinciding with the designation by the United Nations General Assembly of 2014 as the "International Year of Small Island Developing States".

In addition, the theme was chosen to correspond with Decision XI/15, Paragraph 1 in which the Conference of the Parties to the CBD "urges Parties, and invites other Governments, financial institutions and other relevant organizations to strengthen the implementation of the programme of work on island biodiversity".

Islands and their surrounding near-shore marine areas constitute unique ecosystems often comprising many plant and animal species that are endemic – found nowhere else on Earth. The legacy of a unique evolutionary history, these ecosystems are irreplaceable treasures. They are also key to the livelihood, economy, well-being and cultural identity of 600 million islanders – one-tenth of the world's population.

The theme provides a unique opportunity to strengthen existing initiatives such as the Micronesia Challenge, the Caribbean Challenge Initiative, the Coral Triangle Initiative, and the Phoenix Islands Protected Area, and new initiatives including the Western Indian Ocean Coastal Challenges, the proposed Maldives UNESCO Biosphere Reserve, and the development of the Charter on the Conservation and Sustainable Use of Biological Diversity on European Islands under the Bern Convention on the Conservation of European Wildlife and Natural Habitats.

It is also important to note that the Third International Conference on Small Island Developing States will take place on September 1-4, 2014 in Apia, Samoa, providing an ideal forum to highlight the important work being carried out in the context of the programme of work on island biodiversity by Parties and stakeholders.

The International Day for Biological Diversity provides an opportunity to communicate and involve the public to build

awareness on the value of biodiversity for human well-being around the world, as well as to communicate efforts made in support of the Strategic Plan for Biodiversity 2011-2020 and the implementation of the three objectives of the Convention. It also offers an opportunity to highlight other related issues of relevance not only for Island States but for Parties to the Convention that have island ecosystems as part of their national biodiversity heritage, including climate change, marine and coastal biodiversity, invasive alien species, species threatened with extinction, tourism and biodiversity including the Aichi Biodiversity Targets on marine protected areas, as well as cross-cutting issues such as traditional knowledge and customary sustainable use of biodiversity, community conservation areas and others.

Ocean acidity is increasing at an unprecedented rate



THE unprecedented rate of ocean acidification is one of the most alarming phenomena generated by climate change and the only way to mitigate the dangers it represents consists in reducing CO₂ emissions significantly. This is the conclusion of the summary of the Third Symposium on the Ocean in a High CO₂ World (Monterey, USA, September 2012) which were presented at the Conference on Climate Change taking place in Warsaw (Poland), November 11-22, 2013.

The document represents the conclusions of 540 experts from 37 countries reflecting the latest research on the subject. It was prepared by UNESCO's Intergovernmental Oceanographic Commission (IOC), the Scientific Committee on Ocean Research (SCOR), and the International Geosphere-Biosphere Programme (IGBP).

It emerges that all the oceans, which together absorb close to one quarter of CO₂ emissions generated by human activity, have experienced an overall 26 percent rise in acidity since the dawn of the industrial age. Twenty-four million tons of CO₂ are absorbed by the seas daily and, if current emission rates are maintained, the level of the ocean acidity worldwide will rise by 170 percent before 2100, compared to the pre-industrial age.

As acidity increases, the ocean's ability to process atmospheric CO₂ emissions declines, reducing their ability to mitigate climate change. This phenomenon is all the more worrying in view of other threats to marine ecosystems such as rising water temperatures, overfishing, and pollution.

While sea grass and some phytoplankton species seem able to cope with higher acidity, other organisms, such as corals and crustaceans are likely to be severely affected.



Substantial changes in marine ecosystems are expected and they are likely to have a major socioeconomic impact. Experts expect seashell fisheries to lose some \$130 billion annually, if current CO₂ emissions remain unchanged.

While expertise regarding the effects of CO₂ on the marine environment has grown, it remains difficult to provide reliable projections regarding its impact on whole ecosystems. Questions still to be answered include: Will some of the species that will have disappeared be replaced? Will some be able to adapt?

For this reason, scientists are pleading in favor of initiatives that will enable them to learn more about acidification, such as the Ocean Acidification Network co-founded by the IOC and the International Ocean Carbon Coordination Project (IOCCP) set up by the IOC and SCOR.

They also call for the establishment of international mechanisms capable of handling specific questions regarding ocean acidification so as to ensure that they receive the attention they deserve in climate change negotiations. UNESCO News

Threatened marine ecosystems get boost from US\$4.5 million grant from GEF

THE World Bank's Board of Executive Directors has approved a project to support the Capturing Coral Reef and Related Ecosystem Services Project, with US\$4.5 million in grant funding provided by the Global Environment Facility (GEF). This regional project will design innovative models for valuing mangrove, sea grass, and coral reef ecosystems services to inform policy- and decision-making for improved environmental stewardship of these critical resources.

The project focuses on Indonesia and the Philippines, where coral reefs and related ecosystem services are critical to livelihoods, food security, and climate resilience, and includes activities to quantify the value and market potential of coral reef and mangrove ecosystem services; forge community-led innovation in capturing and sustaining benefits from marine eco-system services and enhancing resilience in the face of climate change; and promote behavior change through outreach and widely disseminate scientific information to inform policy- and decision-making.

Coastal and marine resources and their associated ecosystem services in the region are linked to globally important marine biodiversity and underpin an enormous part of



the regional economy.

"Capturing the economic and cultural values of marine natural capital through the valuation of ecosystem services, and quantifying the cost of lost services due to environmental degradation, has enormous potential. We can transform the development and stewardship of coastal areas by translating ecological value into financial terms for local stakeholders and policy makers," said Marea Hatzios, Senior Environmental Specialist and the World Bank's team leader for the project.

"This wealth of natural capital has the potential to be a major driver of inclusive green growth in the region, if we overcome some huge challenges. We especially need better resource governance regimes, measures to adequately value the environment for current and future generations when calculating economic benefits, and good scientific information to inform decision making and tradeoffs," she added.

The world's biodiversity epicenter lies within the Coral Triangle – an area that extends from the northern Philippines to Malaysia in the west, East Timor to the South, Eastern Indonesia and Papua New Guinea to the East and trailing off to the Solomon Islands toward the Southeast. Here, coral reefs are most abundant and diverse and support large populations of people who are highly dependent on coral reef fisheries for the livelihoods and food security. In the Western and Central Pacific, healthy coral reefs and mangroves form the first critical line of defense against storm surge and sea-level rise for low lying islands and atolls.

The GEF grant will be administered by the Global Change Institute of the University of Queensland.

The University is contributing US\$2 million in additional financing and research partners will provide another \$3.9 million in contributions. An additional \$21.9 million in parallel co-financing is provided by World Bank-financed projects: the Coral Reef Rehabilitation and Management Program-Coral Triangle Initiative (COREMAP-CTI) in Indonesia and the Rural Development Project in the Philippines.

WB, GEF News Releases

Biodiversity meeting affirms key role of traditional knowledge in implementing the UN biodiversity convention

(MONTREAL, 12 October 2013) – Governments and indigenous and local communities at the Eighth Meeting of the Ad Hoc Open-ended Working Group on Article 8(j) and Related Provisions, held in Montreal, Canada, have reaffirmed the need to recognize and integrate traditional knowledge (TK) systems of indigenous and local communities into the future work of the Convention on Biological Diversity (CBD), including its Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization.

The Eight Meeting of Article 8(j) concluded Friday, 11 October 2013, with recommendations for work that will build knowledge networks, support capacity-development, and integrate TK and customary practices of indigenous and local communities into the science base of the work of the CBD.

Braulio Ferreira de Souza Dias, CBD Executive Secretary, said: "Throughout the years, this Working Group has

raised the profile of indigenous and local community issues in the framework of the Convention and beyond and has given them an opportunity to contribute actively to the work of the CBD for the benefit of all.”

The main outcomes of the meeting include:

- Governments are encouraged to provide support to the recently founded World Indigenous Network, now housed with the Equator Initiative of the United Nations Development Programme, to permit the development of a global network for knowledge and cultural exchanges for conservation and sustainable use of biological diversity.
- A plan of action on customary sustainable use of biodiversity, to provide ways to integrate customary practices that support sustainable natural resource management into biodiversity management strategies at all levels, was endorsed. This global plan of action will positively contribute to poverty alleviation, as well as provide a substantive contribution to global discussions on the post-2015 sustainable development agenda.
- Community-based monitoring and information systems were welcomed as part of the overall indicators work of the CBD and accompanied by a call for further work for capacity development and for efforts to integrate TK into the systems to monitor progress.
- Results of an in-depth dialogue on “Connecting TK systems and science, such as under the IPBES, including gender dimensions” will be taken into account in the work of the Convention, and will also be transmitted to the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES). The meeting invited the IPBES to look at the contributions of community-based information and monitoring systems and multiple evidence based approaches to biodiversity data.
- It was decided to begin the process of developing draft voluntary guidelines for the repatriation of TK related to the conservation and sustainable use of biodiversity. Guidelines will be developed based on consultations with indigenous and local communities, the United Nations Educational, Scientific and Cultural Organization, the World Intellectual Property Organization, and other organizations. The information will be considered at the next meeting of Article 8(j) with a view to assisting indigenous and local communities with restoration of knowledge systems and culture.
- Participants agreed to advance work on several tasks that will contribute to work under the Convention and the Nagoya Protocol. These tasks will support the development of voluntary guidelines for prior informed consent and equitable sharing of the benefits arising from the use of TK, with the full and effective participation of indigenous and local communities, that will be used to assist Parties and Governments in the development of legislation or other mechanisms for the effective implementation of Article 8(j) and its related provisions.
- The Meeting also urged Parties and other Governments to recognize, support and encourage the development of local *sui generis* systems by indigenous and local communities, including through the development of community protocols, as part of national action plans for the protection, preservation and promotion of TK within national biodiversity strategies and action plans. *SCBD News*

REGIONAL NEWS

ASEAN environment ministers support 10-year framework on sustainable consumption and production

AT the 14th Informal ASEAN Ministerial Meeting on the Environment (IAMME) held in Surabaya, Indonesia on September 25, 2013, ASEAN environment ministers released a joint statement on the implementation of sustainable consumption and production (SCP) in the ASEAN region.



The Ministers affirmed the importance of the implementation of sustainable consumption and production as an objective of sustainable development. They recognized that the ASEAN is a dynamic community and SCP is fundamental to sustaining development and achieving prosperity in the region. However, they also acknowledged that additional policy support and public and private sector investments in capacity building on technical skills and institutional competency are needed to address environmental, social, and economic aspects of SCP. The Ministers thus encouraged relevant stakeholders in ASEAN, including private sector and civil society, to enhance their contribution to sustainable development by continuously building their capacities, implementing best practices for sustainable consumption and production, and promoting exemplary regional cooperation of the 10-Year Framework of Programmes on Sustainable Consumption and Production (10YFP) activities.

At the United Nations Conference on Sustainable Development, Heads of State strengthened their commitment to accelerate the shift towards SCP patterns with the adoption of the 10-YFP. The 10YFP is a global framework of action to enhance international cooperation to accelerate the shift towards SCP in both developed and developing countries. The framework supports capacity building, and provides technical and financial assistance to developing countries for this shift. The 10YFP will develop, replicate and scale up SCP and resource efficiency initiatives, at national and regional levels, decoupling environmental degradation and resource use from economic growth, and thus enhancing the net contribution of economic activities to poverty eradication and social development.

Asia Parks Congress concludes with pledge for new era in protected area collaboration

(19 November 2013) - The first ever pan-Asia gathering on the region’s national parks and protected areas concluded with a pledge for stronger collaboration that will capture the energy of the current Asia boom to ensure that protected areas contribute to human progress while conserving biodiversity.

The Sendai Charter for Asia’s Protected Areas was adopted by more than 800 delegates from 46 countries com-

ing together in Sendai, Japan to help chart a future for protected areas and their contributions to human well-being in the world's fastest growing region.



The Charter supports two other meeting outcomes – a youth declaration on protected areas and a message to next year's IUCN World Parks Congress in Sydney, Australia, calling for action on some of Asia's and the world's most pressing challenges including disaster risk reduction and recovery, human health, sustainable economic development, and climate change.

"Protected areas are much more than just beautiful places," says Scott Perkin, Head of IUCN's Biodiversity Conservation Programme, Asia. "They conserve biodiversity; store carbon; buffer us from natural hazards; provide food, water and fibers; and stimulate local economies. It is our hope that the Sendai Charter and the other important calls to action resulting from the Congress will help to raise the profile of protected areas in the region and highlight the vital role they play in supporting human well-being."

The Congress, which was hosted by the Ministry of the Environment Japan and organized by IUCN and the Ministry, focused in part on Sanriku Fukko (fukko is "reconstruction" in Japanese) National Park, a new protected area that has risen from the devastation of the 2011 earthquake and tsunami that is seeding hope for local people and communities. The project is Japan's most ambitious "Green Reconstruction Project" – a philosophy of revitalization for the rugged and scenic north-eastern Japanese coast. Sanriku Fukko is not only rehabilitating natural areas, but also providing opportunities for local culture, lifestyles and businesses to thrive. The park's rise is emblematic of protected areas' potential to support both successful conservation and sustainable development.

The Congress wrapped up with agreement from delegates to take the example of Sanriku Fukko, in addition to the Sendai Pledge and other outcomes, forward to the

IUCN World Parks Congress. Held only once every ten years, the IUCN World Parks Congress is the premier event for protected areas, and sets the agenda for their conservation for the decade to come. Next year's theme, Parks, People, Planet – Inspiring Solutions, will build on the Asia Parks Congress to further articulate the vital role that protected areas play in conserving nature while also delivering essential ecosystem services and contributing to the goals of economic and community well-being in the post-2015 development agenda. *IUCN News*

Workshop highlights initiatives on wetlands and migratory birds flyway sites



MANAGERS of wetlands and migratory birds flyway sites in Asian countries gathered in Manila to share good practices in managing and conserving wetlands of international importance, and of migratory waterbirds and their habitats.

The "Asian Regional Workshop on the Management of Wetlands and Flyway Sites" was held on September 24-27, 2013 at the Asian Institute of Management Conference Center in Makati City, Philippines. The four-day event was spearheaded by the Society for the Conservation of Philippine Wetlands, Inc., in cooperation with the Protected Areas and Wildlife Bureau of the Philippines' Department of Environment and Natural Resources, the Ramsar Convention Bureau, the Ramsar Regional Center-East Asia, and the East Asian-Australasian Flyway Partnership.

During the workshop, the ASEAN Centre for Biodiversity (ACB) presented its initiatives on protected area management, including its support to wetland conservation and sustainable use in the ASEAN region through the ASEAN Heritage Parks (AHP) Programme.

The AHP Programme is anchored on the ASEAN Declaration on Heritage Parks of 1983 which defined the proposed criteria and guidelines for the selection, establishment and management of protected areas in the region. In 1984, the Declaration on AHPs and Reserves was issued and the ASEAN Member States established the AHPs to generate greater awareness, pride, appreciation, enjoyment and conservation of the ASEAN region's rich natural heritage.

"As part of the AHP Programme, ACB provides support on awareness raising and capacity building of critical wetlands sites such as the Tasek Merimbun National Park



in Brunei Darussalam; Lorentz National Park in Indonesia; Alaungdaw Kathapa National Park, Indawgyi Lake Wildlife Sanctuary and Inle Lake Wildlife Sanctuary in Myanmar; Sungei Buloh Wetland Reserve in Singapore; and Ao Phang Nga-Mu Koh Surin-Mu Koh Similan Marine National Parks and Meinmhala Kyun Wildlife Sanctuary in Thailand, " Ms. Clarissa Arida, Director of the Programme Development and Implementation Unit of ACB, explained.

On-the-ground support to AHPs are piloted through the ACB-GIZ Biodiversity and Climate Change Pilot Project. ACB is also implementing an ASEAN Small Grants Programme, funded by KfW, in AHPs in Myanmar and Indonesia.

Asia-Pacific policy makers discuss valuing and accounting for the environment

SOME 80 senior policy makers and analysts from the Asia-Pacific region participated in a workshop on valuing and accounting for the environment. Held on October 8-10, 2013 at the UN Convention Centre in Bangkok, the workshop brought together senior government policy makers and statisticians, along with representatives of relevant international organizations and the academe, and experts on environmental and national income accounting and ecology, to discuss approaches to augment existing macroeconomic aggregates.

The workshop illustrated how inclusive wealth including natural capital should be an integral part of the Systems of National Accounts (SNA) of countries; elucidated current efforts that integrate environmental considerations into national accounts at the international level, both within the UN system and in specific countries; brainstormed on how to implement the System of Environmental-Economic Accounting (SEEA) Central Framework and to take forward the Experimental Ecosystem Accounts of SEEA in individual countries; illustrated how valuation of ecosystem services can improve public policy decision making; reviewed methods for valuing ecosystem services and identify policy and capacity needs for valuation; and identified ways to develop valuation skills and macro-economic aggregates, other than Gross Domestic Product, to measure progress at the country level.

The *Millennium Ecosystem Assessment 2005*, an in-depth assessment of the state of ecosystems of the world, revealed that approximately 60 percent of the ecosystem services that support life on Earth – such as fresh water, capture fisheries, air and water regulation, and the regulation of regional climate, natural hazards and pests – are being degraded or used unsustainably. Scientists warn that the harmful consequences of this degradation could grow significantly worse in the next 50 years. "Any progress achieved in addressing the goals of poverty and hunger eradication, improved health, and environmental protection is unlikely to be sustained if most of the ecosystem services on which humanity relies continue to be degraded," said the study.

In the years since then, considerable progress in the measurement and valuation of ecosystem services has been made. The recently concluded study on 'The Economics of Ecosystems and Biodiversity' (TEEB) pulled together

much of the work in this area and succeeded in focusing international policy attention on the economic contribution of ecosystems and biodiversity. Valuation has been widely accepted in the environment community, but engaging ministries of finance and economic planning agencies in dialogue about growth and ecosystem services remains a challenge.

One part of the solution to this problem lies in policy making that takes into account the full value of ecosystem services. Another part lies in the regular production and dissemination of macro-economic aggregates which reflect environmental changes. Both these strategies are vital and complement each other. Valuation is an integral part of accounting; though it also has an independent role in decision making for individual projects. Robust valuation of ecosystem services, together with an understanding of the limits of economic valuation, is important for designing projects.

The wealth of a nation is broadly defined to include produced capital, natural capital, human and institutional capital and net foreign financial assets. If wealth is decreasing, for example from depletion or degradation of natural capital, then a country will not be able to sustain its current level of income. This reality is not given attention in policy discussions.

The event was organized by the United Nations Environment Programme, the South Asian Network for Development and Environment, and the UN Economic and Social Commission for Asia and the Pacific; and supported by the ASEAN Centre for Biodiversity, Economy and Environment Programme for Southeast Asia, Wealth Accounting and the Valuation of Ecosystems Programme, Asian Development Bank Greater Mekong Subregion Core Environment Programme, United Nations Statistics Division, United Nations Development Programme, GIZ, Indian Society for Ecological Economics; World Bank, and the Central Statistical Organization of India.

14th IAMME and COP9 on transboundary haze pollution held in Indonesia

MINISTERS responsible for the environment from ASEAN Member States held their 14th Informal ASEAN Ministerial Meeting on the Environment (IAMME) and 9th Meeting of the Conference of the Parties to the ASEAN Agreement on Transboundary Haze Pollution on September 25, 2013 in Surabaya, Indonesia. The Ministers reviewed regional cooperation on a number of environmental issues, in particular the related actions in the environmental sustainability section of the ASEAN Socio-Cultural Community (ASCC) Blueprint, and discussed new initiatives to further promote regional environmental cooperation.

The Ministers reviewed national, sub-regional and regional activities to address land and forest fires, including transboundary haze pollution. They welcomed the significant progress in the implementation of the Work Programme of the ASEAN Agreement on Transboundary Haze Pollution, including concrete on-the-ground activities; the progress in the development of the ASEAN-wide Fire Danger Rating System; implementation of the ASEAN Peatland Management Strategy (2006-2020); and the implementation of the Strategic Review on Sub-Regional Ministerial Steering



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Committee (MSC) on Transboundary Haze Pollution programmes. The Ministers also adopted the updated ASEAN Peatland Management Strategy (2006-2020). Because of an expected increase in hotspot activities leading to the occurrence of transboundary haze, the Ministers agreed to recommend the adoption of the ASEAN Sub-Regional Haze Monitoring System (HMS) as a joint haze monitoring system among countries.

Other highlights of the 14th IAMME include the adoption of the ASEAN Environmental Education Action Plan 2014-2018 as the successor plan to the ASEAN Environmental Education Action Plan 2008-2012, to serve as a guiding document to continue promoting sustainable development through environmental education and public participation. The Ministers released an ASEAN Joint Statement on Sustainable Consumption and Production to express their commitment to strengthen cooperation within ASEAN and with ASEAN Dialogue Partners, relevant UN Agencies, and other international partners on the implementation of the 10-Year Framework of Programme on Sustainable Consumption and Production.

Indonesia ratifies Nagoya Protocol, reaches halfway mark to entry into force

WITH five new ratifications, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization has taken a big step towards entry into force. The ratifications by Indonesia, Bhutan, Côte D'Ivoire, Guinea Bissau and Norway, during



Convention on
Biological Diversity

the United Nations Treaty Event, bring to 25 the total number of ratifications to the ground-breaking treaty under the umbrella of the Convention on Biological Diversity (CBD). This is half of the 50 ratifications needed for the Protocol to enter into force.

Indonesia is the fourth mega-diverse country and the second ASEAN Member State (AMS) to ratify the Nagoya Protocol. Executive Director Roberto V. Oliva said the first AMS to ratify the Protocol was Lao PDR. The commitment to the Protocol by countries that hold vast stores of biological diversity demonstrates the potential for access and benefit-sharing to contribute to sustainable development and increased knowledge of the value of natural resources while providing the conditions for continuous research on and development of genetic resources.

Norway became the first developed country to ratify the Nagoya Protocol. The growing community of States that has ratified this instrument highlights its importance both for obtaining access to genetic resources and for sharing benefits arising from their use.

"The new ratifications have significantly added to the momentum towards entry into force of the Nagoya Protocol in time for the 12th Meeting of the Conference of the Parties to the Convention, to be hosted by the Republic of Korea in October 2014," said Bráulio Ferreira de Souza Dias, CBD Executive Secretary, adding, "We now have ratifications from all regions of the world, attesting to the broad support for this Protocol and its objective of contributing to the conservation and sustainable use of biodiversity through access to genetic resources and the sharing of benefits arising from their use."

The Nagoya Protocol will enter into force on the 90th day after the date of deposit of the 50th instrument of ratification, acceptance, approval or accession.

SCBD-ACB News

■ Brunei Darussalam

ISB students learn wildlife preservation. Children at International School Brunei (ISB) participated in an educational outreach programme to learn about the environment and wildlife in Brunei Darussalam. The event was the first of a series planned for schoolchildren around Brunei Darussalam organized by the Biodiversity and Natural History Society (BruWILD). Activities during the event included lessons on collecting insects, which showed participants the variety and diversity of insect life in Brunei Darussalam; observation of animals found in the wild, such as a collection of endemic frogs; and discussions on how to protect and conserve the country's natural heritage and biodiversity.

The Brunei Times



Wildlife group spots rare deadly coral snake. The Malayan Blue Coral snake, a deadly and lethal snake that is rarely found on the island of Borneo, was spotted and documented by the 1stopbrunei Wildlife Club (1SB Wildlife) during an excursion into one of the Ulu forests of Brunei. The snake was over six feet long. The Malayan Blue Coral snake has no anti-venom as other coral snakes and is the deadliest snake within its family.

The Brunei Times

JKR, PUJA to run, cycle to save water. The Public Works Department (PWD) under the Ministry Development of Brunei Darussalam heeded the call to improve water conservation in the country by raising awareness through a charity event known as JKR REACH, which stands for 'Run, Exercise and Cycle for Health'. The event was jointly organized with the Brunei Association of Surveyors, Engineers and Architects (PUJA). JKR REACH,



which was themed *Dare to Reach. Care to Save* took place on October 27 at the government complex area at the Old Airport Road, Berakas. Officials state that Brunei Darussalam has the highest water consumption in the region at 450 liters per person per day compared to a daily consumption of 250 liters in neighboring countries. The event heightened public awareness on water conservation which is in line with World Water Day 2013's theme of the International Year of Cooperation. *The Brunei Times*

■ Cambodia

White-shouldered ibis numbers more than expected. BirdLife International Cambodia counted 973 critically endangered white-shouldered ibis, the largest recorded population of the species since 2009. Some roosts were found to have between 300 and 400 ibis. During the rainy season, the white-shouldered ibis, which is about 80 cm long and native to Southeast Asia, lives in colonies in dry forests of palm trees that are common in Cambodia. Almost 80 percent of the white-shouldered ibis live in roosts outside protected areas, making them vulnerable to habitat loss and deforestation. The counts show that the Western Siem Pang Proposed Protected Forest is the most important site for this critically endangered species globally, with 451 individuals (equal to 41 percent of the global population), followed by Lumphat Wildlife Sanctuary with 298 individuals. However, both sites are threatened by economic land concessions, which will destroy key nesting and foraging habitats for the species. *The Cambodia Daily*

Bat watchers wanted. Nearly 50 government officials, NGO members and students gathered at the Royal University of Phnom Penh (RUPP)



to learn about conservation and monitoring tactics of one bat genus indigenous to Southeast Asia – Lyle's Flying Fox. The workshop focused on calculating and conserving populations of the Flying Fox, a genus found only in Cambodia, Thailand, and Viet Nam. The event was led by the Southeast Asian Bat Conservation Research Unit in collaboration with the Centre for Biodiversity Conservation at RUPP. Through pollination and seed distribution, Flying Foxes are crucial to the survival of hundreds of different plant species such as Cambodia's durians. Though about 15 of the 31 known species of Flying Foxes in Southeast Asia are considered threatened or endangered, the bats are killed by hunters and farmers using pesticides across the region. The workshop was part of a series intended to grow the network of scientists and others interested in Flying Foxes who can measure populations in areas where data is lacking. *Phnom Penh Post*

Killing of endangered gaur prompts arrests. Four unidentified men were arrested for allegedly killing an endangered and pregnant gaur – a species of wild bovine – in a protected wildlife reserve in Mondulkiri province. Provincial authorities and conservationists in charge of feeding the animal were alerted after villagers discovered the carcass. Diminishing populations of hoofed animals in Southeast Asia have hit epidemic proportions, according to a report published by the World Wide Fund for Nature. The report stated that Cambodia has also been hit hard, with one of its indigenous hoofed species, the banteng, experiencing a 90 percent drop in its numbers since the 1960s. Endangered animals are frequently found for sale in local markets. *Phnom Penh Post*

■ Indonesia



New fish discovered in Indonesia's coral reefs. Conservation International and the Indonesian Biodiversity Research Centre announced that a new fish of the flasher wrasse species with striking orange color and rounded fins has been found in Indonesia's coral reefs. The discovery was made in the East Nusa Tenggara province, and has been published in the latest *Aqua*, International Journal of Ichthyology. The species was named *Paracheilinus rennyae* in recognition of the scientific contributions of ichthyologist Renny Kurnia Hadiaty from the Indonesian Institute of Sciences. The fish is known only from reefs off southwestern Flores Island and the Komodo National Park area. Although it is the 17th known type of flasher wrasse, it is unique in both its coloration and especially the rounded shape of its dorsal and anal fins and tail, and genetically distinct from all other known flasher wrasses in the Coral Triangle. Flasher wrasses are favorites among divers and underwater photographers due to their electric blue and red color patterns, which are only displayed as part of a daily mating ritual that normally occurs about an hour before sundown. Komodo National Park, encompassing a number of islands and their surrounding waters, is popular with divers, and it is hoped that such discoveries will increase the tourism value of the park. *CTV News*

Sumatran rhinos found in Kalimantan. The World Wide Fund for Nature (WWF) Indonesia and West Kutai administration found the first evidence of a two-horn Sumatran rhino in West Kutai, East Kalimantan. The findings were announced at the first Asian Rhino Range States Meeting in Bandar Lampung. The team obtained the



evidence of a two-horn Sumatran rhino in Kalimantan through 16 video traps that collected footage over a three-month period. The video, recorded on June 23, June 30 and August 3, showed rhinos foraging for food and rolling in the mud to lower their body temperatures. WWF Indonesia called on all parties in Indonesia and abroad to immediately take part in the efforts to save rhinos in Indonesia, particularly Sumatran rhinos in Kalimantan. *UPI*



New spiny rat discovered in 'birthplace of evolution'. The Spiny Boki Mekot Rat was found in the mountain forests of Halmahera in the Moluccas (Maluku) archipelago. It was from these islands that Alfred Russel Wallace wrote to Charles Darwin, outlining his theory of evolution. The new rat was found in a remote, hilly region of Halmahera by an expedition team from the University of Copenhagen and Indonesia's Museum Zoologicum Bogoriense. Traps were baited with roasted coconut and peanut butter and placed on tree trunks and at burrow openings. Among their findings was a previously unknown rodent with coarse, brownish grey fur on its back, and a whitish grey belly. By analyzing the rat's DNA and physical features such as its skull and teeth, they determined it was not only a new species, but an entirely new genus. They named it *Halmaheramys bokimekot* after nearby Boki Mekot, a mountainous area under ecological threat due to mining and deforestation. Their findings are reported in the *Zoological Journal of the Linnean*

Society. The discovery highlights the large amount of unknown biodiversity in the region and the importance of its conservation. Little is known about their behavior, but they are thought to be omnivorous, as the scientists found both vegetable and insect remains in their stomachs. *BBC News*

■ Lao PDR

Green industry development discussed. Lao PDR held a National Workshop on Green Industry for Low Carbon Development to discuss the development of a green industry by promoting the use of renewable energy to reduce production capital and negative impact on environment and thus ensuring safety and health protection. The government has laid out a plan to promote the use of renewable energy in various forms including animal mass and natural gas in industry, agriculture and handicraft sectors. The workshop was organized by the Cleaner Production Centre and the Industry and Handicraft Department, and supported by the Japanese government and the United Nations Development Programme. *KPL*



Dr. Manohak Rasachack, Head of Industry and Handicraft Department (center) addressing the opening ceremony for the workshop.

UN helps southern provinces build defenses against climate change. The United Nations Least Developed Countries Fund and United Nations Developed Programme in Vientiane provided USD4.98 million to Xekong and Saravan when studies showed that the two provinces were at risk from changes in weather patterns. The project will run from 2013 to 2016 and will build capacity among provincial, district and local authorities in Xekong and Saravan provinces to integrate climate change risks into their existing development planning and

budgeting. As part of the main project, 48 small-scale infrastructure projects to strengthen community resilience to changing weather patterns will be set up.

Vientiane Times

Guppy fish proven to be cheap, effective tool against dengue.

Larvae-eating guppy fish can help combat the spread of dengue, a mosquito-borne illness giving rise to hundreds of thousands of severe cases including 20,000 deaths worldwide every year, according to a trial study by the Governments of Cambodia and the Lao PDR with the support of the Asian Development Bank (ADB) and the World Health Organization (WHO). The community-based project, conducted in two districts in Cambodia and the Lao PDR from 2009 to 2011, resulted in a sharp decline in mosquito larvae in water storage tanks after the tiny fish were introduced. Guppies eat larvae that grow into mosquitoes, which in turn bite humans and transmit dengue. Dengue causes severe joint and muscle pain, headache, high fever, and rashes and is fatal in a small proportion of cases. Around 2.5 billion people worldwide are at risk of contracting dengue, more than 70 percent of whom live in Asia and the Pacific. Dengue is spread by a specific mosquito that breeds readily in standing water, such as found in storage containers, flower pots, and discarded tires. The trial showed that guppies do not harm water quality and can survive on microscopic organic material in the absence of mosquito larvae. ADB stated that this method offers a low-cost, year-round, safe way of reducing the spread of dengue in which the whole community can participate. It offers a viable alternative to using chemicals and can reduce the scale of costly emergency response activities to contain epidemics. *ADB*

■ **Malaysia**

Count your carbon emissions.

It makes business sense for companies to measure their carbon emissions, report it, and then reduce it. Once a company has mapped its carbon footprint (how much is emitted and where), it is better able

to plan ways and means to curtail emissions and set targets for them. In Malaysia, carbon mapping is still in its infancy and is mostly done by large companies, often with overseas owners. In 2014, a local voluntary carbon reporting scheme called MYCarbon will be launched to encourage companies to audit their activities for GHG emissions and plan reduction measures. This provides companies with tools to look at their business from the carbon perspective so that they can conduct an in-house analysis of their carbon emissions. Data can be used to improve efficiency and as a corporate benchmark to compare with other companies. Knowing this will inform and empower companies to view their business from a sustainability standpoint or even consider carbon labelling. The government hopes to get 20 companies to participate in the pilot phase of the carbon reporting scheme. Aside from the sources of GHG emissions, the company should also identify sinks and reservoirs (such as tree-planting projects) as these will help absorb the emissions.

The Star Online

“Green Initiatives” welcomed in 2014 budget. Conservation organizations welcomed the government’s Budget 2014 announcement on several green initiatives that will be introduced in the country. These include the setting up of the National Conservation Trust Fund; introduction of the Environmental, Social and Government Index; National Carbon Reporting Programme or MyCarbon; investment tax allowance on green technology products; income tax exemption on green technology services and systems; establishment of the Malaysian Green Foundation; and the government’s leadership by example in energy efficiency. Budget 2014 also announced efforts to market Malaysia as a venue for Social Responsible Investment. Environmentalists stated that they would work closely with the government and related organizations to move Malaysia on the “green journey” and look forward to seeing the implementation of the green initiatives. They also expressed

hope that allocations to increase economic activities and outputs all sectors will be underpinned by the principles of sustainability and respecting the limits of nature and the environment. *WWF Malaysia*



Saving the clouded leopard.

Wildlife researchers are now in a better position to draw up conservation plans following the capture of one of Sabah’s most elusive wildlife animals, the Sunda clouded leopard. The 25-kg male animal was trapped in the lower Kinabatangan region in Sabah’s east coast and released after being fitted with a satellite tracking collar in a collaborative project between the Sabah Wildlife Department and research non-government organizations Wild CRU and the Danau Girang Field Centre. Information collected from the male leopard, including its movements over the next six months, would enable researchers to come up with effective measures in protecting the species. Sunda clouded leopards are among the most elusive and secretive of the world’s wild cats, and remain one of the least understood. The research programme is funded mainly by a RM1.46million donation from Sime Darby Foundation with additional funding and support from the Atlanta Zoo, Houston Zoo, Recanati-Kaplan Foundation, Robertson Foundation, Point Defiance Zoo and Rufford Foundation. *The Star*

■ **Myanmar**

First electricity from waste due in October 2014. Waste-generated electricity is expected to come online by October 2014, with two waste-to-energy projects in the Yangon Region expected to start in January 2014. A South Korean company called Chasson International won the tender for a compressed natural gas

(CNG) plant at the Htein Pin garbage collection site in Hlaing Tharyar Township, while a joint venture between Zeya and Associates and Hyundai Rotem won the tender for the electricity-generating plant at Dawei Chaung in North Dagon. The Htein Pin project will be implemented in three years, producing 12 megawatts an hour in the first year, 10MW in the second year, and 8MW in the third. The Dawei Chaung project will generate 15.4MW an hour after two years. About 1,400 tons of organic and inorganic waste from Htein Pin and Dawei Chaung would be used for the electricity projects, which will also promote environmental conservation.

Myanmar Times

Rare species of turtles to be released in Sunderbans. A bale of a rare species of Northern River Terrapin or Sunderbans Batagur turtles, which is considered critically endangered across the globe, will be released in the Sunderbans in mid-2014. This is part of the conservation programme of the Sunderbans Tiger Reserve (STR), which has been successful in its efforts in hatching the Batagur Turtles at the Sajnekhali Mangroves Interpretation Centre in the Sunderbans. STR hatched 33 Batagur turtles in the centre in 2012, and 56 in 2013. These turtles will be released in the wild two years from the day of their hatching. Only 15 to 20 turtles will be released to see if the turtles will be able to find a suitable habitat. The Batagur turtles, which are found in Sunderbans forests of India, Bangladesh and parts of Myanmar, have been declared critically endangered by the International Union for Conservation of Nature. The Batagur turtles in India have undergone a sharp decline in last few decades due to human consumption. *EIN*

Illegal fishing linked to Irrawaddy dolphin deaths. Officials say they believe a number of Irrawaddy dolphins found dead on the Ayeyarwady River this year suffered injuries related to illegal fishing. One cause may be battery fishing, which is particularly common from October to May when fishing conditions are best. The deaths of the dolphins have raised concerns



since Irrawaddy dolphins are critically endangered. In an effort to boost declining dolphin numbers, the Ministry of Livestock and Fisheries created a 74-kilometer long protected area on the Ayeyarwady River between Kyaukmyaung and Mingun in Sagaing Region in December 2005. The protected area also seeks to maintain the unique culture of cooperative fishing between humans and dolphins. This culture is now under threat because of the growth in illegal fishing and, in particular, fishing with batteries. Conservationists and residents say that because of battery fishing, dolphins are now afraid to approach vessels, and government officials have struggled to stop the fishermen, who are often armed and work in groups. *Myanmar Times*

■ Philippines

Coastal forest restoration eyed for storm-hit areas in Eastern Visayas. The Department of Environment and Natural Resources (DENR) is looking at restoring mangrove and beach forests in some 380 kilometers of coastline in Eastern Visayas, including Leyte and all other portions ravaged by Super Typhoon Haiyan, to protect these communities against the devastating effects of future storms. DENR Secretary Ramon J. P. Paje said the tragedy caused by Haiyan underscored the need to revive the region's degraded coastal forests to make its coastlines less vulnerable to extreme weather events. A massive tree-planting activity under the government's National Greening Programme may take place in coastal areas in Tacloban City and Dulag town in Leyte; municipalities of Guiuan, Llorente, and Balangiga in Eastern Samar; and the town of Basey in Samar to provide livelihood to residents and allow them to take

part in building a "green wall" against storm surges. The government is also looking at the reversion of abandoned government-leased ponds to mangroves to boost coastal protection, food resources, and livelihood opportunities for coastal communities. The DENR will soon conduct ground validation to pinpoint what areas are viable for mangrove rehabilitation and those for beach forest within the 20-meter easement zone along the shoreline as provided for in the Philippine Forestry Code. *DENR*

Salceda first Asian elected to chair UN Green Climate Fund.

Joey Salceda, Governor of Albay, Philippines, was elected as Chairman of the Board of the Green Climate Fund (GCF), the first Asian to chair the prestigious body, during its fifth meeting held in Paris on October 7-10, 2013. Established by the Conference of the Parties to the United Nations Framework Convention on Climate Change in December 2011, the GCF aims to help developing countries adapt to the impacts of climate change. The 24-member GCF board oversees the operation of the Fund, which has pledged of USD 100 billion by 2020, and approves the funding of projects in line with the Fund's principles, criteria, modalities, policies and programs. With 2014 as the target for the operationalization of the Fund, Salceda aims to make the Fund work for developing



countries, including small islands developing states, least developed countries, Africa, and highly vulnerable communities in countries like the Philippines, Indonesia, and Bangladesh. *PNA*

Biodiversity where you least expect it: new beetle species from a busy megacity.

In an 83-hectare green island amidst the unnatural ocean of countless human-made edifices, researchers of the Ateneo de Manila University have discovered a tiny new species of aquatic beetle, aptly named *Hydraena ateneo*. It was named after the university, a 154-year-old Jesuit-run institution that is recognized as one of the premier universities in the Philippines and in the region. The international open access scientific journal *Zookeys* has published the paper about the unusual discovery in its latest issue. During field training in November 2012, Biology students and a faculty member of the Department of Biology sampled small creeks, ponds, and pools in wooded areas within their sprawling university campus. The group found seven species of water beetles, one of which was a new record for the entire island of Luzon and another was *Hydraena ateneo*. The Long-palped Water Beetles (genus *Hydraena*) are one of the most overlooked and diverse genera of aquatic beetles. Only 14 species of this genus – all endemic – are known from the country, but many more wait to be named and described. All of them display extremely enlarged palps of the maxilla. These are real mouthpart appendages and not the antennae. Those species that were found in the Ateneo campus must have re-colonized the area after the tree cover re-established in the last 50 years and the small creeks began to flow again. The study has shown that small patches of semi-



natural habitats amidst the densely populated and highly urbanized capital region can accommodate an astonishing assemblage of species. This will hopefully be an inducement to protect and extend such islands of urban biodiversity in the cities.

Science Daily

■ Singapore

Singapore's solar-powered supertrees. Supertree Grove is part of Singapore's Gardens by the Bay – a massive tract of reclaimed land that the government has transformed into a giant garden. The Supertrees are a stunning example of green architecture, and are much more than just gigantic tree-shaped edifices. In addition to serving as vertical gardens, they're also designed to mimic the ecological functions of real trees. Each structure is outfitted with an array of photovoltaic cells that collect and store solar energy throughout the day – power that's used to illuminate the garden when the sun goes down each night. Due to their unique shape, the trees also serve as rainwater collectors, and help funnel water to fountain displays and irrigation systems. The bigger ones even have space for people. One can get an aerial view of the gardens from a skybridge attached to two of the larger trees, and can even grab a bite to eat in the big 160-foot supertree. *Digital Trends*

Sustainable Singapore Blueprint to be reviewed. Prime Minister Lee Hsien Loong has announced that there will be a review of the Sustainable Singapore Blueprint. The blueprint, which was launched in 2009, outlines strategies to achieve the twin objectives of economic growth and a good living environment. The aim is to update it with new initiatives, which include building more environmentally-friendly hawker centres and reducing carbon emissions in 2014. While addressing its own environmental concerns, the government will also help address environmental issues of its neighbors, such as haze. Should the haze return, the government will do what it can to minimize its impact by monitoring and surveillance capabilities as well as putting in place contingency plans to ensure that masks and essential supplies can be distributed to vulnerable groups. *Channel News Asia*

New desalination plant opens. Tuaspring Desalination Plant, Singapore's second and largest desalination plant has begun operations, more than tripling the nation's capacity to turn seawater into fresh water to meet up to a quarter of its total demand. In the past, people queued for water and lacked basic sanitation. But pricing water right, working with academia and industry to develop water infrastructure, and having national





agency PUB manage the entire water cycle from supply to recycling, have given Singapore a clean, reliable supply of water. Singapore plans to extend a deep tunnel sewerage system to the west to reuse more of its wastewater, and to have Newater and desalination meet up to 70 percent of demand by 2030. Tuaspring is designed, owned, built and operated by Singapore-listed water firm Hyflux and can supply up to 70 million gallons of water a day. Singapore uses 400 million gallons of water a day, but that could nearly double by 2060. By then, it aims to have Newater and desalination meet up to 80 percent of demand. The USD1.05 billion Tuaspring also has an attached power plant fuelled by liquefied natural gas to provide a secure energy supply for desalination operations. This makes it the first water project in Singapore to be combined with energy generation.

asiaone

■ Thailand

Students put environment studies into practice. Mahidol University (MU)'s Faculty of Environment and Resource Studies recently joined forces with Banpu to organize "Power Green Camp 8", a youth camp aimed at teaching students how to tackle environmental conservation. The seven-day camp was held at the Learning Centre Building in Nakhon Pathom on MU's Salaya campus. Its 70 high school



participants were selected from around 900 applicants nationwide. They worked in teams on various activities, including an exhibition at which the teams produced displays exploring solutions for environmental conservation. The displays were also entered into a contest, which was won by a bio-diesel-fuelled device created to remove hyacinth weed that seasonally blocks Thailand's waterways. The participants learned about Thailand's flood crisis and the integration of cross-border water management. Their activities focused on teamwork and active learning, such as calculating the extent of the nationwide flooding. The camp participants also got a chance to join a discussion on cross-border water management where they learned about real flood problems and solutions. *The Nation*

Thailand allots THB910 M for green projects. Natural Resources and Environment Minister Vichet Kasemthongsri has earmarked THB 910 million to improve natural resources and environmental management in Ratchaburi, Prachin

Buri, and Pathum Thani provinces. The provinces will become models for environmental protection efforts. Ratchaburi will be a model for forest and water resources management, Prachin Buri will showcase industrial pollution management, and Pathum Thani will be a model for urban environmental problems resolution, he said. A total of 46 projects will be implemented, including a water diversion project in Pha Chi River in Ratchaburi, as well as maintenance of reservoirs, sluice gates, water pipelines, groundwater wells, and a 13,000-rai forest plantation also in Ratchaburi province. *Bangkok Post*

Two held over Rihanna posing with loris photo.

A man and a teenage boy have been charged with possessing a protected primate after pop star Rihanna posted a picture of herself online cuddling a loris in Phuket. The singer posed with the tiny, large-eyed slow loris and posted the photo on Twitter and Instagram without realizing that the use of endangered animals as a prop for tourist snaps is illegal. The image generated outrage from animal lovers concerned about rampant exploitation of animals on the island. Officials arrested the suspects with two lorises aged between one to two years. Police said they were offering the animals as photo props for tourists. *Bangkok Post*



Rare 'Asian Unicorn' sighted after 15 years. The elusive saola has recently been spotted in the forests of Central Annamite mountains of Viet Nam. The saola, one of the rarest and threatened mammals in the world, has evaded environmentalists for the last 15 years, and is so rare that there may be only a couple dozen to a few hundred left of the species. Discovered first in 1992 on the Lao PDR-Viet Nam border, the animal is so elusive it is called "Asian Unicorn", though it is recognized by two parallel horns with



sharp ends. The saola is a cousin of the cattle but looks like an antelope. The last confirmed sighting of the animal was in 1999, from camera-trap photos taken in Lao PDR. In 2010, villagers in the same region captured a saola but it died before researchers could reach it. There have been serious efforts to protect the saolas' habitat from illegal hunting and snares. Researchers feel this is a sign that these efforts are working and will help in making an estimate of its population. Since 2011, forest guard patrols in the Central Annamite mountains have removed more than 30,000 snares from this critical saola habitat and destroyed more than 600 illegal hunters' camps. Confirmation of the presence of the saola in this area is a testament to the dedicated and tireless efforts of the forest guards. *UPI*

■ Vietnam

Coastal Forum confirms nature-based solution a key for climate change adaptation. More than 200 delegates representing local communities, government agencies, academics, NGOs and media from Cambodia, Thailand, and Viet Nam gathered at the Second Annual Coastal Forum on October 15-18, 2013 in Soc Trang Province, Viet Nam, to share experiences, lessons learned, and good practices for climate change adaptation in the coastal zone, highlighting nature-based solutions. The event was organized by the International Union for Conservation of Nature, the

Vietnam Administration for Seas and Islands, German Development Cooperation, the Sustainable Development Foundation, and Soc Trang Provincial Peoples' Committee. The Forum was an activity of the project "Building Resilience to Climate Change Impacts in Coastal Southeast Asia", funded by the European Union. After two years of implementation in eight coastal provinces of Thailand (Chanthaburi and Trat), Cambodia (Koh Kong and Kampot), and Viet Nam (Soc Trang, Can Gio, Kien Giang and Ben Tre), more than 30 pilot project activities, specifically tailored to the unique characteristics of each site have been designed and are being implemented to enhance the adaptive capacity of people and the ecosystems on which they depend to cope with the anticipated impacts of climate change and plan for disaster risk reduction. These

pilot projects demonstrate that development based on bottom-up planning and soft solutions provided by natural ecosystems are instrumental in bringing about desired solutions for coastal communities in adapting to climate change. *IUCN*

Co-management plan to protect mangroves. More than 3,000 hectares of the southern Cuu Long (Mekong) Delta city of Soc Trang's mangrove coastal forest will be co-managed by local authorities and the Vo Thanh Van Hamlet coastal forest co-management group, which includes more than 750 local residents. This means that while the government owns the land, local communities will share decision-making power, management responsibility, and accountability. The move aims to provide local communities with legal access to natural resources in protected forests while ensuring that the resources are used sustainably. It is part of a Viet Nam-German technical cooperation project that started in 2007 with the goal of protecting the coastal wetlands of Soc Trang Province for the benefit of the local population. The forest co-management model has played an important role in coastal mangrove forest protection in recent years. Thanks to policies that limited access to forests and mandated sustainable use of resources, the province's mangrove areas have been protected while residents have seen higher incomes from benefits from mangrove resources.

Vietnam News Service





Dusky fruit bat (*Penthetor lucasi*)

This uncommon species occurs in lowland and lower montane forests. By day it roosts in colonies in dark rock crevices and quiet caves. The dusky fruit bat is primarily a fruit eater, generally flying away from the fruit-bearing tree to consume its meal elsewhere.

Head and body length of the dusky fruit bat is on average 114mm, with a tail 8-10mm long. The fur is coarse, short and smoky brown in color, and the chest and belly are lighter than the back. The fur on the head is slightly longer and dark brown. The wings are dark brown to black. Its head is of typical fruit bat shape, with a dog-like muzzle, and large eyes. The ears are dark-edged.

This species appears to be gregarious, roosting in large groups in caves, rock shelters, and in the nooks and crannies between boulders. Roosts can have as many as 100 individuals. It also inhabits secondary and primary lowland to hill forest.

Research indicates that breeding in dusky fruit bats is seasonal. One study of pregnancy in *P. lucasi* revealed that the highest number of pregnant females was recorded in September, very few females were pregnant in June, and there were no recorded pregnancies in January, February, March, and July. There is typically only one offspring in a birth.

The dusky fruit bat ranges from southern Thailand, Peninsular Malaysia and Singapore to the Riau Archipelago, Borneo and Sumatra. This species is listed as Least Concern in view of its wide distribution. It occurs in a number of protected areas and is tolerant of some disturbance of its habitat.

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Javan tailless fruit bat (*Megaerops kusnotoi*)

The Javan tailless fruit bat is an elusive species from Indonesia. It has greyish-brown fur on its upperparts; slightly paler fur on its underparts; elongate, oval, simple ears; and large, well-developed eyes. The species lacks a tail, hence the name Javan tailless fruit bat.

Although little is known about the Javan tailless fruit bat, like other fruit bats it is likely a nocturnal species with a frugivorous diet. The Javan tailless fruit bat probably spends the day roosting in trees in small groups or individually, where it hangs upside down by its feet. At dusk, this species will leave the roost and fly in search of fruit, which it locates using its sight and sense of smell. It crushes ripe fruit in its mouth, swallowing the juice and spitting out most of the pulp and seeds. Due to the frugivorous diet of fruit bats, they play an important role in pollinating and dispersing the seeds of plants.

The Javan tailless fruit bat occurs only on the island of Java, in Indonesia, and possibly also on the islands

of Bali and Lombok. Occurring in tropical montane evergreen forest, the Javan tailless fruit bat has been found up to 700 meters above sea level, but is suspected to also occur at higher elevations.

Habitat loss due to land clearing for agriculture and human settlements is believed to be a major threat to the Javan tailless fruit bat. Logging and mining are also a major cause of habitat destruction in the region. In addition, the Javan tailless fruit bat may be impacted by volcanic activity, which repeatedly disturbs the vegetation and puts further pressure on the ecosystem. Gunung Raung, a mountain range in Java, has more active volcanoes than anywhere else in the world. The Javan tailless fruit bat is classified as Vulnerable on the IUCN Red List.

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Large Flying Fox (*Pteropus vampyrus*)

The large flying fox or Malayan flying fox is one of the largest bats in the world. It can attain a wing-span of over six feet (1.8 m) and weigh well over two and a half pounds (1000 g). The large flying fox has long, pointed ears and no clearly visible tail. The head is usually reddish black or russet, becoming deep gold or orange rather suddenly during the breeding season. The back is black with scattered white hairs.

The large flying fox roosts in colonies that can contain anywhere between a few individuals to thousands. Leaving the roost near sunset, the large flying fox flies silently to feeding areas, which can be up to 50 km away. It often circles a fruit tree before landing, and forms noisy feeding groups numbering a few to over 50 bats. Unlike many other bats, which use echo location in order to navigate, flying foxes depend on sight in order to find their way at night. While it is known as a 'fruit bat', and will eat the fruit of rambutan, fig and langsat or lanzones trees, the large flying fox also feeds on the nectar and flowers of coconut and durian trees. It has a long tongue, which enables it to lick the nectar without damaging the flower. As it feeds from a flower, pollen may stick to its fur; thus the large flying fox is an important pollinator of many forest plants.

Female large flying foxes typically give birth to a single young each year, the timing of which depends on the location. In the Philippines, most births take place during April and May, while in Thailand births peak during March or early April. The young bat is carried by its mother for the first few days, but is then left in the roost while the mother forages. The young suckles

from its mother for two to three months.

Although most common in coastal regions, the large flying fox has also been found at altitudes as high as 1,370 meters above sea level. It usually inhabits primary forests and mangroves, and roosts in tall trees with leafless upper branches, but can also be found feeding in coconut groves and fruit orchards. The large flying fox is found throughout Southeast Asia. Its range extends from southern Myanmar, Thailand, Cambodia and Viet Nam, south through Peninsular Malaysia to Singapore and much of Indonesia, and east to Borneo and the Philippines.

There are seven subspecies of large flying fox with the most threatened being *P.v. lanensis* (vulnerable) of the Philippines. This species is declining rapidly in the wild due to unsustainable hunting, persecution as a crop pest, and habitat destruction. This species is listed on Appendix II of CITES.

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Lyle's Flying Fox (*Pteropus lylei*)

Lyle's flying fox is a medium-sized flying fox, which forms large colonies high up in trees. Lyle's flying fox has a long dark muzzle and large eyes. The wings and back of Lyle's flying fox are dark brown or black, which strongly contrast against the bright fur around the head and neck. Its lower body varies from a deep dark-brown to a brighter yellow-brown. Its breast and belly are black-brown. The species resembles a fox, hence the common name 'flying fox'.

The diet of Lyle's flying fox consists mainly of ripe fruit. However, this species will also feed on nectar, pollen and blossoms to ensure it gets enough energy. Fruit is very low in protein and sodium, so the salivary gland of Lyle's flying fox has become specially adapted to ensure this species can extract the required nutrients. The species' primary sense when foraging is vision, as it lacks the echolocation abilities of insectivorous bats. It has well developed teeth which are used to chew fruit while spitting out most of the seeds and pulp.

Although it is a nocturnal species, Lyle's flying fox is very sociable and noisy during the day, as this is when females suckle their young. Large noisy colonies are very conspicuous, but they have few natural predators and so can hang safely up in the trees all day. They roost by day in large colonies in protected areas of villages, towns and cities, such as the leafy compounds of Buddhist temples and other buildings where they

can be free of persecution. At sunset they radiate out into rural areas to feed on fruits,

Lyle's flying fox is native to Southeast Asia and is found in Thailand, Viet Nam, Cambodia, Malaysia, and Yunnan in China. This species has been mostly documented in Thailand, where at least 11 colonies have been identified, the largest containing around 3,000 individuals.

The population of Lyle's flying fox is believed to be in decline, a trend which is expected to continue due to human pressures on its environment. Habitat loss is a major threat, with deforestation and construction projects destroying the forests that Lyle's flying fox relies on for roosting and for food. Farmers also pose a threat as they consider Lyle's flying fox to be a crop pest, resulting in persecution of this species. Lyle's flying fox is classified as Vulnerable on the International Union for Conservation of Nature Red List and is listed on Appendix II of Convention on International Trade in Endangered Species.

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- An intact biodiversity and its sustainable use pose immense opportunities for protection and adaptation to climate change and have a great developing potential for the ASEAN region. However, this tangible value to society has not yet been fully appreciated. National development strategies consider only some aspects of biodiversity conservation and sustainable development and national policy frameworks addressing climate change are still not thoroughly articulated. The ASEAN challenge is to develop adequate policies, instruments, and the capacity to tackle issues on biodiversity and climate change.
- In response to this challenge, GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) and the ASEAN Centre for Biodiversity (ACB) are jointly implementing the Biodiversity and Climate Change Project which will run until 2015.
- The ACB-GIZ Biodiversity and Climate Change Project focuses on the elaboration and implementation of ASEAN-wide regional and national strategies to appropriately address the interface between biodiversity on one side, and sustainable development and climate change on the other side. The project targets to benefit the vulnerable population of the region who depends on the ecosystem services and biodiversity resources for subsistence.



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