



Empowered lives.
Resilient nations.

BIODIVERSITY

For Sustainable Development

Delivering Results for Asia and the Pacific



Empowered lives.
Resilient nations.

United Nations Development Programme
304 East 45th Street, 9th Floor
New York, NY 10017 USA

www.undp.org
www.undp.org/gef

United Nations Development Programme
Asia-Pacific Regional Centre
3rd Floor UN Service Building
Rajdamnern Nok Avenue
Bangkok 10200, Thailand

www.asia-pacific.undp.org

**BIODIVERSITY FOR SUSTAINABLE DEVELOPMENT:
DELIVERING RESULTS FOR ASIA AND THE PACIFIC**

Copyright © UNDP 2014

The views expressed in this publication do not necessarily represent those of the United Nations, including UNDP, or the UN Member States. The boundaries and names shown and the designations used on maps in this document do not imply official endorsement or acceptance by the United Nations or contributory organisations.

UNDP partners with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone. On the ground in more than 170 countries and territories, we offer global perspective and local insight to help empower lives and build resilient nations.
www.undp.org



*Empowered lives.
Resilient nations.*

We would like to recognize the many development partners that have financed and contributed to the projects and programmes outlined in this publication. We extend special thanks to the Global Environment Facility (www.thegef.org).



BIODIVERSITY FOR SUSTAINABLE DEVELOPMENT

DELIVERING RESULTS FOR ASIA AND THE PACIFIC



Borneo red flying frog in mushroom (*Rhacophorus pardalis*), Borneo
Photo: Frans Lanting



FOREWORD

The Asia-Pacific region is both dynamic and diverse, covering 36 countries and territories. Tremendous progress has been made in terms of human and economic development over the last couple of decades. However, this progress has come at the cost of the biodiversity and ecosystems that support millions of lives and livelihoods in the region. Biodiversity is in decline in all types of ecosystem existing in the region, particularly in forests, rivers and oceans. The rate of species loss is almost twice the global average, and the occurrence of natural and man-made disasters, exacerbated by climate change and shocks, is increasing at an alarming rate. In the Pacific, the very existence of some nations is threatened by sea level rise.

Yet, far from succumbing to these challenges, the countries of the Asia Pacific region are rising to the task of harnessing the positive opportunities provided by biodiversity and natural ecosystems, as catalysts for sustainable development. In recognizing the real value of biodiversity and ecosystems – in relation to secure livelihoods, food, water and health, enhanced resilience, conservation of threatened species and their habitats, and increased carbon storage and sequestration – they, together with the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP), are drawing on the potential of nature to achieve multiple development dividends.

UNDP and GEF are thus delighted to present this publication – “Biodiversity for Sustainable Development: Delivering Results for Asia and the Pacific” – which showcases the ground-breaking work that has taken place in recent years in this vast and disparate region to conserve land, water and ocean resources while adapting to climate change, enhancing local capacity, and generating sustainable livelihoods.

The publication highlights case studies and examples of initiatives, from the eastern tip of Asia to the far reaches of the Pacific Ocean, which have expanded and strengthened protected areas, integrated biodiversity and ecosystem management into key economic sectors including tourism, agriculture and fisheries, and supported ecosystem-based adaptation to, and mitigation of, climate change. This work has been reinforced by initiatives focusing on access to clean and affordable energy and improved energy efficiency, empowering women, and ensuring effective risk management and resilience building.

In total, since 2000, UNDP and GEF have carried out work over 10 million hectares in 13 countries to improve production practices in agriculture, fisheries, forestry, tourism and extractive industries, to

conserve biodiversity while driving economic growth and generating jobs. A total of 459 marine and terrestrial protected areas and indigenous and community conservation areas—covering 64 million hectares in 19 countries—has benefited from UNDP-managed GEF investment in governance, management effectiveness and livelihood generation.

Going forward, as the international community identifies the priorities and Sustainable Development Goals for the post-2015 development agenda, as well as a new climate change regime for the post-2020 period, UNDP and GEF commit to further support countries in the Asia Pacific region in responding to the challenge of sustainable development by intensifying actions for the effective maintenance and protection of natural capital.

In particular, the Ridge to Reef programme will constitute a major area of work, promoting integrated natural resource management to deliver multiple development benefits in a number of Pacific Island countries. Tiger landscape management will be supported in tiger range states to support the Global Tiger Recovery Programme, and we will address trade in endangered species by supporting efforts to create sustainable livelihoods for communities; strengthen

governance and law enforcement; and reduce the demand for illegal wildlife products. We will work with Small Island Developing States in the region to reduce threats from invasive species and their negative impacts on island ecosystems and their development. We will also work with countries to integrate biodiversity and ecosystem values in national and local fiscal and development planning processes through UNDP's Biodiversity Financing (BIOFIN) programme.

Our focus is on strengthening the human resources of partner countries and their people, while promoting inclusive economic growth that takes the real value of biodiversity and ecosystems into account in decision-making and works to influence markets to reflect that value. We will continue to build genuine and durable partnerships at the local, national and regional levels, through greater South-South cooperation, more effective coordination, and engagement with new partners on shared priorities.

UNDP and GEF look forward to continuing to work closely with our Asia-Pacific partners to deliver solutions to biodiversity and ecosystem loss to help them chart a path towards sustainable development.



Haoliang Xu,
Director, Regional Bureau
for Asia and the Pacific,
UNDP



Adriana Dinu,
Executive Coordinator,
UNDP-GEF, UNDP



Gustavo A. B. Fonseca,
Head of Natural Resources,
GEF

CONTENTS



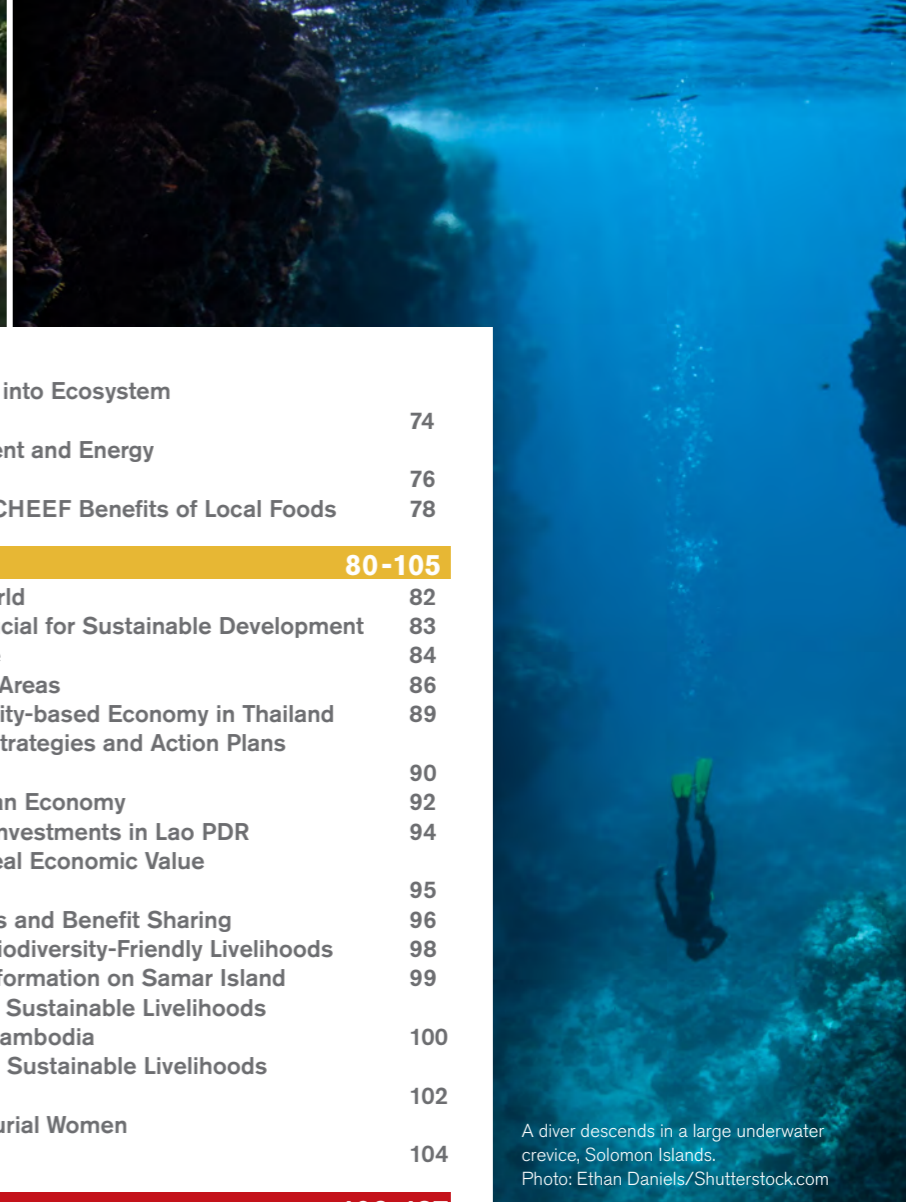
Crimson sunbird (*Aethopyga siparaja*)
Khao Kitchakut National Park, Thailand
Photo: kajornyot/Shutterstock.com



Little owl (*Athene noctua*)
Photo: Marc Foggini



A farmer ploughs his field near Aungmyan, Myanmar
Photo: Sarah Valenti



A diver descends in a large underwater crevice, Solomon Islands.
Photo: Ethan Daniels/Shutterstock.com



Himalayan goral (*Naemorhedus goral*), Bhutan
Photo: Midori Paxton



Olive ridley turtle (*Lepidochelys olivacea*)
Photo: Prashanth Vishwanathan/UNDP India

THE FUTURE WE WANT – BIODIVERSITY AND ECOSYSTEMS DRIVING SUSTAINABLE DEVELOPMENT **6**

INTRODUCTION **8**

MUST SEE WILD PLACES IN ASIA AND THE PACIFIC **10**

HOME **16-55**

Protected Areas: Managing Biodiversity for Sustainable Development 18

Expanding and Strengthening Protected Areas to Meet Global Goals 20

New Ways to Manage Protected Areas – Innovation in Thailand 22

What's Out There? Using Camera Traps to Monitor Protected Areas 23

Wildlife Crime – Preventing the Trade of Endangered Species 24

Tigers! in Short Supply 25

“Tiger Tiger Burning Bright” or Heading into Darkness 26

Conserving the Asiatic Cheetah in Iran 28

Conserving the Last Refuge of Endangered Primates in Viet Nam 29

Empowered Indigenous Communities Conserve their Ancestral Homes in the Philippines: The Rise of ICCAs 30

Community Development and Education Supports Wildlife Management in Papua New Guinea 32

Looking Across the Landscape: Managing Biodiversity and Ecosystems within and beyond Protected Areas 34

Nepal's Western Terai: Integrated Planning at the Landscape Level 35

Mongolia's Altai: The Landscape Approach in the Largest of Landscapes 37

Connecting Landscapes in Bhutan and Malaysia: Creating and Strengthening Biodiversity Corridors and Networks 39

CALM in Cambodia: Generating Sustainable Livelihoods through Biodiversity Conservation 42

Why Buy Ibis Rice? 45

Partnerships for Paradise: The Tioman Tourism Story 46

Managing the Impacts of Climate Change: Embedding Climate Resilience in Protected Area Planning - the Case of Papua New Guinea 48

UNDP's Legacy – Institutional Capacity Building for Biodiversity and Ecosystems Management 50

Building Individual and Institutional Capacities for Ecosystems and Biodiversity Management in Asia and the Pacific 53

How Healthy is your Home? 54

FOOD & WATER **56-79**

Securing the Future of Agriculture in Asia Pacific 58

How They Have Done It: Embedding Wild Relative Crop Conservation into Rural Development 60

A Big Bang for your Buck – Conserving Traditional Crops in Bhutan 61

Recipe for Putta – Local Bhutanese Buckwheat Noodles 63

Managing and Restoring Precious Wetlands in Iran and Nepal 64

Sustainable Agriculture Can Solve Problems Facing Wetlands 66

Conserving Ecologically Critical Areas in Bangladesh's Vast Wetlands 67

The Conservation and Rehabilitation of Lake Inle in Myanmar 68

International Waters – Sharing and Sustaining Marine, Coastal and Freshwater Resources across Borders 69

How Locally Managed Marine Areas are Making a Difference 70

What is a Locally Managed Area (LMMA)? 71

Sustaining Forest and Watersheds in Indonesia 72

The Power of Women: Integrating Gender into Ecosystem and Biodiversity Management 74

Combining Sustainable Forest Management and Energy 76

Efficient Cookstoves in Cambodia 76

Go Local! In Micronesia – Promoting the CHEEF Benefits of Local Foods 78

WORK & MONEY **80-105**

Reconnecting People with the Natural World 82

Why Biodiversity and Ecosystems Are Crucial for Sustainable Development 83

Natural Capital – Insurance for our Future 84

The Price of Parks – Financing Protected Areas 86

Growing a Socially Responsible Biodiversity-based Economy in Thailand 89

The Importance of National Biodiversity Strategies and Action Plans (NBSAPS) and Biodiversity Financing 90

Biodiversity is the Bedrock of the Maldivian Economy 92

Poverty Environment Initiative: Greening Investments in Lao PDR 94

UN-REDD Programme: Calculating the Real Economic Value of Forests in Mongolia 95

Fair and Equitable Frameworks for Access and Benefit Sharing 96

Supporting Sustainable Alternative and Biodiversity-Friendly Livelihoods 98

From Timer to Tourists: Community Transformation on Samar Island 99

Microcredit for Self Help Groups Leads to Sustainable Livelihoods and Greater Security in Tonle Sap Lake, Cambodia 100

Protecting the Markhor: Conservation and Sustainable Livelihoods in Pakistan's Northern Highlands 102

Profiting from Wild Apricots – Entrepreneurial Women Capitalize on Small Grants 104

HEALTH & SECURITY **106-127**

Ecosystem Health and Human Security Go Hand in Hand 108

Managing and Restoring Ecosystems for Climate Change Mitigation and Adaptation in Asia and the Pacific 110

‘Great Steppes’ Forward in Mongolia through Ecosystem-based Adaptation 115

Integrating Biodiversity into REDD+ 116

Community Cooperation Helps Herders to Combat Environmental Change 118

Emergency Biodiversity Conservation Measures Support Reconstruction in Earthquake-hit Areas of Sichuan Province, China 120

Conserving Mother Nature's Medicine Cabinet in India 122

A National Framework for Safe Use of Biotechnology in Malaysia 124

Global Warning – Invasive Alien Species Are Coming 125

Reducing Conflict between Wildlife and Communities 126

HAPPINESS & LOVE **128-137**

Culture, Livelihoods, and Nature (CLAN): Tibet's “Jewels of the Land” 130

Biodiversity and Ecosystems: Essential Ingredients for Happiness 132

Tiger Man of Malaysia! 134

Community-led Conservation of Forest Biodiversity in Fiji 135

ECOSYSTEMS QUIZ **138**

ACKNOWLEDGEMENTS **139**

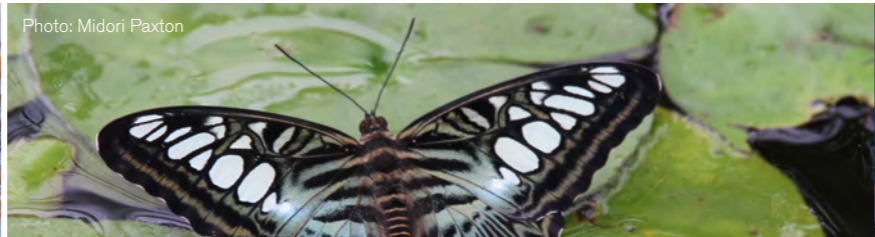
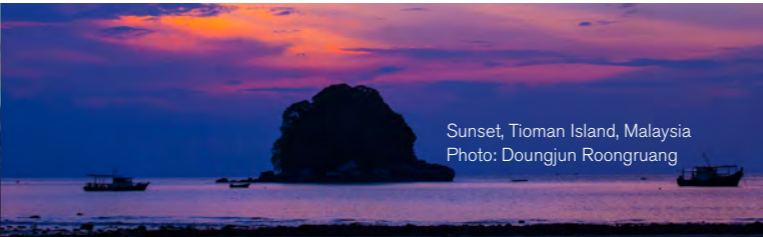
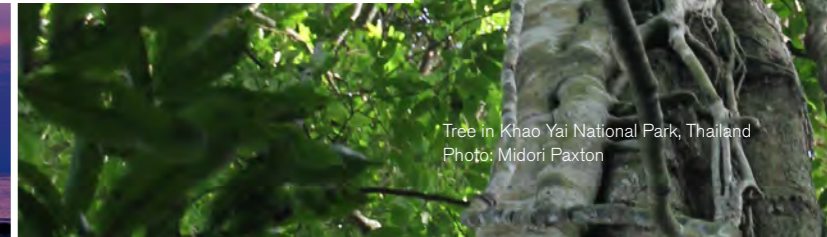


Photo: Midori Paxton



Sunset, Tioman Island, Malaysia
Photo: Doungjun Roongruang



Tree in Khao Yai National Park, Thailand
Photo: Midori Paxton

THE FUTURE WE WANT – BIODIVERSITY AND ECOSYSTEMS DRIVING SUSTAINABLE DEVELOPMENT

UNDP'S 'GLOBAL ECOSYSTEMS AND BIODIVERSITY FRAMEWORK 2012-2020' SEEKS TO HARNESS THE POSITIVE POTENTIAL OF ECOSYSTEMS AND BIODIVERSITY TO CONTRIBUTE TO SUSTAINABLE DEVELOPMENT

Nomads with their yak herds roam across the snow-carpeted hills of the Tibetan plateau that are their home. On the other side of the world, I am pouring a glass of cool water in between meetings in my packed day in New York City, indulging myself for 10 seconds reflecting on the sight of an orang-utan I saw in the Borneo rainforest two years ago. More than 12,000 kilometres (km) to the east in Lao Peoples' Democratic Republic (PDR), a young boy sits down to savour a bowl of rice. In the Western Ghats where I grew up, an aspiring tour guide studies a book on the birds of India, anxious to impress her first tour group the following day. Some 13,000 km to the south east, a fisherman in the tiny Pacific island nation of Kiribati heads home with his day's catch of fish, enough to feed his family and a few neighbours. 7,500 km northeast a Bhutanese monk meditates backed by the sacred peak of the mountain, Gangkhar Puensum.

Though we may not realize it, each of these people shares a common bond in a very real, tangible and vital way — each depends on ecosystems and biodiversity. The nomadic herders have lived in the high mountain landscapes of Central and North Asia for millennia, relying on pasture to graze their livestock for their main livelihood. Rice farmers in Lao PDR rely on agro-biodiversity to secure their crops from threats from climate change and disease. In New York, all 8 million residents, along with the 47 million annual visitors, rely on protected areas in upstate New York to supply their drinking water day in and day out. The tour guide in the Western Ghats is soon to become part of her country's nature-based tourism industry, which contributes to the local and national economy.

The fisherman in Kiribati relies on the Phoenix Islands Marine Protected Area to supply his family with daily protein. In Bhutan, nature contributes to spiritual fulfilment and the concept of protected areas has existed for thousands of years, as sacred sites.

As these examples illustrate, ecosystems and biodiversity provide us with a home, food, water, medicine, livelihoods and jobs, money, knowledge, and inspiration and equip us to cope with disasters and climate change impacts. These are

the very themes of this publication. As the Malaysian government also put it so aptly in its official biodiversity conservation logo: "My Biodiversity - Life, Heritage and Future".

While biodiversity provides the foundation on which all life depends, including human societies, it is particularly important to the 2.7 billion people — more than a quarter of the world's population — who survive on less than US\$2 a day. As much as 70 percent of the world's poorest people depend critically on biodiversity to provide them with life's most basic necessities, including food, water, shelter, medicine and their livelihoods. UNDP's core mission is to contribute to the eradication of extreme poverty and the reduction of inequality and exclusion: if this is to be achieved, the integration of biodiversity and ecosystems management into the development and poverty reduction agenda is vital.

And this is exactly the reason why UNDP works on ecosystem and biodiversity, managing an ever-increasing US\$1.2 billion portfolio.

In 2012, at the 11th Conference of Parties of the Convention on Biological Diversity in India, we launched the UNDP Biodiversity and Ecosystems Global Framework 2012-2020.

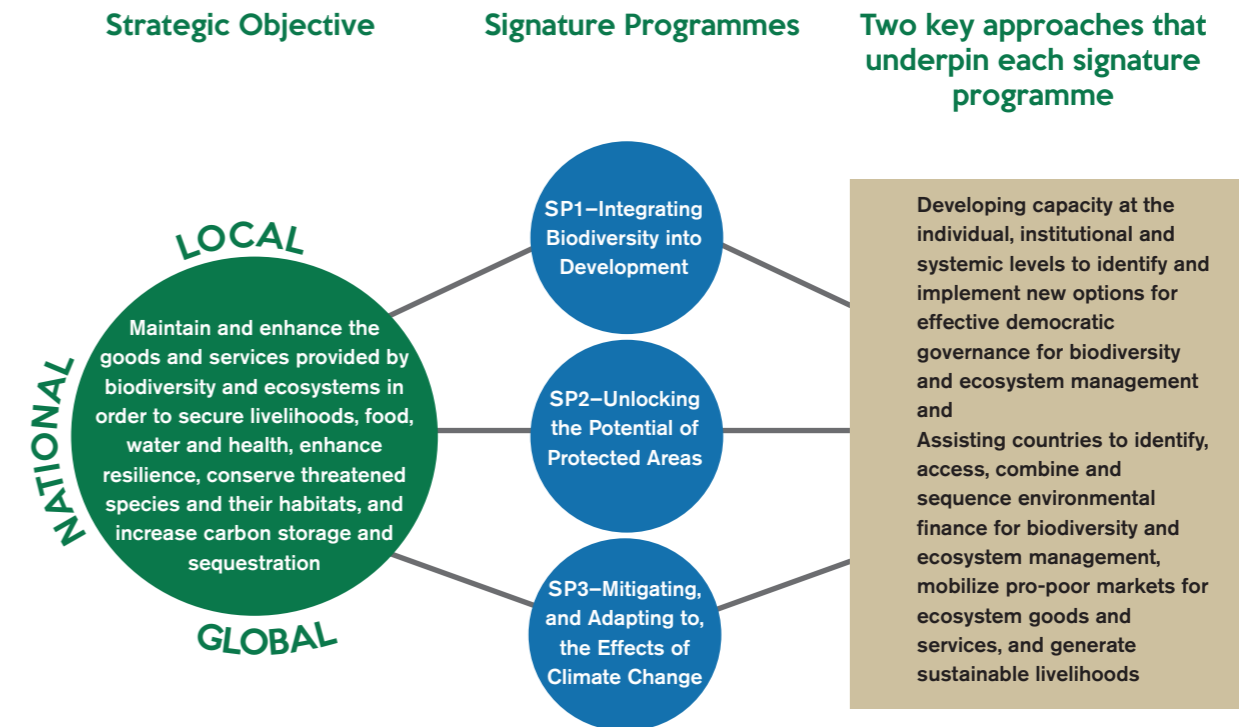
As illustrated in the diagram on the right, the framework comprises three signature programmes, to respond to countries' demand for support on Policy, Finance and Capacity:

1. Integrating biodiversity and ecosystem management into development planning and production sector activities to safeguard biodiversity and maintain ecosystem services that sustain human wellbeing.
2. Unlocking the potential of protected areas, including indigenous and community conserved areas, to conserve biodiversity while contributing towards sustainable development.
3. Managing and rehabilitating ecosystems for adaptation to, and mitigation of, climate change.

by Nik Sekhran, Chief of Profession, Sustainable Development Cluster



UNDP'S BIODIVERSITY AND ECOSYSTEMS GLOBAL FRAMEWORK FOR THE WHOLE DOCUMENT PLEASE VISIT: WWW.UNDP.ORG/BIODIVERSITY



All of our programmes and projects in 140 countries around the world, including Asia and the Pacific, fall under this framework. Ultimately, it all comes down to securing the essential natural capital of the nations and the world. Natural capital represents 25 percent of total wealth in developing countries.

Therefore attenuating biodiversity loss is a critical strategy for mitigating poverty and achieving sustainable development. Biodiversity can provide an important safety net for the poor.

I believe there are two key factors that determine success or failure of human societies to manage biodiversity and reduce poverty:

1. Strength of environmental governance systems: putting in place policies, regulations and effective institutions to support accountable decision-making systems and protect property rights.
2. Ability to address market failure: changing the trajectory of markets to account for and correctly value ecosystem goods and services in financial transactions.

UNDP's ecosystem and biodiversity programme is designed to address these factors by removing barriers to country action to address the root causes of biodiversity loss and improve the state of biodiversity over the long-term.

I was trained as an economist. But you don't have to be an economist to realise that it simply does not make sense to grow the economy — accumulate financial wealth, increase physical assets — if this growth depletes your natural capital beyond the threshold of being able to support our life. It is a housekeeping fundamental; all accounts must be healthy. If the biodiversity and ecosystem account is in the red, how can we justify calling the growth progress? How can it be development?

Globally, through management of 512 projects on ecosystems and biodiversity with US\$1.5 billion infunding from the GEF and other sources, and co-finance of US\$3.5 billion, UNDP's ecosystems and biodiversity programme has been successful in: impacting over 2,000 protected areas in 85 countries, covering 272 million hectares; undertaking interventions in production sectors and development planning in 38 countries, covering 244 million hectares; and promoting ecosystem-based adaptation to or mitigation of climate change in 71 countries. In addition to this portfolio of projects, UNDP also implements two programmes focused at the local level—the GEF Small Grants Programme and the Equator Initiative partnership—that are working with indigenous peoples and local communities on ground-breaking work in biodiversity conservation and sustainable development.

INTRODUCTION

The Asia Pacific region teems with life. The region encompasses some of the world's largest and most diverse ecosystems and is home to more than half of the world's population. From the rivers flowing from the high Himalayas to the waters of the Coral Triangle, the web of ecosystems in this region and the biodiversity that enriches them support the lives and livelihoods of millions of people.

However, despite much progress in environmental protection, the region is losing the integrity and productivity of its lands and seas. The Living Planet Index, published biennially by the World Wildlife Fund (WWF) and its partners, reports that biodiversity is in decline in all types of ecosystem examined in the Asia Pacific region, including forests, rivers and oceans. The rate of species loss is about twice the global average. Data have shown that the region is depleting natural assets at an unsustainable rate: water scarcity is increasing; tropical forests are shrinking; and climate change is worsening these threats. The risk of natural disasters – exacerbated by climate change and economic shocks – magnifies existing vulnerabilities.

Since 2000, UNDP's Ecosystems and Biodiversity (EBD) programme has achieved substantial results through its management of more than 160 GEF-financed projects in Asia Pacific. Work has been carried out over more than 10 million hectares in 13 countries to improve production practices in agriculture, fisheries, forestry, tourism and extractive industries, to conserve biodiversity while driving economic growth and generating jobs. A total of 459 marine and terrestrial protected areas and indigenous and community conservation areas—covering 64 million hectares in 19 countries—have been impacted through UNDP-supported GEF-financed projects. Sustainable forest management measures and ecosystem-based adaptation and mitigation interventions supported by UNDP with GEF finance are also under way in the Asia Pacific region.

UNDP-GEF currently supports a portfolio of 104 ecosystems and biodiversity projects in Asia Pacific, which are at various stages of the project cycle. In addition to this portfolio of projects, UNDP also implements two programmes focused at the local level—the GEF Small Grants Programme and the Equator Initiative.

In the Asia Pacific region as of 2013, 29 UNDP supported GEF financed projects are working to integrate biodiversity and ecosystem management into development planning and production sector activities that target the agriculture, extractives, fisheries, forestry and tourism sectors, directly impacting an area of over 8 million hectares. UNDP is currently working in more than 300 protected areas in the region, impacting a total of more than 45 million hectares. This work primarily supports strengthening of protected areas so that they are

better managed and sustainably financed, but it also supports strategic expansion of existing protected area networks. A total area of more than 167,000 hectares is directly impacted by ecosystem-based adaptation (EbA) interventions in the region, in ecosystems ranging from the mountainous to the marine, bringing benefits, such as water security, to the nearby communities.

UNDP country offices, jointly with national governments and partners in the region, manage and monitor implementation of these projects. The UNDP Regional Bureau for Asia and the Pacific has 24 Country Offices as well as Regional Service Centres in Bangkok and Suva, covering 37 countries and territories. These Regional Service Centres support project formulation, implementation, monitoring and reporting and provide policy advice.

This publication presents results and success stories from UNDP's work with ecosystems and biodiversity outcomes in the Asia Pacific region. The majority of work presented is supported with grant financing from the Global Environment Facility Trust Fund (GEF). Apart from the GEF, major funding sources include the Adaptation Fund, Least Developed Countries Trust Fund and Nagoya Protocol Implementation Fund, also administered by the GEF; the European Union, German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Government of Norway, Government of the Netherlands, SNV Netherlands Development Organisation, Swiss Agency for Development and Cooperation SDC, World Wildlife Fund.

The projects presented represent a range of approaches being adopted to implement UNDP's Global Ecosystems and Biodiversity Framework 2012–2020. In addition, achievements are also presented from other core and bilaterally funded regional work and UNDP environment programmes that also contribute to biodiversity management, including the UNDP-UNEP Poverty Environment Initiative (PEI) and the UN Reducing Emissions from Deforestation and Degradation (UN-REDD Programme), a collaborative initiative of UN FAO, UNEP and UNDP.

The results and stories are structured in five themes that aim to reflect some of the positive contributions of ecosystems and biodiversity to sustainable human development and wellbeing: Home, Food and Water, Work and Money, Health and Security, and Happiness and Love. Each article highlights selected achievements of various projects within a particular theme or topic, but all of the projects are characterised by the use of multiple approaches to achieving their objectives in the specific contexts of the countries and locations where they are implemented.



MUST SEE WILD PLACES IN ASIA AND THE PACIFIC

THOUGH BY NO MEANS COMPREHENSIVE, THIS LIST GIVES A SAMPLE OF SOME OF THE AMAZING ECOSYSTEMS AND BIODIVERSITY THAT ASIA AND THE PACIFIC HAVE TO OFFER

Natural lakes in Band-e-Amir National Park
Photo: Rodrigo Guim/Shutterstock.com

1. ALTAI TAVAN BOGD KHAN NATIONAL PARK, MONGOLIA.

The vast, stunning mountains of this national park are considered sacred to local Mongolian herders and are home to spectacular species, such as the snow leopard, listed as Endangered by IUCN, and the world's largest wild sheep – the argali.

2. ANNAMITE MOUNTAINS OF SOUTHEAST ASIA AND THE CARDAMOM MOUNTAINS OF CAMBODIA.

The mysterious rich rainforests that cover these mountains are still relatively unexplored – three new species of mammal were recently discovered here. The park is also home to the striking and Endangered douc langur monkey, tiger and Asian elephant.

3. BAA ATOLL, MALDIVES.

This heart-shaped group of 75 islands is renowned for its extensive coral reefs and marine life, which includes rare corals unique to the atoll, and the famous Hanifaru Bay, a significant aggregation site for manta rays and whale sharks.

4. BAND-E-AMIR NATIONAL PARK, AFGHANISTAN.

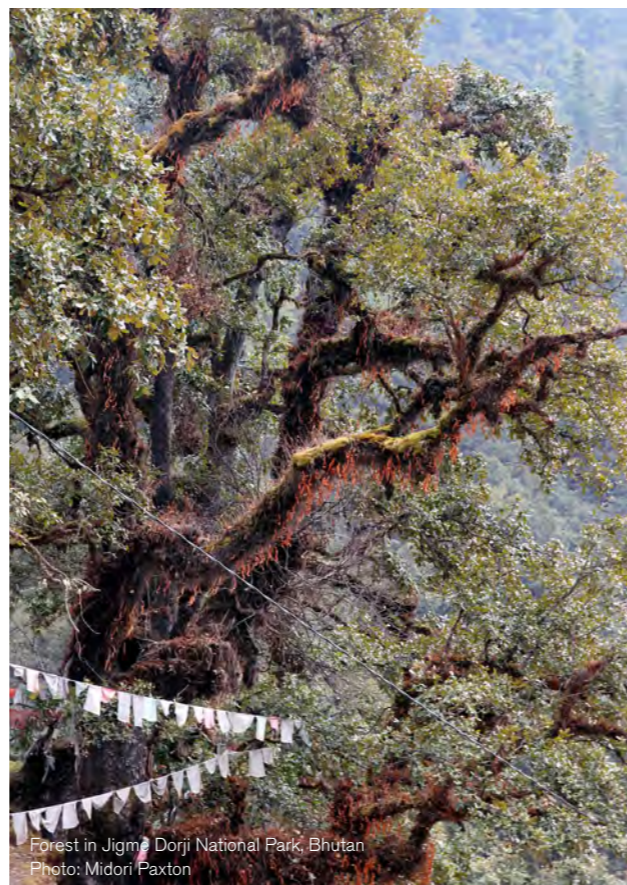
Afghanistan's first national park, Band-e-Amir is one of few places in the world where natural lakes created by travertine mineral deposits can be found. Six deep, almost impossibly brilliant blue lakes separated by these natural dams nestle among stark limestone cliffs in the Hindu Kush Mountains, where the Persian leopard still roams.

5. CASPIAN HYRCANIAN FOREST LANDSCAPE, IRAN.

This ancient landscape of lowland and montane forests is a storehouse of endemic and threatened species. Named after the ancient region of Hyrcania ("Wolf Land"), the landscape is also home to wolves and brown bears.

6. CHITRAL VALLEY, PAKISTAN.

Snow-fed rivers run through lush green meadows, terraced fields and forest against a backdrop of rocky glacier-topped mountains in the spectacular Chitral Valley. Chitral's mountains harbour snow leopards and the world's largest species of wild goat – the majestic and Endangered markhor.



Forest in Jigme Dorji National Park, Bhutan
Photo: Midori Paxton



Baa Atoll in the Maldives is an aggregation site for manta rays (*Manta spp.*). Photo: nitrogenic.com/Shutterstock.com

7. DANUM VALLEY CONSERVATION AREA, BORNEO.

This large tract of relatively undisturbed ancient lowland tropical rainforest is home to a number of rare and enigmatic species, including the tarsier, Bornean pygmy elephant, and the recently discovered spectacled flowerpecker bird. It includes the Maliau Basin Conservation Area established to conserve the Maliau river catchment and the Yayasan Sabah Concession Area.

8. EASTERN STEPPE, MONGOLIA.

Great migratory herds of Mongolian gazelle roam the open plains, rolling hills and pristine wetlands of the eastern steppe, one of Asia's last grassland wildernesses. More than twice the size of New York State, 200,000 nomadic herders depend directly on this vast and fragile landscape for their livelihoods.

9. LANGU GORGE, NEPAL.

Accessible only by foot, the Langu Gorge lies in Nepal's largest national park – Shey Phoksudo – famous for its spectacular Himalayan landscapes. With cliffs, ridges and gullies, this is prime snow leopard habitat and the first place that the species was ever studied by radio collar.

Forests of the Annamite mountains are home to the douc langur (*Pygathrix nemaeus*)
Photo: Subin Pumsom/Shutterstock.com



Myanmar's Northern Mountains Forest Complex harbour rufous-necked hornbill (*Aceros nipalensis*)
Photo: Kim Briers/Shutterstock.com



Sunrise in Danum Valley, Borneo
Photo: Kim Briers/Shutterstock.com

10. LAYA VILLAGE OF JIGME DORJI NATIONAL PARK, BHUTAN.

Laya village, home to the Layap indigenous people, lies at an altitude of 3,850 metres in the Tibetan peaks of Bhutan's second largest national park. Blue sheep, musk deer, tigers, snow leopards and Bhutan's national animal, the takin (a type of goat-antelope), all share this landscape.

11. NINO KONIS SANTANA NATIONAL PARK, TIMOR-LESTE.

Timor-Leste's first national park encompasses primary rainforest, more than 200 cultural sites and a large tract of the Coral Triangle, an underwater paradise with the world's greatest coral and reef fish diversity. On land, the park links Important Bird Areas, which harbour the Critically Endangered endemic Timor green-pigeon and yellow crested cockatoo.

12. NORTHERN MOUNTAINS FOREST COMPLEX, MYANMAR.

This vast landscape at the crossroads of India, Myanmar and China encompasses four protected areas and is one of the region's largest remaining expanses of natural forest, harbouring tiger, red panda and the rufous-necked hornbill. Myanmar's highest mountain and the headwaters of its most important rivers, the Ayerwaddy and Chindwin are also found here.

13. NORTHERN PLAINS OF CAMBODIA.

Once referred to as the 'Serengeti' of Southeast Asia, Cambodia's Northern Plains are famous for both their rich abundance of wildlife and their cultural heritage, as the site of Angkor Wat. This landscape is home to some of the world's rarest large waterbirds, including the Critically Endangered giant ibis, and large threatened mammals such as the Asian elephant and banteng, a species of wild cattle.



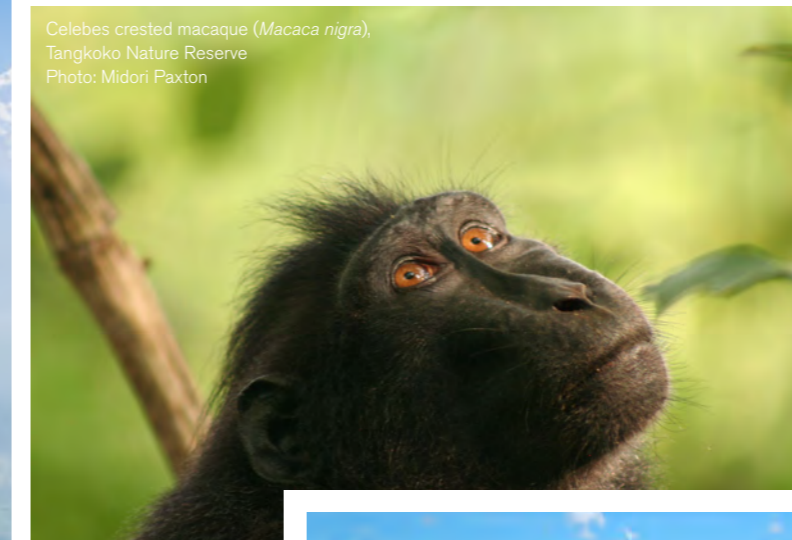
Pokhara Valley.
Photo: Det-anan/Shutterstock.com

14. PALAWAN ISLAND, PHILIPPINES. With its rain-forested hills, powder-fine beaches, sparkling azure waters and abundant wildlife, Palawan Island is a true nature lover's paradise with amazing seascape views. Majestic karst limestone formations, lagoons, marble cliffs, prehistoric caves and waterfalls are all off the coast waiting to be explored, and the endemic Philippine pangolin can be glimpsed in the island's forests.

15. PARAMBIKULAM WILDLIFE SANCTUARY, KERALA, INDIA. Forests, gentle hills and valleys, meandering streams and waterfalls make up the stunning landscape of Parambikulam National Park in the Western Ghats. Tigers and the world's oldest teak tree, the Kannimara Teak, at 450 years old and 49.5 metres tall, can be found here.

16. POKHARA VALLEY, NEPAL. Pristine air, a spectacular backdrop of snowy peaks of the Annapurna mountain range and serene lakes surrounded by lush greenery, make the Pokhara Valley a place of remarkable natural beauty. Landraces of aromatic rice originating in this valley make it important for national agricultural diversity.

17. RHODODENDRON GARDEN IN THRUMSHINGLA NATIONAL PARK, BHUTAN. Wild rhododendrons can be seen in colourful bursts of pink and white across this beautiful 'garden' established in Thrumshingla National Park. The garden boasts 29 species of rhododendrons, traditionally used to make incense and medicines in Bhutan.



Celebes crested macaque (*Macaca nigra*),
Tangkoko Nature Reserve
Photo: Midori Paxton



Papua New Guinea's forests harbour several species of tree kangaroo.
Photo: Susan Flashman/Shutterstock.com



The giant *Rafflesia cantleyi* flower,
Royal Belum/Temengor Forest
Complex. Photo: Midori Paxton



Palawan, Philippines
Photo: walterencsv/Shutterstock.com

18. ROYAL BELUM/TEMENGOR FOREST COMPLEX, PENINSULAR MALAYSIA. Believed to be one of the world's oldest rainforests, at 130 million years old, it is home to 3,000 species of flowering plants including the world's largest flower – the giant and stinky *Rafflesia* – over 100 mammal species, including the Malayan tiger, tapir, sun bear, Sumatran rhinoceros and all 10 of Malaysia's magnificent hornbill bird species.

19. SANJIANGYUAN NATIONAL NATURE RESERVE AND QINGHAI LAKE, QINGHAI, CHINA. Also called the Three Rivers Nature Reserve because it was established to protect the headwaters of three great rivers – the Yellow, Yangtze, and Mekong – on the Tibetan Plateau. Qinghai Lake, translated as 'Blue Lake' or 'Teal Sea', is one of the largest inland saltwater lakes in the world and sits at 3,205 metres high.

20. TANGKOKO NATURE RESERVE, INDONESIA. Bright orange sea putat flowers scatter the black volcanic sand beaches like stars as they meet the rainforest in this unique nature reserve, overshadowed by a large volcano. Several threatened and enigmatic creatures live here, including the Celebes crested macaque, spectral tarsier, Sulawesi bear cuscus and mimic octopus, which is capable of impersonating other animals to trick predators.

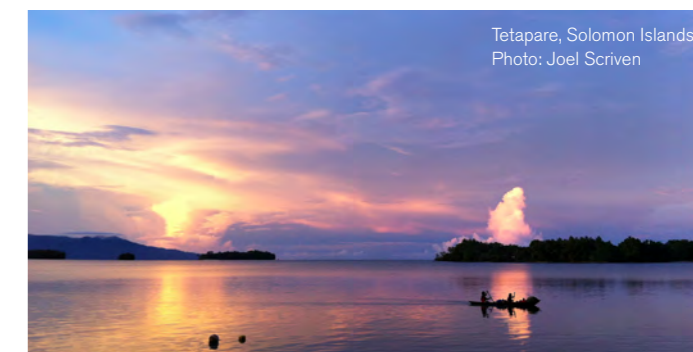
21. COOK ISLANDS. The Cook Islands has pledged to establish a vast marine protected area covering just over one million km², making it one of the largest marine areas ever committed for conservation. In addition to many oceanic and reef species, mother humpback whales and their calves rest in the waters off these islands, on their migration route back to colder southern waters. On land, catch a glimpse of the Rarotonga flycatcher, an endemic bird.

22. PAPUA NEW GUINEA. Papua New Guinea is a paradise for nature lovers above and below the water, containing the world's third largest intact rainforest and a large chunk of the Coral Triangle's teeming waters. From the Endangered Matschie's tree kangaroo living in its montane forests and beautifully-plumed birds of paradise to the giant Bosavi woolly rat recently discovered living in an extinct volcanic crater, PNG is home to a stunning array of unique species, with more being discovered all the time.

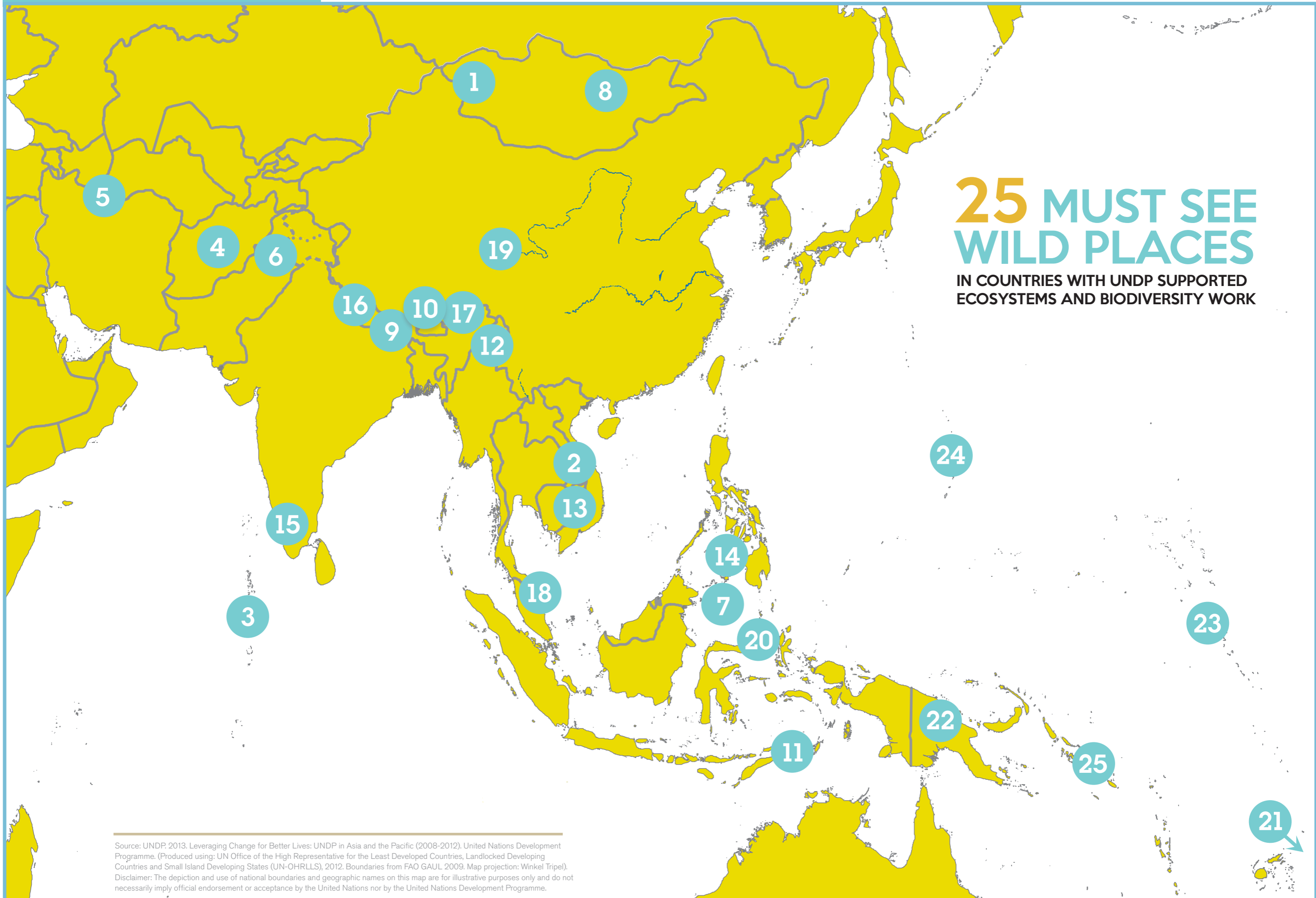
23. PHOENIX ISLANDS PROTECTED AREA, KIRIBATI. One of the largest marine protected areas in the world, at 408,250 km², PIPA encompasses two submerged reefs, eight islands and up to 30 seamounts. A known breeding site for numerous migratory and oceanic species; tuna, billfish, sharks, manta rays and giant humphead wrasse can all be seen in abundance here. It is also a seabird haven, with hundreds of thousands of terns, petrels, boobies and shearwaters nesting on the islands.

24. POHNPEI, FEDERATED STATES OF MICRONESIA. Formed from an extinct volcano, the high island of Pohnpei contains some of the last remaining montane cloud forest in Micronesia, and marine reserves conserve many of its mangroves, freshwaters swamps and coral reefs. The island's isolation and great age mean that unique species such as the Pohnpei fantail bird can be seen here.

25. TETEPARE ISLAND, SOLOMON ISLANDS. Known as the 'last wild island', Tetepare Island and its reefs, lagoons and coastal waters area all protected, forming the largest MPA in the country. The island and its waters are home to an amazing array of life, from the world's largest skink, the Solomon Islands skink, to sharks, saltwater crocodiles, dugongs and turtles.



Tetepare, Solomon Islands
Photo: Joel Scriven



25 MUST SEE WILD PLACES

IN COUNTRIES WITH UNDP SUPPORTED ECOSYSTEMS AND BIODIVERSITY WORK

Source: UNDP, 2013. Leveraging Change for Better Lives: UNDP in Asia and the Pacific (2008-2012). United Nations Development Programme. (Produced using: UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS), 2012. Boundaries from FAO GAUL 2009. Map projection: Winkel Tripel).
Disclaimer: The depiction and use of national boundaries and geographic names on this map are for illustrative purposes only and do not necessarily imply official endorsement or acceptance by the United Nations nor by the United Nations Development Programme.

An aerial photograph of a mountain slope covered in a light layer of snow. The slope is terraced into numerous narrow, parallel rows of brown earth. A herd of dark-colored cattle is grazing across the terraces, moving from the upper right towards the lower left. A single person wearing a red jacket is visible on one of the terraces in the upper left quadrant. The overall scene depicts a traditional agricultural landscape in a high-altitude, cold environment.

HOME

The Asia Pacific region is home to more than half of the planet's population. This home is crowded and extraordinarily diverse. From the snows of the high Himalayas and the inky depths of the Mariana Trench to tropical rainforest to tundra, alpine meadows and mangroves... This intriguing home, like every home, faces familiar challenges. Is there room for all the family? Who pays the bills? Where do the food and water come from? And are some inhabitants neglecting room maintenance and stealing the milk from the proverbial shared fridge? UNDP's ecosystems and biodiversity work – which seeks to expand and strengthen protected areas, integrate biodiversity and ecosystem management into key economic sectors, and support ecosystem-based adaptation to, and mitigation of, climate change – is about maintaining this shared home and resolving “household issues”

64 MILLION HECTARES OF MARINE AND TERRESTRIAL PROTECTED AREAS IN THE REGION HAVE BEEN IMPACTED THROUGH UNDP SUPPORTED GEF FINANCED PROJECTS SINCE 2000

PROTECTED AREAS: MANAGING 'BIODIVERSITY FOR SUSTAINABLE DEVELOPMENT'

Protected areas are part of the world's life support system. They protect intact ecosystems from being destroyed and degraded by over-exploitation, pollution, and conversion to agriculture and urbanization. They provide critically important homes for fauna and flora, and act as storehouses of biodiversity. They also secure benefits that humanity depends on by conserving water supplies, combating soil erosion, buffering people from the impacts of climate change and bolstering economies through tourism and sustainable supply of resources.

A comprehensive, effectively governed and ecologically representative network of protected areas is crucial to maintain the health of Asia Pacific's landscape and contribute to the sustainable human development of the people that share it. Since 2000, UNDP supported GEF financed projects have impacted 64 million hectares of marine and terrestrial protected areas in the region.

Sanjiangyuan National Nature Reserve, Qinghai Province, China. UNDP, with GEF financing, is working with the Government of Qinghai Province to improve the management of the protected area system that harbours the important headwaters of the Tibetan Plateau
Photo: Marc Foggin

MANAGING THE THREE RIVERS RESERVE – CHINA'S LARGEST WETLAND PROTECTED AREA

Green pasture surrounds craggy ridges and snowy peaks rising high above deep meandering valleys, where three great rivers – the Yellow, Yangtze and Mekong – wind away from one another in the centre of the Tibetan plateau. This is Sanjiangyuan National Nature Reserve, known as the Three Rivers Reserve, in China's Qinghai province. Larger than England and Wales combined, this is the Earth's highest and most extensive wetland protected area. It is home to the snow leopard, Tibetan antelope, wild yak and black-necked crane; all threatened with extinction. It is also home to 200,000 people. These people, and the nearly 600 million more living downstream, rely on this fragile environment to meet their basic needs and generate local livelihoods.

The United Nations Development Programme (UNDP), with finance from the Global Environment Facility (GEF), is working with the government of Qinghai to improve management of the Sanjiangyuan region. The protected area system in the province is at significant risk from illegal mining, poaching, overgrazing, infrastructure development and climate change. The project is addressing these challenges by building institutional and staff capacity to strengthen environment-related policies and enforcement, and working collaboratively with local Tibetan herding communities to strengthen conservation and sustainable use of local natural resources.

While only in its first year of implementation, the Qinghai Biodiversity Conservation Project has already begun to engage actively with multiple high level and grassroots stakeholders through targeted workshops, meetings and field trips. This is consolidating the extensive groundwork that has been laid over the past decade for a people-friendly approach to biodiversity conservation in the region's high altitude grasslands and wetlands.

The Qinghai Forestry Department is developing management plans to tackle identified threats in the region. Appropriate guidelines for management and business planning, effective enforcement, monitoring and reporting, and collaborative management with local communities are also being developed. The project is training staff at the prefecture and county levels to promote the further development of Qinghai's protected area system and strengthen its effectiveness.

EXPANDING AND STRENGTHENING PROTECTED AREAS TO MEET GLOBAL GOALS

World leaders recognise that the current global protected area network is not enough to meet our needs. In 2010, they agreed on targets to expand protected areas to cover at least 17 percent of land and inland areas and 10 percent of oceans by 2020.

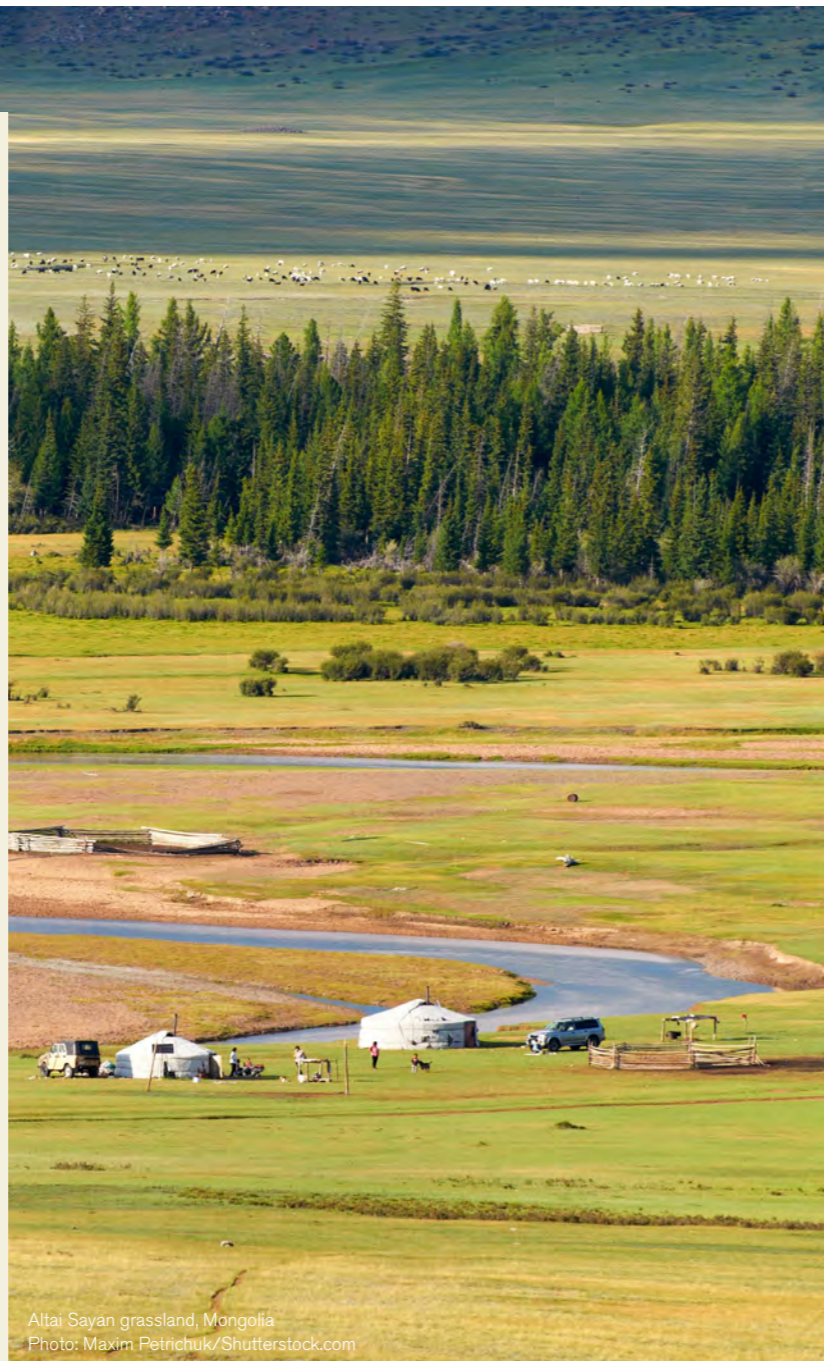
As part of this effort, UNDP works with governments to expand and strengthen protected areas across a wide range of ecosystems that harbour globally significant biodiversity. These include currently under-represented marine, freshwater and grassland habitats, and areas that are important for providing ecosystem services.

For example:

- **In the Maldives**, a UNDP GEF project surpassed its original aim to create three marine protected areas in Baa Atoll, by establishing six marine parks that together cover over 3,700 hectares of ocean and under-represented coral reefs. These coral reefs play an important role in distributing and maintaining biodiversity throughout the Indian Ocean.

- **The advocacy** efforts of a UNDP GEF project in Mongolia's Altai Sayan Mountains have led the government to designate 12 new protected areas, which harbour globally significant biodiversity and under-represented steppe grasslands.

- **In the Philippines**, which harbours some of the most unique and threatened biodiversity in the world, UNDP is supporting the government to expand coverage of Key Biodiversity Areas in the national protected area network.



Altai Sayan grassland, Mongolia
Photo: Maxim Petrichuk/Shutterstock.com

ENHANCING THE MANAGEMENT EFFECTIVENESS OF PROTECTED AREAS

All GEF financed, UNDP supported protected area projects aim to strengthen "management effectiveness (ME)". What is management effectiveness and what must we do to improve it? The items on the wish lists opposite are typical of the types of action needed!

UNDP gauges quantitative progress towards achieving ME using the Management Effectiveness Tracking Tool (METT), which was developed by the World Bank and World Wildlife Fund (WWF) in 2003. It comprises a set of 30 questions that are key for ME improvement. These questions range from legal and regula-

tory issues to the existence of management plans, adequacy of budget and staffing and skill levels, equipment, relationships between park residents and neighbours, and the state of the natural and heritage values of parks. METT works as a checklist to enable park authorities to tackle ME in a comprehensive and practical way.

"Experience has taught us that efforts to improve ME on the ground cannot be completed without improvements at the systemic and institutional levels. Without change at these levels, good work done at the local level is likely to be short-lived," says Yoko Watanabe, GEF Senior

Biodiversity Specialist for Asia. "This is why GEF increasingly invests in catalysing sustainability of protected areas through transformative institutional strengthening."

GEF's work in Mongolia on successive biodiversity projects, in collaboration with UNDP and other partners, has provided long-term strategic support over the last 15 years. Earlier projects contributed to strengthening parks, such as the 4.4 million hectare Great Gobi Strictly Protected Area (SPA) in the south, the half million hectare Dornod Mongol SPA in the Eastern Steppe, and the 600,000 hectare Altai Tavan Bogd National Park in the far west. These projects



HERE ARE TWO WISH LISTS FROM PARK MANAGERS IN BHUTAN AND MONGOLIA

WISH LIST OF SONAM WANGCHUK, HEAD OF PARKS IN BHUTAN:

1. Increased budget for him to be able to ensure adequate park management;
2. More skilled staff with relevant qualifications and experience to handle assigned tasks;
3. Stronger laws to enable his staff to perform effective park management and law enforcement;
4. Development of an information and data depository combined with a real time reporting system from the field to Headquarters, so that he can brief the Minister with accurate and timely information; and
5. A decrease in human wildlife incidents, which he has to deal with on a daily basis.

MONGOLIAN RANGER ANKHBAYER B'S WISH LIST:

1. A dozen more staff to be able to patrol the Naiman Nuur (Eight Lakes) area, covering 39,670 hectares, under his jurisdiction in the Orkhon Valley National Park;
2. More motor cycles and equipment, such as GPS and a camera;
3. Some funding for a modest visitor centre and information materials;
4. Opportunities for training to gain new professional knowledge and skills; and
5. More cooperative park resident herders.

have collectively supported the strengthening of 12 magnificent parks and the establishment of 18 new protected areas covering a staggering 8.7 million hectares.

The on-going 'Strengthening the Protected Area Network' (SPAN) project consolidates these efforts by catalysing the management effectiveness and financial sustainability of Mongolia's national protected areas system. The project is strengthening the policy, legal and institutional frameworks for sustainable financing and co-management of protected areas at the national level.

SPAN has managed to secure the engagement of an impressive range of stakeholders at the national level to work towards strengthening the protected area system. The cross-sectoral National Protected Area Forum was established to meet annually to promote the protected area agenda to ensure support and investment from the government and stakeholders. The project has also developed a road map towards achiev-

ing the financial sustainability of the protected area system. In order to implement the actions suggested in this road map, the project has established, by Ministerial Decree, an inter-agency Working Group on Sustainable Financing for protected areas with 19 members drawn from key Ministries and other stakeholders.

In addition, the project is supporting two protected areas to increase their ME – Orkhon Valley National Park and Ikh Nart National Park. At mid-term, the METT scores for the two target sites are on the rise: from 60 to 75 for Ikh Nart and from 37 to 55 in Orkhon Valley National Park.

Further south in tropical Malaysia, the recently completed "Conserving Marine Biodiversity through Enhanced Marine Park Management and Inclusive Island Development" project has increased the capacity of the Department of Marine Parks Management to enforce regulations within the parks' waters five-fold. 156 DMPM field officers were trained to man patrol

boats and given the authority to arrest people that violate marine park regulations. "These new credentials have given our officers a sense of pride. They now have the skills and equipment with which to enforce measures to protect this fragile environment," says Mohamad Bin Ishak, Parks Assistant at Redang Island Marine Park.

Park management plans for the three target marine parks – Redang, Sibu Tinggi and Tio-man islands – have significantly contributed to increasing ME, and the number of community participation mechanisms has increased. By the end of the project, the METT scores for the three marine parks had increased significantly. For example, the score for Redang Island Marine Park more than doubled from 41 to 89 during the project period.

The METT, complemented by robust biodiversity and ecosystem monitoring indicators, remains a vigorous and reliable tool for gauging the progress of protected areas towards effective management.

NEW WAYS TO MANAGE PROTECTED AREAS – INNOVATION IN THAILAND

The National Parks and Protected Areas Innovation Institute was established in 2012 in the Department of National Parks, Plants, and Wildlife Conservation in Thailand through the UNDP supported and GEF financed 'Catalyzing Sustainability of Thailand's Protected Areas System' project, which was active from 2010-2014.

Evolved from the Research and Development Unit within the National Parks Division, the Institute is mandated to work on: (i) Innovation for sustainable financing including payments for ecosystem services and other revenue raising mechanisms; (ii) development of an information system for protected areas management; (iii) strategic planning for protected areas; (iv) research and development; and (v) innovation to help meet national obligations to international environment conventions. It has a central unit in Bangkok with eight centres in the regions, with over 30 staff.

"We would like the institute to become a think tank that supports effective protected area management. We hope it will serve as a coordinating mechanism to help Thailand meet our obligations to the international conventions on Biodiversity and Climate Change, specifically in relation to protected areas," explains Dr. Songtam Suksawang, Director of the Institute. "In light of the Association of South East Asian Nations (ASEAN) Economic Community initiative to be launched in 2015, we would like to position the institute as a leading hub for knowledge sharing and capacity building among ASEAN countries. The institute has already started to gain traction and recognition on this front, providing training for visiting park managers from neighbouring countries and supporting cross-boundary protected areas projects with Myanmar and Cambodia."

The institute has recently drafted a master plan for the management of Thailand's national parks, which has just gone through an extensive round of consultations with stakeholders. An information and database for protected areas management plans is also under development using the Management Effectiveness Tracking Tool as a main source of data, and the institute is working on the economic valuation of select protected areas to develop Payment for Ecosystem Services schemes and other revenue-generating mechanisms.

White-handed gibbon (*Hylobates lar*) in Khao Yai National Park, Thailand
Photo: Annabel Paxton



WHAT'S OUT THERE? USING CAMERA TRAPS TO MONITOR PROTECTED AREAS

LEFT: Camera trap set by the salt lick in Belum Temenggor Forest Reserve, Malaysia
Photo: Midori Paxton

"What's out there?" A question asked since the beginning of human history. Sabre tooth cats, life on distant planets? Usually nobody is sure and answers are vague. But as far as protected area managers are concerned, the question is key. What's out there in the protected areas? And the answer needs to be accurate.

You need to know what's what and what's where to protect anything effectively. Many PAs are not foot friendly. Craggs, limestone karst ups and downs, thick forest, lots of leeches! And the wildlife is shy. Solution? Bring on the camera traps! These simple devices are made from a point and shoot camera fitted with a motion or infrared sensor to trigger a photograph when they detect warmth or movement nearby. Many camera traps can be set in a 'grid' across a piece of forest, or other key habitat, to continuously record the animals present at each site, and how they use the area.

UNDP's partners use camera traps to collect information on wild animals and how they use their habitat to inform conservation decisions. For example, the Malaysian Department of Wildlife and National Parks (DWNP) uses camera traps to survey protected forest within two national parks in Peninsular Malaysia. In the Taman Negara National Park, 200 camera traps monitor three different areas and have recorded 70 different species, as well as ten individual tigers. Once the traps are set up, they operate continuously for

two months before staff returns to recover the data. Image analysis enables staff to monitor the proportion of different species living in the forest, how they use different areas, and their activity patterns. They are also able to identify and patrol 'hotspots' where tigers often roam to prevent poaching more effectively. A poacher, when photographed, looks just as recognizable as his prey.

In the Belum-Temenggor Forest Reserve, DWNP's camera traps monitor the effectiveness of road safety efforts. Forest habitat here is split by a road. How can an elephant cross a highway? The Malaysian government plans to build a viaduct to encourage animals to cross it safely. Camera traps are used to survey forest surrounding the site to assess and monitor how large mammals use the site and viaduct before, during and after its construction. The camera traps have already detected some threatened and illusive mammals at the study site, including Malayan tiger, Asiatic golden cat and black leopard.



RIGHT: Male Asian elephant (*Elephas maximus*) photographed by camera trap in Belum Temenggor Forest Reserve, Malaysia, UNDP's project site
Photo: Malaysian Department of Wildlife and National Parks



Snow leopard (*Panthera uncia*) photographed by camera trap in Sanjiangyuan National Nature Reserve in Qinghai Province, China, UNDP's project site
Photo: Plateau Perspectives



Asiatic cheetahs (*Acinonyx jubatus*) photographed by camera trap in Iran
Photo: Conservation of the Asiatic Cheetah Project/UNDP



Photo: Svetlana Foote/Shutterstock.com

WILDLIFE CRIME - PREVENTING THE TRADE OF ENDANGERED SPECIES

Illicit wildlife trafficking is said to be worth US\$7.8 to 10 billion a year. Asian countries are both major consumer and transit countries of illegal wildlife products and derivatives, including ivory and rhino horn from Africa. Many Asian species are also under heavy poaching pressure – tigers, snow leopards, pangolin, tortoises, orchids, to name a few.

Strengthening the anti-poaching capacity within protected areas and nations as a whole is critical for securing the magnificent and globally significant biodiversity in Asia. Even if we secure natural habitats, we know from experience, whether it is the dodo or the giant Steller's sea cow in the Bering Sea, that hunting pressure alone can decimate or extirpate wildlife populations.

With this recognition, many protected area projects supported by UNDP focus on promoting wildlife trade surveillance and building the response capacity of conservation agencies and stakeholders to prevent the illegal trade of endangered species. These include establishment of wildlife crime intelligence units to control and analyse intelligence data, and increasing capacity for wildlife crime monitoring, interception and conviction at the regional and site levels.

TIGERS! IN SHORT SUPPLY

Legend has it that Guru Padma Sambhava, who introduced Buddhism to Bhutan in the 8th century, arrived at the Tiger's Nest Monastery on the back of a flying tigress. Asia's natural and cultural heritage cannot be fully described without mention of tigers. But tigers are in short supply. All are threatened with extinction in their last 13 range countries. Three of the nine subspecies are already extinct, and there are only an estimated 3,200 tigers left in the wild – a drastic decrease from the estimated population of 100,000 at the turn of the twentieth century. Diminishing natural habitats due to conversion for agriculture, plantation and urbanization, increasing fragmentation of forests and other habitats, coupled with enormous poaching pressure for illegal wildlife trade accelerate the death of our tigers. Extinction looms.

UNDP works in tiger landscapes in seven countries in direct support for the Global Tiger Recovery Programme under the World Bank coordinated Global Tiger Initiative (GTI). With funding from the GEF, the tiger landscape projects support strengthening of frontline enforcement actions within and around protected areas. They support protection and enhancement of natural habitats that can ensure healthy prey population and necessary corridor move-

ment of tigers. In addition, these projects provide targeted support to make the economic case for increased investment in protected area management and forest conservation, as well as establishing and implementing national sustainable financing plans.



Tiger conservation is not just about tigers. It's about national development. When we protect the natural habitat of the tiger, we protect the forests that provide water and regulate water flows, regulate the climate and produce clean air, generate livelihoods for people and constitute major tourism assets. We must also strengthen

governance systems to ensure effective enforcement from source to market to conserve species threatened by illegal and unregulated trade. The plight of the tiger represents the tip of an enormous iceberg – the US\$7.8 to 10 billion a year illicit wildlife trafficking industry combined with fast economic growth and prosperity in consumer countries is generating rapidly growing demand and consumption.



*Empowered lives.
Resilient nations.*

**“Tiger Tiger
or heading**

**burning bright”
into darkness**

**Only 3,200 left....
What else are we losing?**

CONSERVING THE ASIATIC CHEETAH IN IRAN



Photo: Conservation of the Asiatic Cheetah Project/UNDP

Iran is big – the eighteenth largest country in the world, and from alpine peaks to coral reefs, desert to rainforest, it has a tremendous variety of habitats and biodiversity. It is also the last refuge of the Asiatic or Iranian cheetah, a formerly abundant species that once ranged from Arabia as far east as the Indian Subcontinent. Classified by the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species as Critically Endangered, current population estimates are no higher than 75 animals, mostly living in the harsh and arid eastern and central plains of the Dasht-e Kavir desert plateau.

The challenge facing UNDP, GEF and other conservation organizations that make up the 'Conservation of the Asiatic Cheetah' project, known as CACP, is immense. Just 110 game guards are employed to protect 40 percent of all territories under Iran's Department of Environment (DoE) management – that is nearly 6 million hectares of cheetah habitat to be protected against the backdrop of myriad infringements. 110 rangers and 6 million hectares. That means each ranger has to patrol an area approximately twice the size of the city of Kuala Lumpur!

CACP was initiated in 2001 and is now in Phase two. The project has been singularly successful in forging national and international partnerships. Key players currently include the DoE, the Wildlife Conservation Society, the IUCN's Cat Specialist Group, Panthera and local NGOs and village councils. CACP's strategies include community education particularly with regard to overgrazing in protected areas, which poses direct competition with cheetah prey species such as goitered gazelle, wild goat and wild sheep. CACP also conducts basic education on cheetahs (many herders

reportedly confuse cheetahs with other local predators such as the Iranian leopard, striped hyena, wolf and even caracal, lynx and wild cats) and supports efforts to reduce human-wildlife conflict. Other education initiatives include the official designation of August 31st as Cheetah Conservation Day during which media programmes are presented designed to raise awareness about conservation, and the formation of Cheetah Friends, a series of popular local youth clubs dedicated to education. The national football team even adopted the cheetah as its logo for the 2014 World Cup!

The "science based" approach to conservation is also a CACP focus and, given the massive land areas involved, camera traps are widely deployed to assist in wildlife population monitoring (predator and prey) and evaluation, although international sanctions have made obtaining some project equipment difficult.

Perhaps one of the most noteworthy of CACP's successes has been capacity building among the DoE's staff through multiple seminars and training sessions and provision of motorcycles and vans, which has built their professional skills and enabled them to more effectively patrol large areas. Training and study tours for local people to visit cheetah sites have built trust and fostered collaboration between guards and locals.

Ensuring the survival of the Asiatic cheetah is a daunting task but recent camera trap images of females with young earlier in 2013 have thrilled the conservation world and at the conclusion of Phase One of CACP, an independent evaluation of project progress stated: "The project has clearly contributed to saving the Asiatic cheetah from extinction."

CONSERVING THE LAST REFUGE OF ENDANGERED PRIMATES IN VIET NAM

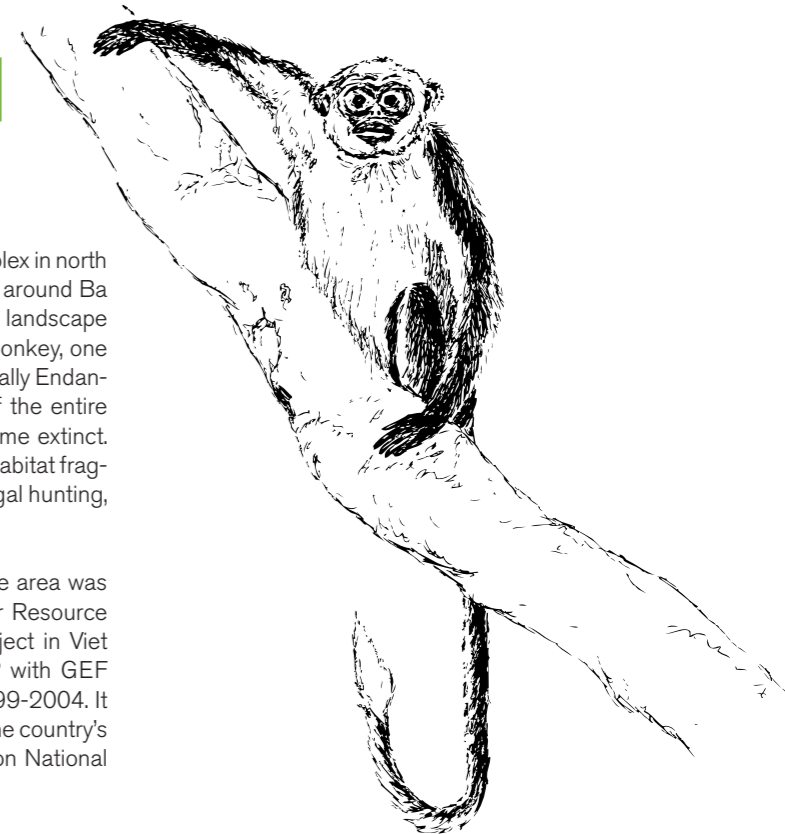
The Ba Be and Na Hang Conservation Complex in north east Viet Nam, comprises the forest landscape in and around Ba Be National Park and Na Hang Nature Reserve. This landscape is almost the final refuge of the Tonkin snub-nosed monkey, one of the world's most threatened primates, listed as Critically Endangered by IUCN. Without coordinated management of the entire forest complex this species will almost certainly become extinct. The main threats to biodiversity in the area come from habitat fragmentation, large-scale infrastructure development, illegal hunting, over-exploitation and livestock grazing.

In response, a landscape conservation strategy for the area was developed through the "Creating Protected Areas for Resource Conservation using Landscape Ecology" (PARC) project in Viet Nam. The project was the first supported by UNDP with GEF finance in the country, and was implemented from 1999-2004. It piloted a landscape ecology approach for conserving the country's diverse biological heritage in the complex and Yok Don National Park.

Yok Don National Park protects a seasonal habitat that is important for large mammals and birds. Therefore, conservation of suitable habitats outside the park borders is essential to ensure the continuity of migratory pathways. Biodiversity surveys during PARC Project recorded 102 mammal species (including 51 bats), 327 bird species, 41 reptile species and 28 amphibian species from the Conservation Complex. Thirty-four of these species are listed as nationally or globally threatened.

PARC identified priority habitat areas in the wet and dry seasons and management needs for long-term conservation. Based on this information, a multiple-use conservation strategy was produced that includes proscribed management of the wider landscape.

Other achievements of the project include a hunting gun exchange programme in Ba Be and Na Hang Districts, which resulted in over 1,000 guns being turned in, and new guard posts, monitoring stations and information centres.



Tonkin snub-nosed monkey (*Rhinopithecus avunculus*)
Illustration: Patricia Valenti

DID YOU KNOW?

The tonkin snub-nosed monkey was presumed extinct before its rediscovery in 1989. There are thought to be fewer than 250 adults of this striking primate remaining in the wild.



Menuvù children in traditional dress
Photo: DENR-PAO/NewCAPP/UNDP

EMPOWERED INDIGENOUS COMMUNITIES CONSERVE THEIR ANCESTRAL HOMES IN THE PHILIPPINES: THE RISE OF ICCAS

In the highlands of the southern Philippines, the Menuvù tribe has garnered international recognition for documenting, mapping and registering their traditionally conserved ancestral lands. Like the territories of many other indigenous communities in the Philippines, the Menuvù's traditional lands shelter significant biodiversity. But rising socio-economic pressures have increasingly threatened the country's natural ecosystems. With support from the 'New Conservation Areas in the Philippines Project' (known as NewCAPP), the United Nations Environment Programme World Conservation Monitoring Centre (UNEP WCMC) has formally recognized the Menuvù Indigenous Community Conserved Area, with an accompanying community conservation plan to protect and govern their lands.

The Philippines is a treasure trove of biodiversity, containing 52,177 species, half of which are unique to the country. But many of the country's unique and threatened species and important ecosystems lie outside the country's protected areas and are threatened by indiscriminate logging, mining, land conversion, overharvesting of resources and infrastructure development. In 2009, about 65 percent of the country's 128 'Key Biodiversity Areas' – of global importance for biodiversity – lacked formal protection.

Since 2009, with support from UNDP and finance from the GEF, NewCAPP has worked with the Government of the Philippines and local and indigenous communities to document, map and recognize new conservation areas that are managed by indigenous peoples, local government or local communities. These conservation areas expand coverage of Key Biodiversity Areas and empower them to conserve them. The project is implemented by the Department of Environment and Natural Resources through its Protected Areas and Wildlife Bureau, now renamed the Biodiversity Management Bureau.

Specifically, the project is supporting indigenous communities to strengthen their traditional governance mechanisms that were responsible for the continued protection of their sacred forests, lakes, mountains, burial grounds, and traditional hunting grounds which harbour important biodiversity and deliver ecosystem services. These are carried out through a process of documentation of traditional practices and rituals, mapping of traditionally conserved areas, inventory of resources and delineation of Indigenous Community Conserved Areas (ICCAs). Community Conservation Plans have been developed by the community with project support to govern these areas. To date, two ICCAs, covering 7,115 hectares in total, have been formally recognised in the ancestral lands of the Menuvù and the Aytá Abellen peoples. These ICCAs have been registered in the UNEP-WCMC global database.

"Our community is known not just locally but now globally via the ICCA registry, bringing us a great sense of pride," says Menuvù elder Nonoy Nunay. Tribal leader Herminio Guinto agrees: "The ICCA has been a big help, opening our eyes to reflect on our culture." He says the entire ICCA process has sent a strong message to indigenous peoples that their way of life in preserving nature is important; their systems of traditional governance and conservation

are to be respected. The world is seeing them in a fairer light, understanding their immense contribution to the conservation and management of locally and globally significant biodiversity.

Miles away in the highest peaks of the Northern Philippines, the project has contributed to resolving conflicts over land among indigenous groups. A long standing dispute between the Banao and Balatoc people within the Balabasang-Balbalan National Park about each other's claim to about 2,000 hectares of forested land that overlapped their ancestral domains was resolved. Through the project's introduction of the ICCA concept and series of dialogues with both tribes, the two have declared a truce and renewed a peace pact.

Over its lifetime, NewCAPP aims to expand the Philippine's protected area system under new management regimes, including ancestral domain ICCAs as well as local government- and community-managed areas. About 120,613 hectares are in various stages of establishment as conservation areas (both ICCAs and LGU-managed) in 400,000 hectares of Key Biodiversity Areas covered by the project. It is also building capacity to manage these protected areas effectively.

In the nearby Zambales Mountain Ranges, a tribal leader was able to interact with fellow international ICCA advocates at the Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) in India last October 2012. Aytá Abellen leader, Salvador Dimain of Cabangán Zambales, presented his people's traditional knowledge systems and practices, which support the protection of their sacred forests as sources of water, food, and medicine.

The Philippines has been at the forefront in recognizing ICCAs and their role in biodiversity conservation, elevating them nationally through the National ICCA Conference in March 2012, and internationally through the 11th CBD Conference of the Parties in Hyderabad, India



The Menuvù community in Mt. Kalatungan, Bukidnon, shows the 3-D map of their ancestral domain. The community has developed a Community Conservation Plan to sustain and improve protection and conservation efforts for the Indigenous Community Conserved Area (ICCA). Photo: Glaiza Tabanao

COMMUNITY DEVELOPMENT AND EDUCATION SUPPORTS WILDLIFE MANAGEMENT IN PAPUA NEW GUINEA

Papua New Guinea (PNG) supports an estimated 5 to 7 per cent of the world's biodiversity in its rainforests, reefs, swamps and grasslands. From the world's tiniest frog, the 'Pinocchio', to one of the world's largest birds, the southern cassowary, a unique array of species have evolved here in isolation – about one in five of which are found nowhere else on earth. PNG's numerous indigenous clans depend directly on these rich ecosystems and natural resources for their livelihoods. They also control a large majority of the nation's land through a system of traditional ownership. As a result, they hold the key to conserving their country's natural wealth.

In an effort to conserve more of this natural wealth, in 1995 UNDP and PNG's Department of Environment and Conservation (DEC), embarked on an initiative with local clans in the Bismarck-Ramu area. Bismarck-Ramu lies in the heart of PNG, plunging from the country's highest point at 4,500m among the jagged peaks of the Bismarck mountain range, down through primary forests to the floodplains of the Ramu River on PNG's northern coast. Drawing on documented lessons learned from earlier projects in PNG, the UNDP supported GEF financed "Bismarck-Ramu Integrated Conservation and Development Initiative" (1995-1999) took a strongly participatory approach that emphasised community development, education and empowerment.

The project trained local people as community development workers and deployed them in small teams to meet with clans in Bismarck Ramu. The community development workers focused

on establishing a relationship with the communities through a carefully designed seven-step engagement programme that involved introductions, mutual story-telling exercises, community mapping, discussions of community aspirations and needs, exploration of possible solutions, visioning and development of action plans to implement solutions. This was complemented by an education and outreach programme in communities, schools and churches, implemented by different staff, which aimed to raise awareness of the value of the environment to local livelihoods.

Only once communities had indicated their interest in conservation to the community development teams, and had sought out the DEC Conservation Area Manager themselves to obtain information and invite him to visit them, were potential options for setting aside land for conservation discussed. Visits were then arranged to discuss the clans' motivations for wanting conservation, the different options for reservation and which the community wished to adopt. All clans selected to establish Wildlife Management Areas (WMAs). The project then worked with the clans to fulfil the requirements needed for declaration of their WMAs – to establish the boundaries of the area, a committee and rules to manage it, to submit a formal request to DEC for declaration, approval and gazette of the WMA.

When the project ended, over 120,000 hectares of land had been designated by their traditional owners (thirteen clans from the Sepu area and four clans from the Foroko/Brimde area) as WMAs. As a result of the project's awareness-raising efforts, another village further out on the Madang coast decided to establish their own marine WMA as a no fishing zone.

LOOKING ACROSS THE LANDSCAPE: MANAGING BIODIVERSITY AND ECOSYSTEMS WITHIN AND BEYOND PROTECTED AREAS

NEPAL'S WESTERN TERAI : INTEGRATED PLANNING AT THE LANDSCAPE LEVEL

Over the past seven years, the 'Western Terai Landscape Complex' project in Nepal has worked with the government and communities to build the basis for a landscape approach to conservation, which has helped to safeguard the area's biological wealth and its vital ecological functions. Nepal's Western Terai is an important home for globally significant biodiversity: dense riverine forest harbours Bengal tigers; rhinos live in its swampy grasslands; and vast, tall stands of sal, the Terai's most common tree, shelter huge herds of blackbuck deer.

Prior to the project, two areas of this forest were legally protected – the Bardiya National Park and the Suklaphanta Wildlife Reserve. Adjoining areas of productive forest act as 'corridors', enabling large migratory mammals to pass from Nepal's protected areas, to protected areas in India. These forests also reduce the effects of floods, prevent soil erosion and help maintain a high quality water supply for the one million people that live in the Western Terai.

In a well-protected protected area, you will see it! Biodiversity in exuberant abundance! Stingrays, reefs, ferns, gibbons, leeches, giant forest hogs, infuriating ticks, fireflies, fungi... Biodiversity doesn't respect boundaries. Nor is it confined to them. Most of our planet's biodiversity occurs outside protected areas in land and seascapes dedicated to human activities or lies in the 'commons' – areas belonging to nobody, but accessible to all.

Simply protecting a specific area is not sufficient if biodiversity conservation is a priority, hence UNDP's support of the landscape concept. This involves UNDP working with governments, producers and communities to integrate biodiversity and ecosystem management within and far beyond protected area limits.

UNDP supported GEF financed projects have directly impacted a total landscape area of more than 60 million hectares since 2000 in Asia Pacific alone.

The landscape approach involves coordinating management of a mosaic of land and marine activities – including protection, restoration, subsistence use, and encouraging biodiversity and ecosystem friendly production in a wide range of sectors, from agriculture, forestry, fisheries and mining to tourism. A holistic landscape approach is far more effective in keeping high value biodiversity areas that sustain vital ecosystem services intact than simply concentrating solely on a single protected area.

But logging, conversion of forest to farmland, over-grazing and uncontrolled forest fires were all degrading this landscape, reducing and fragmenting the forest and threatening to encroach on the national park and wildlife reserve.

The project developed policies to guide integrated planning at the landscape level and worked with local communities to manage the Terai's forests and wildlife. Through the project, 10,375 people from local communities and government were trained in a range of activities, including conservation, sustainable forest management and improved livelihoods to enable them to conserve both the productive and protected landscape. The project was implemented by Nepal's Ministry of Forests and Soil Conservation and supported by multiple partners, including UNDP, GEF, Netherlands Development Organisation (SNV) Nepal, WWF Nepal, Local Initiatives for Biodiversity Research and Development, Biodiversity International, and the Nepal Agricultural Research Council.

The project's advocacy efforts have led the government to establish three areas of Protected Forests (totalling 130,565 hectares) within all three corridors in Western Terai and to develop management plans to govern their sustainable use. This is the first time that this category of protected area, which preserves the forest while allowing for some traditional and sustainable use, has been used in Nepal. A Protected Forest Manager and a number of Rangers have been employed to implement the management plans.

With project support, the participation of local communities in forest management has more than doubled. More than 73,612 households are now involved in participatory forest management systems through 387 Community Forest User Groups. These groups work in the buffer zones of the protected areas to mobilise their own resources to implement biodiversity-friendly initiatives.

To strengthen the wildlife reserve and national park, which are priority areas for biodiversity, the project has helped establish District Forest Sector Coordination Committees. These committees control encroachment on protected areas of forest, illegal hunting and poaching and help govern forest user groups.

Critical habitats have been restored, including 914 hectares of grassland within protected areas and 37 wetlands within and outside of protected areas. The project has also produced conservation plans for two mammals, seven plants and 106 local varieties of crops.

The project has worked to integrate biodiversity and ecosystem management into planning and production practices in the Western Terai by revising 51 Community Forest User Group plans. These aim to promote biodiversity friendly activities, help communities to adopt new trades that reduce pressure on forests and other natural habitats, and establish anti-poaching groups. Almost 400 households have become involved in cultivating medicinal and aromatic plants, generating a total income of Nepalese Rupees (NRs) 5.4 million (US\$ 63,529) in 2011, and reducing their reliance on the forest.

Populations of tiger, swamp deer and blackbuck have increased and rhino populations are stable. Of 4,759 families involved in income-generating activities though seed grant support, more than 75 percent are still active.



Swamp deer (*Rucervus duvauceli*), Bardia National Park, Nepal
Photo: Ashley Whitworth/Shutterstock.com

This holistic approach has brought tangible results. Forest cover in the Western Terai has increased by 260 km² and in the Churia Hills by 48 km². Populations of tiger, swamp deer and blackbuck have increased and rhino populations are stable. Of 4,759 families involved in income-generating activities though seed grant support, more than 75 percent are still active.

After the project's livelihood interventions, net annual household income of the forest dependent households increased by NRs 7,428 (approximately US\$ 87) against the project target of NRs 3,887 (or about US\$ 45). Efforts to revive eco-tourism in the national park and wildlife reserve saw tourist numbers grow more than eight-fold (over the 2006 baseline of 1,191), benefitting both the protected areas and the enterprises and communities living around them.

As a result, the Government of Nepal has endorsed the landscape management approach for the first time (in its tenth National Development Plan). The Landscape Support Unit in the Ministry of Forestry and Soil Conservation, which the project helped to establish, has provided national level support for this holistic approach.



Photo: Midori Paxton

MONGOLIA'S ALTAI: THE LANDSCAPE APPROACH IN THE LARGEST OF LANDSCAPES

At first glance, Mongolia's 104,250 km² Altai wilderness of Alpine peaks and sweeping grasslands appears impregnable, immune to change and human influence.

Like many high altitude regions, however, this impression of invulnerability is deceptive. As the Altai Mountains Biodiversity Conservation Strategy notes: "The Altai's fragility has already been demonstrated through over-exploitation of land and wild species of animals and plants, leading to degraded grasslands, damaged forests, depleted wildlife populations and polluted and diminished flows of water to downstream ecosystems."

The threats facing Altai's natural resource base and unique biodiversity are many and varied. They include poorly regulated sport hunting and poaching, mining, deforestation, insensitive infrastructure development, pest poisoning and overgrazing.

In order to address these varied and often interconnected threats to biodiversity, the UNDP supported, GEF financed 'Mountain Landscapes of Mongolia's Altai Sayan Eco-Region' project adopted a landscape approach focusing on the entire area.

Simply stated, the landscape concept enables national and local actors to: i) Implement the ecosystem approach to biodiversity conservation for long-term impact; ii) facilitate working in co-operative partnerships to address the interconnected issues faced by biodiversity and society in an integrated way; and iii) promote the resilience of ecosystems and society to climate change.

With these objectives in mind, the project amassed a huge amount of existing data, filling gaps where necessary, and gathered new supplementary information in co-operation with NGOs, government agencies, local communities, herders, miners, scientists and businesses.

The result was that the many pieces of the vast Altai jigsaw – from new road developments to pasture degradation driven by unsustainably large goat herds fuelled by Kashmir demand and damaging government subsidies – came together to create a comprehensive picture of the Altai landscape.

Contained within the Strategy are details of flora and fauna, topography, meteorology, demographics, legal matters, conservation gaps and solutions to fill them, all supported by an abundance of maps, charts, graphs and survey results. In short, it is an “all you need to know and all that needs to be done” guide to one of the largest and most biodiverse regions in Asia.

The Strategy has already been approved by national Government and has been adopted by the regional Governments of Uvs, Khovd, Bayan Olgii and Gobi Altai as a working blueprint for landscape biodiversity conservation. And with the Strategy, a practical land use plan was born to provide for the needs of both wild species and people living there; a plan, in the words of the Strategy, “to be followed and championed by government, developers, non-governmental organisations and local residents.”



Photo: Midori Paxton

A herder home. The gers (yurts) are covered by layers of fabric and sheep's wool felt for insulation and weatherproofing. Inside is colorfully decorated with many carpets on the floor and on the wall.

CONNECTING LANDSCAPES

IN BHUTAN AND MALAYSIA:

CREATING AND STRENGTHENING BIODIVERSITY CORRIDORS AND NETWORKS

Humans strive for an ever more interconnected world. The same is important for biodiversity. As uncoordinated development and habitat conversion fragments landscapes into smaller and smaller patches of natural habitat, conserved areas risk becoming islands isolated from each other by roads, fences, farmlands and urban development.

Without connections between natural habitats, many migratory species are unable to travel the long distances they need to survive or to find an unrelated mate. Fragmentation reduces genetic

diversity and disrupts ecological processes and vital ecosystem services. Linkages among natural habitats are particularly important in a changing climate – to ensure species have a wide range of options to migrate and shift ranges.

UNDP, with GEF finance, supports countries to increase landscape connectivity. UNDP supported projects have helped to establish and strengthen the management of ‘corridors’ and ‘buffer zones’ that connect protected areas, to allow species to move and genes to flow more easily between them.

UNDP's support has piloted the corridor concept in Bhutan, to strengthen the protected area network and support conservation of threatened species, such as the tiger. Bhutan is internationally recognised for its commitment to conservation – the Kingdom maintains 70 percent forest cover, has conserved almost half of its territory in 11 protected areas and pledged to create conservation corridors to connect them. But in 2003, these corridors had not been tested or operationalized on the ground.

The “Linking and Enhancing Protected Areas in the Temperate Broadleaf Forest EcoRegion



Bhutan maintains 70 percent forest cover and has conserved almost half of its territory in 11 protected areas. The LINKPA project identified and delineated conservation corridors to connect them. Photo: Sarah Valenti

of Bhutan" (LINKPA) project, a GEF financed collaboration between UNDP, the Ministry of Agriculture and Forestry and the World Wildlife Fund (WWF) Bhutan, successfully strengthened Bhutan's biological corridors. The project identified suitable corridors, helped create the institutional framework that would be needed to operationalize and manage them, and piloted management approaches with local authorities and communities in the corridor, linking Thrumshingla National Park with two others.

Specifically, it developed and agreed a framework for corridor management in the country, mandating Bhutan's territorial Forest Divisions to manage the corridors, with coordination by the Nature Conservation Division. As a result of the project's work, forest corridors are afforded greater priority for sustainable management than the rest of the Bhutan's government-managed reserve forest. It has also strengthened links among staff in Forest Divisions and protected areas.

"LINKPA has helped to implement the Corridor Management Plan. Corridors are important to support the protected areas network. There is a clear need to operationalize the corridor policy officially declared over 10 years ago, supported by the thorough regulations and management arrangements recommended in 2010," says Vijay Moktan, Conservation Director of WWF Bhutan. He adds that "without a good corridors

system to connect fragments of habitats, it will be difficult to maintain the tiger population – let alone increase it." By creating linkages among key habitats, it is expected that the corridors will contribute towards increasing Bhutan's tiger population to reach targets set under the National Tiger Recovery Programme.

An essential element of this work has been support to enhance the livelihoods of communities living in the corridors who are dependent on natural resources. The project promoted ecotourism to generate income, supporting tourist trails and homestays and promoting a local mushroom festival as tourist attraction. "Most of the communities living in these in-between spaces of corridors are among the poorest and the most vulnerable," says Tashi Dorji, former project manager of LINKPA; now Programme Analyst at UNDP Bhutan. "This is why corridor management needs to explicitly incorporate integrated conservation and development projects and mechanisms for sustainable utilization and income generation opportunities. It will be important to build on the LINKPA lessons in future."

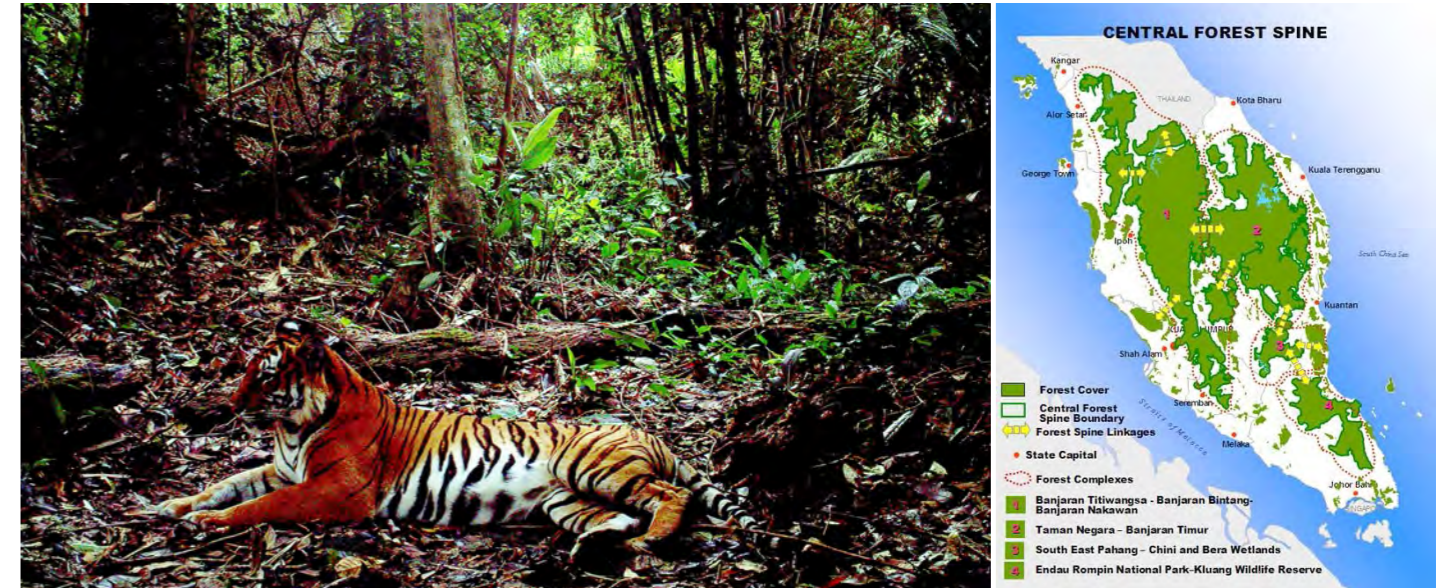
UNDP is also supporting the Government of Malaysia to improve connectivity among the remaining forests of Peninsula Malaysia. These forests serve as natural "water towers" for Peninsular Malaysia and neighbouring Singapore because of their water catchment function and

also harbour an array of large mammals, including the Critically Endangered Malayan tiger. But forest degradation, infrastructure development and conversion to agriculture has left them increasingly fragmented – degrading the quality of tiger habitat and undermining the integrity of the landscape and its ability to sustain a supply of water to people in Malaysia and Singapore.

This project, which began implementation in 2014, will conserve biodiversity and ecosystem services in three critical landscapes of the Central Forest Spine (CFS), by supporting the country's Central Forest Spine Master Plan to restore connectivity between forest complexes. The project will create corridors, rehabilitate degraded forest and improve forest landscape management to increase linkages among the forest complexes and improve the integrity of the landscape. It will also strengthen national and local institutional frameworks for forest management and law enforcement, and demonstrate sustainable financing mechanisms to sustain conservation of the linkages and reflect the value of ecosystem services in land use planning.

Connected forests in the CFS mean improved habitat for wildlife and sustained water supply for people. A more interconnected natural world with benefits for people and wildlife!

MAP BELOW: Ecological linkages in the eight main forest complexes identified in Malaysia's Central Forest Spine Master Plan. UNDP is supporting Malaysia's Central Forest Spine Master Plan to restore connectivity between forest complexes. The project will create corridors, rehabilitate degraded forest and improve forest landscape management to increase linkages among the forest complexes and improve the integrity of the landscape. Source: Malaysia's Central Forest Spine Master Plan (2010)



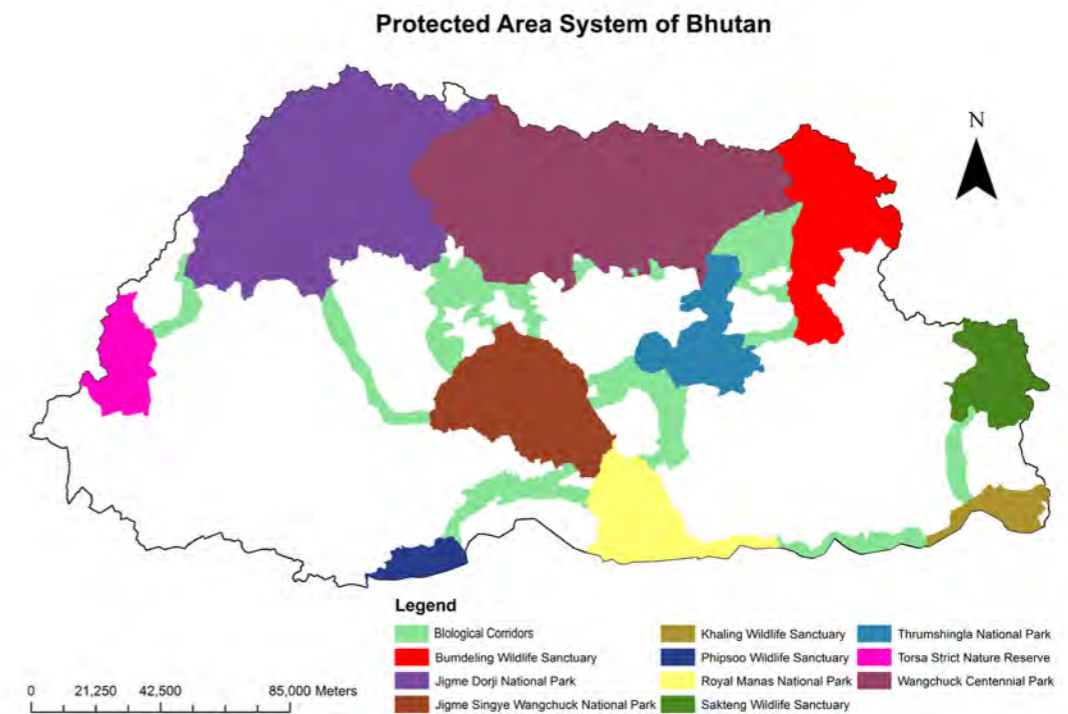
ABOVE: A Malayan tiger basking in sunlight caught on camera trap. Only an estimated 250-340 individuals of the Malayan tiger remain in the wild. Malaysia's Central Forest Spine Master Plan supports efforts to link priority tiger habitats. Photo: Malaysian Department of Wildlife and National Parks, Malaysia



Photo: Midori Paxton

"LINKPA has helped to implement the Corridor Management Plan. Corridors are important to support the protected areas network." Vijay Moktan, Conservation Director of WWF Bhutan

The Belum-Temengor forest complex, within Malaysia's Central Forest Spine is well known for its spectacular plants, birds and mammals. It is an Important Bird Area – a site of international importance for bird conservation.



Bhutan's protected area network, with connecting biological corridors (shown in green). The LINKPA project piloted management approaches with local authorities and communities in the corridor linking Thrumshingla National Park with Jigme Singye Wangchuck National Park and Royal Manas National Park. Source: Wildlife Conservation Division, Department of Forest and Park Services, Ministry of Agriculture and Forests, Bhutan

CALM IN CAMBODIA: GENERATING SUSTAINABLE LIVELIHOODS THROUGH BIODIVERSITY CONSERVATION

The Conservation Areas through Landscape Management (CALM) project sought to empower local people. This UNDP supported, GEF financed, grassroots oriented biodiversity conservation initiative involved the Wildlife Conservation Society (WCS) and local NGOs, the Government of Cambodia, indigenous farming, fishing and forest dwelling communities... and the birds.

During the project's six-year lifespan, 5,000 local residents and government officials were trained to participate in conservation planning processes, manage their natural resources sustainably and expand their livelihood options. 32 community-based organisations (CBOs), including five indigenous representation committees, were created to manage their immediate natural environments and land use plans were designed in 12 areas in the Kulen Promtep Wildlife Sanctuary, the country's largest protected area (4,025 km²). This involved the designation of 30,000 hectares of land as either 'community use' or 'sustainable use' zones.

Fifteen villages within the Preah Vihear Protected Area developed forest plans thereby securing ownership and control of their own natural resources management. A clear demarcation between communal land and adjoining forest was made to prevent confusion and inadvertent incursion into fully protected areas.

Cleaning the Ibis Rice
Photo: Eleanor Briggs/WCS



Critically Endangered white-shouldered ibis (*Pseudibis davisoni*)
Photo: Ashish John/WCS



LINKING BIODIVERSITY AND ECOSYSTEMS MANAGEMENT WITH ECONOMIC GROWTH

Photo: Sok Sony/WCS

Community members get on-site training in wildlife protection in Tmatboey conservation area in Preah Vihear province, northern plains of Cambodia

Finding ways to effectively link biodiversity and ecosystems management with inclusive economic growth for long-term sustainable development is UNDP's priority. By integrating biodiversity and ecosystems considerations into development planning and production sector activities, the biodiversity and ecosystem services that sustain human wellbeing can be safeguarded.

In the heart of the 'Emerald Triangle', near the Thai and Lao borders, Cambodia's national bird is helping save threatened forests and, at the

same, bringing dignity and growing prosperity to the people who inhabit them. The Northern Plains region of Cambodia, once described as the Serengeti of south east Asia due to the abundance of wildlife, is still home to many species, 40 of which are listed as Endangered by IUCN.

Like many areas in the region, it is at an ecological crossroads. The country as a whole has witnessed war, the Khmer Rouge genocide, rampant deforestation and a wholesale, if piece meal, assault on its natural resource base. With

the exception of deliberate criminal enterprises – for example, organised poaching and traffic in wildlife and tropical hardwoods – much environmental damage is driven by poverty, necessity and perhaps most crucially, a lack of options for local people.

Once seen as unrelated, and sometimes even in conflict, conservation and local economic development are increasingly being recognised as being interdependent and fundamentally symbiotic.



Bird watchers, Tmatboey conservation area
Photo: Ann Koontz/WCS

Ecotourism initiatives were supported by WCS and a local NGO partner and are currently thriving. A village development fund, with contributions from tourists, was established to support infrastructure projects that benefit the entire community. Fuelled by tangible results – some 20,000 people in 23 villages have benefitted from CALM's interventions – attitudes are changing. Income is being generated, and so are results.

Part of the Northern Plains dry forest and wetlands protected areas where CALM worked were initially gazetted to conserve Cambodia's National Animal, the kouprey, a giant wild ox related to the aurochs, ancestor of all our planet's domestic cows. The last kouprey was sighted in 1982 and it is believed to be extinct. The same was thought of the giant ibis until this Critically Endangered bird was re-discovered in the area.

The huge bird, largest of the ibises, is a principle ecotourist draw, as are other wetland birds such as the equally Critically Endangered white-shouldered ibis. It is also helping rice farmers. Instead of clearing ibis habitat for standard paddy, the Wildlife Friendly Ibis Rice scheme has been developed whereby farmers are paid a premium price for rice cultivated in an ecologically sensitive fashion. Assistance in packaging, transportation, marketing and sales is organised by a Cambodian NGO, Sansom Mlup Prey, and the rice (along with its

conservation message) is turning up in bowls everywhere – from the Foreign Correspondents Club in Phnom Penh to the tourist hotels of Siem Reap near Angkor Wat.

The multi-pronged CALM approach has yielded many tangible results. In Preah Vihear, the number of logging incidents has decreased by 94.5 percent and the number of hunting incidents fell by 88.5 percent over the project lifetime. Ecotourism models, pioneered in international award winning Tmatboey village are being replicated elsewhere.

"Things are so different in a good way, unlike previously when our village did not even have a paved road. I am very proud of what we have achieved for our community in terms of biodiversity conservation and sustainable development," says Dib On, village head of the ecotourism community in Tmatboey.

And as for the birds? Monitoring data showed that population density of four species of globally threatened water birds has more than doubled since CALM began. Local people like that. "Eating a bird, I can only fill my family's stomach once, but guiding tourists to see the bird I get US\$5 each time," says Yin Sary, a former poacher turned tour guide (and gamekeeper) "Our community is earning thousands of dollars showing the same birds over and over again."

"Eating a bird, I can only fill my family's stomach once, but guiding tourists to see the bird I get US\$5 each time,"

Yin Sary, a former poacher turned tour guide (and gamekeeper)



Patrol planning training
Photo: Hugo Rainey/WCS



Weighing the Ibis Rice
Photo: WCS



Certified Wildlife Friendly
Popular varieties
Help farmers sustain
Protected habitat

Giant ibises like Cambodian Rice Naturally grown and chemical free
Boil it or fry it, it's just as nice Good for you and safe for me!

GIANT IBIS *Thaumatibis gigantea*

Critically Endangered, native bird. About 115 breeding pairs remain in Cambodia.
Supported by wildlife friendly farming.

IBIS RICE is a quality brand of naturally grown, fragrant Jasmine rice, produced by Cambodian farmers who care about protecting wildlife habitat for the benefit of native wildlife and people for future generations.

Supported by higher value wildlife friendly products, Ibis Rice farmers benefit from a combination of improved farming techniques and higher value marketing that brings better revenues to the six participating villages in three protected areas in Cambodia's northern plains.

International visitors to Siem Reap and Phnom Penh enjoy IBIS RICE through luxury and boutique hotels, restaurants, shops and department stores.

Call +855(0) 17 548 300 to order

www.facebook.com/IbisRice

Certified Wildlife Friendly™ develops, certifies and promotes products and practices that conserve threatened wildlife while contributing to the economic vitality of rural communities.
For more information see: wildlifefriendly.org





PARTNERSHIPS FOR PARADISE: THE TIOMAN TOURISM STORY



Photos: Department of Marine Parks Malaysia and DoungJun Roongruang



At first sight, Tioman reads like a tropical paradise tick list with a tick in every “yes” box. Pristine, palm-fringed beaches? Crystal clear waters? Coral gardens (221 hard and soft coral species)? Mountains smothered in rainforest? That’s “yes” “yes” “yes”. Tick the lot. In 2013, CNN ranked Tioman, which is part of a 69-island archipelago off the east coast of peninsular Malaysia, one of the world’s top 100 Best Beaches. But Tioman and its sister islands were, and to a degree still are, at risk of becoming a case of Paradise Lost.

Tourism is an economic staple but the principle assets of the archipelago – the exquisite and varied marine life – were being degraded by a combination of factors. Tourist activities and the tourism service sector were ironically a major problem prompting damage to coral caused by reckless anchorage, litter accumulation on beaches, spear guns, pollution and irresponsible or naïve purchases of shells and coral souvenirs. Although Malaysia’s Marine Parks cover 42 of these islands, illegal fishing incursions in protected waters by both locals and raiding vessels from elsewhere in the country and from other nations were denuding resources and threatening a biodiversity-rich environment of global significance.

The Department of Marine Parks Malaysia (DMPM) staff and the villagers were in an uncomfortable situation. Local community members initially saw the DMPM staff as police. In the words of DMPM officer, Che Mohd Khir B Omar, locals felt sidelined and “caught in the middle between the need to earn an income, the restrictions, and limited options to earn income from other sources.” There was, at first, he explains, “little interaction between conservation authorities and locals”.

This has changed and quite dramatically as the GEF financed and UNDP supported project ‘Conserving Marine Biodiversity Through Enhanced Marine Park Management and Inclusive Island Development’ provided six years of solid support from 2007 to 2013.

The project was characterized by a complex bit of diplomacy and a ‘meeting of minds’, and involved expansion of the marine parks system, strengthening of law enforcement capacity, community involvement, educational outreach by community groups, international conservation and development bodies, local businesses and the tourists themselves.

Marine park management has improved dramatically with 156 more staff fully trained in conducting patrols, with authority to arrest transgressors and an enforcement manual implemented thanks to project support. Two new marine parks were designated, expanding Malaysia’s marine protected areas system by an additional 6,400 hectares. Marine park management plans have been developed for all three targeted islands through a process that drew on information provided by committees of representatives at the community, state and national level.

A coral reef bleaching response plan was also developed and implemented to help reduce the impact of coral bleaching events on the marine parks’ reefs. The project’s support has

established regular coral reef clean-ups and 300 square meters (m²) of coral reef have been rehabilitated through transplantation at three sites on Tioman Island. Marine surveys in 2013 indicate that live coral cover has increased 13 percent at Redang Island since the bleaching event in 2011.

Project priorities with the island communities were practical and encouragingly effective. Give a man a fish and he eats for a day. Give him a fishing rod and he eats for a lifetime. This development cliché holds good in some cases but not necessarily in a marine national park network where commercial fishing as a result of project’s support is now banned within two nautical miles of the coast. They needed a different kind of fishing rod. The people of the Tioman archipelago needed alternative sustainable sources of income not dependent on marine exploitation.

Through a combination of training programmes, seminars and equipment provision, people learned a wide range of new, sustainable professions that did not impact local natural assets. 484 people in the three project focus islands – Redang, Sibutu-Tinggi and Tioman – were trained in non-destructive fields. Mayuzi Sidek, for example, has stopped fishing and now drives tourists through the wonderful seas out on snorkelling trips to see the islands’ thriving coral reefs. He received training to achieve his full boat licence through project support, which enabled him to get a job with a local five star resort. Hasni Abdul Gani makes yellow noodles ideal for the Malaysian culinary classic ‘Mee Goreng’ popular with tourists. She received equipment through the project. “The noodles bring in US\$ 113 a month,” explains Hasni.

This is sufficient to put her children through school and carry them through the low tourist monsoon season. Other locals have received scuba-training certification, training for safe boat handling and have started cake bakeries. One former housewife, Norhayati Binti Junoh, has now obtained a captain’s licence and is planning to captain a coastal cargo ship. And community groups have received training in marine park rules and are acting as the eyes and ears of the DMPM. Arrests for violations have fallen significantly and repeat offenders run the risk of having their boats confiscated for use as patrol vessels or being sunk to form artificial reefs. Relationships between Parks officials and local communities have flourished. Children are adopting their own rivers and clearing rubbish. Beach clean-ups attract hundreds of people. Crown of Thorns, a coral eating alien starfish is hunted. New reefs are being created or restored. Tioman has a new philosophy “Reef Etiquette”.

Inspired by this burst of success other islands in the archipelago are emulating the initiatives and Tioman, happily, seems destined to receive more media accolades for its beauty and commitment to conservation.

MANAGING THE IMPACTS OF CLIMATE CHANGE

UNDP works with countries to incorporate nature-based solutions into their strategies for adapting to and mitigating the negative impacts of climate change. Ecosystem-based adaptation helps vulnerable communities increase their resilience, and the resilience of the ecosystems on which they depend. In the Asia Pacific region, expanding and connecting protected areas to conserve intact forests, wetlands, mangroves and coral reefs will provide a natural buffer for vulnerable communities against disasters intensified by climate change.



Stamps: Neftali/Shutterstock.com

EMBEDDING CLIMATE RESILIENCE IN PROTECTED AREA PLANNING – THE CASE OF PAPUA NEW GUINEA

Papua New Guinea (PNG) has become one of the first countries to incorporate climate change adaptation strategies into their gap assessment of the country's national protected area system. Developed by PNG's Department of Environment and Conservation (DEC) and The Nature Conservancy (TNC) with a grant from the UNDP supported and GEF financed 'Early Action Grant Project for Protected Areas' initiative, the assessment provides a clear blueprint for developing a climate-resilient network of terrestrial protected areas across the country.

Member nations of the Convention on Biological Diversity (CBD) have agreed to establish protected area networks that represent the country's ecosystems and biodiversity. Gap assessments are used to identify 'gaps' in the current protected area network – where important ecosystems and/or species occur that are not currently covered by effective conservation measures. They involve mapping and comparing the current status of biodiversity with the current status of the protected area network. The resulting analysis can be used to design expanded protected area networks that are more effective at conserving representative ecosystems and biodiversity and meeting specific conservation goals.

Climate change is expected to cause rapid changes in biodiversity distribution and abundance, so shifting the map. But the precise nature of climate change impacts and their effects is uncertain.

PNG's gap assessment has incorporated three strategies for integrating climate change adaptation into national protected area planning. In addition to mapping and considering the distribution of ecosystem types and status, endemic species, planning units and the current protected area network, the assessment also set out to achieve the following:

1. Conserve diversity of land systems. As the climate changes, species naturally respond by shifting their location or reorganising in new ways. Evidence shows that diversity of land systems – for example, varied elevation and geology – helps to maintain species diversity. The assessment therefore mapped land systems in PNG and aimed to conserve the full spectrum of land diversity to maximise species diversity in a dynamic climate.
2. Protect 'climate refuges'. When changes in climate outpace the natural capacity for species to adapt, biodiversity is lost. And the likelihood, speed and extent of climate-driven changes

are likely to be uneven. Places where climate changes are least severe are likely to serve as a 'refuge' for species and habitats marginalised by ecological changes elsewhere. Using models of projected climate change impacts, the assessment identified areas where environmental conditions – for example, available water capacity, average temperature and hottest months – were expected to remain most similar to their current state. To improve the scope for natural adaptation and buy time to help improve the broader ecosystem's ability to cope with climate driven changes, the assessment aimed to protect these climate 'refuges'. This significantly reduced the overall amount of climate change that habitats in the identified protected areas are predicted to experience.

3. Prioritise connectivity across habitats and landscapes. Increasing geographic connectivity among protected areas at the landscape level is a common climate change adaptation strategy. To increase the likelihood that species populations will remain connected to suitable habitat as the climate changes, the assessment prioritised connectivity among both habitats – cooler and warmer, drier and moister – and protected areas. It did this by prioritising protection of locations with high environmental heterogeneity while maximising connectivity at the landscape

“As we move forward, the conservation priority areas identified in this report represent key components of a national conservation plan to help shape a bright future for the people and the biodiversity of this extraordinary country,” Dr. Wari-lea Iamo, Former Secretary of the Department of Environment and Conservation

level. Explicitly considering environmental heterogeneity between adjacent areas resulted in protected area networks with 40 percent more internal environmental connectivity.

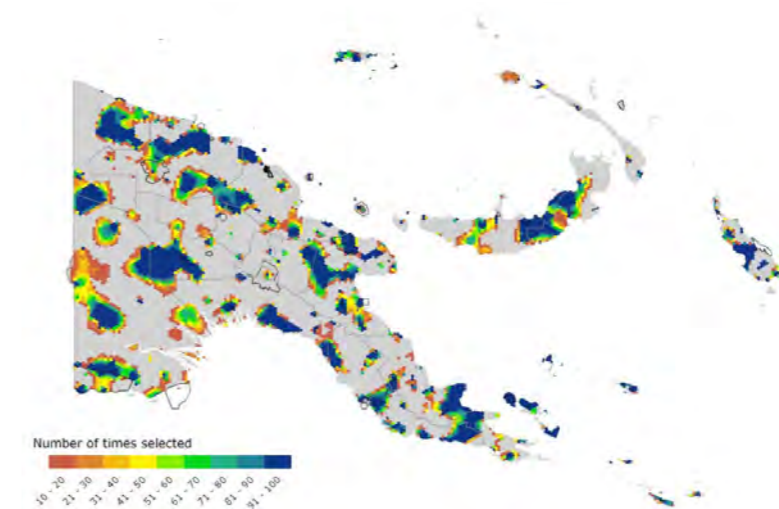
The resulting climate-ready gap analysis provides a clear map of priority areas for conservation, based on the number of times each was selected according to the criteria prioritised. Because climate change projections alone do not drive the selection of protected areas, as targets for all conservation features are still being met based on current knowledge of biodiversity distribution, the solutions represent potential 'no regrets' measures.

According to the authors of the assessment, in many other countries, these strategies could be implemented immediately with current data and expertise typically available during national conservation assessments. They represent defensible ways to guide national conservation priorities given current uncertainty in our ability to predict climate changes and their impacts.

The project also includes a plan to integrate protected areas into the wider landscape, seascape and sectoral plans, as well as developing a comprehensive legal framework. The next step will be to create the protected areas.

“As we move forward, the conservation priority areas identified in this report represent key components of a national conservation plan to help shape a bright future for the people and the biodiversity of this extraordinary country we call our home. I look forward to seeing these areas, not on paper, but as a tangible reality across our nation,” says Dr. Wari-lea Iamo, Former Secretary of the Department of Environment and Conservation.

RESULTING ANALYSIS OF THE CLIMATE-READY GAP ASSESSMENT



The UNDP supported, GEF financed 'Early Action Grant Project for Protected Areas' programme (active from 2008 to 2013), which funded this work in PNG, was designed in direct response to the CBD's Programme of Work on Protected Areas. This global project has supported 46 countries (75 percent of which are Least Developed Countries (LDCs) and Small Island Developing States (SIDS)) to meet their commitments under this Programme of Work by undertaking critical actions towards achieving effective and sustainable National Systems of Protected Areas – from gap assessments to finance assessments to legal and management effectiveness assessments. The project resulted in more than 135 products and key assessments, including a lasting legacy of e-learning modules available in multiple languages.

Source: Game, E. T., Lipsett-Moore, G., Saxon, E., Peterson, N. & Sheppard, S. (2011) Incorporating Climate Change Adaptation into National Conservation Assessments. *Global Change Biology*, 17 (10), 3150-3160.

UNDP'S LEGACY – INSTITUTIONAL CAPACITY BUILDING FOR BIODIVERSITY AND ECOSYSTEMS MANAGEMENT

UNDP has a long and significant history of investment in building capacity and partnerships to support ecosystems and biodiversity management in the Asia Pacific region. UNDP's mandate and involvement in environmental issues has its origins in the early years of the organisation's existence (from 1966 onwards), reflecting the central importance of the environment for sustainable human development and poverty reduction.

Between 1970 and 1982, UNDP funded about 35 projects totalling US\$ 12 million in support of wildlife and national parks management in the Asia Pacific region.

These projects were funded by UNDP in its then capacity as the central funding organisation for technical cooperation in the United Nations (UN) system, and executed by the UN Food and Agriculture Organisation (FAO). This

support contributed to the establishment and strengthening of many wildlife reserves and national parks in Afghanistan, Myanmar (then Burma), India, Indonesia, Iran and Nepal.

Through country projects and targeted support, UNDP helped to establish organisations that play an instrumental role in biodiversity conservation and sustainable ecosystem management in the region: the Wildlife Institute of India (WII) and the Mekong River Commission (MRC).

WILDLIFE INSTITUTE OF INDIA



In the 1980s, the UNDP-funded and FAO-executed "Assistance for the Establishment of the Wildlife Institute of India" project supported the formation of the WII at Dehradun in 1982, with a mandate to build capacity through training, education and research in wildlife conservation. Ongoing support provided by the project enabled the nascent institute to build up a distinguished faculty through rigorous training and state of the art research, to broaden its research, teaching and training base, and to equip itself with advanced computers, laboratories and field equipment.

The WII successfully became an autonomous institute under the Ministry of Environment and

Forests under the Government of India in 1986, before the project closed in 1988. Today, it is an internationally acclaimed Institution, offering Postgraduate Diplomas, Masters Courses and professional training in wildlife management, conservation and science to trainees from India and more than 20 countries across Asia and Africa. The Institute is a centre of national capacity in biodiversity conservation and management, having conducted ecological gap assessments of India's protected area network, protected area management effectiveness evaluations, species action plans and impact assessments. It is also engaged in research on biodiversity-related issues across the breadth of the India, with 190 research projects completed to date.

MEKONG RIVER COMMISSION



Mekong River
Photo: Doungjun Roongruang

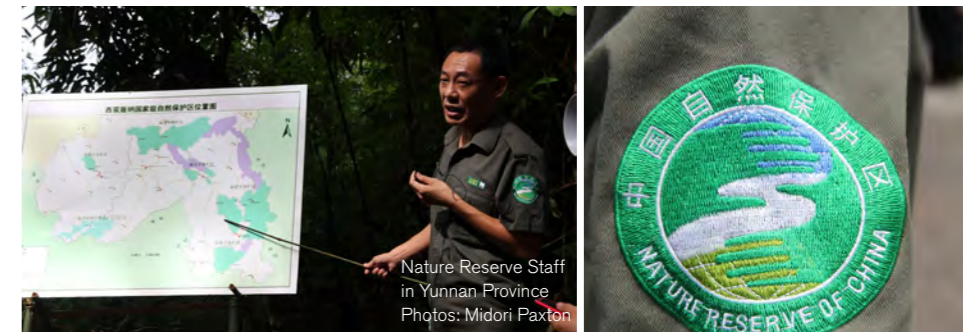
UNDP-supported negotiations in 1994 led to the 1995 Mekong Agreement (Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin of 5 April 1995). From 1993 to 1995, UNDP provided extensive support and facilitation for drafting, negotiation, ratification and adoption of this agreement, which established the Mekong River Commission (MRC) and the MRC Secretariat (MRCS). The MRC is the only inter-governmental agency that works directly with the governments of Cambodia, Lao PDR,

Thailand and Viet Nam on the joint management of shared water resources and the sustainable development of the Mekong River, which harbours three times more fish diversity per unit area than the Amazon River basin and is home to about 65 million people.

UNDP support enabled the establishment and the relocation of the MRC Secretariat, the operational arm of the Commission, and also contributed to the development of the first MRC Strategic Plan. Since its establishment,

the MRC has adopted a number of rules and procedures, such as the Procedures for Water Quality, to provide a systematic and uniform process for the implementation of the Mekong Agreement. It also acts as a regional knowledge hub on several key issues such as fisheries, environment monitoring, navigation, flood and drought management, hydropower development and climate change adaptation.

INSTITUTIONAL STRENGTHENING FOR BIODIVERSITY IN CHINA



Nature Reserve Staff
in Yunnan Province
Photos: Midori Paxton

More recently, the European Union-UNDP-China Biodiversity Programme (ECBP), a joint initiative by the EU, UNDP and the Chinese Ministry of Commerce and Ministry of Environmental Protection (MEP), has provided support to strengthen policies, guidelines and capacity to implement the Convention on Biological Diversity in China.

The programme has combined policy dialogue and development, institutional strengthening and awareness-raising with a set of 18 field projects that helped improve biodiversity conservation and management at all levels across middle and western China. Implemented from 2005 to 2011, many activities under the programme supported strengthening of the overall capacity of institutions housed under China's MEP and the Foreign Economic Cooperation Office (FECO), which implemented the ECBP.

At the national level, the programme focused on incorporating biodiversity into central government policy. For example, ECBP provided financial

and technical support to integrate biodiversity into the work of relevant Ministries. Many have participated directly in the programme, with the Ministry of Agriculture, Ministry of Land and Resources, the State Forestry Administration, and others having developed guidelines for mainstreaming biodiversity into their work through the programme. ECBP supported the first ever biodiversity Strategic Environmental Assessment of an industrial development plan in China and developed national guidelines and procedures for including biodiversity considerations effectively in Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA). MEP is now planning to integrate biodiversity into future SEA and EIAs.

Field projects conducted with 69 partner organisations have also integrated biodiversity considerations in sector plans and demonstrated community based conservation schemes and alternative livelihood models to reduce pressures on wild and agricultural biodiversity. Biodiversity priorities were introduced into routine provincial, municipal and local

government through the formation of cross-sectoral committees and the establishment of incentives for government departments to show improvements in the local status of biodiversity. UNDP's support for institutional strengthening for biodiversity mainstreaming continues. The on-going GEF financed "Institutional Strengthening for China Biodiversity Partnership and Framework" (CBPF) for Action (2011-2015) of MEP has supported development of provincial biodiversity strategy and action plans, as well as a sector biodiversity strategy and action plan of the State Oceanic Administration. The CBPF was established in 2005 and ECBP was one of the many initiatives under this umbrella.

A pilot payment for ecosystem services (PES) legislation project in Liaoning Province also started in 2012, which facilitates financial transactions between one upstream and one downstream municipality, based on water quality in Liaohe River. The PES payment, which is financed from the provincial budget, is expected to reach as much as US\$80 million.

Levels of Capacity and Entry Points for Capacity Development for Environmental Sustainability. UNDP's support on capacity development for enhanced ecosystems and biodiversity management in the region has been targeted at various levels and entry points.

LEVEL	ENTRY POINTS
<p>ENABLING ENVIRONMENT: the political, economic policy, social, legal and regulatory systems within which organisations and individuals operate</p>	<ul style="list-style-type: none"> ▪ Societal framework: cultural norms, social values, traditions and customs ▪ Constitutional framework for environmental sustainability (ES) ▪ Environmental governance: rule of law, accountability, transparency and responsiveness ▪ Political framework ▪ Policy, legal and regulatory frameworks ▪ National/sub-national institutional, management and accountability frameworks ▪ National and sectoral planning frameworks ▪ Inter-agency coordination and collaboration frameworks ▪ Stakeholder engagement and collaboration (multi-agency, multi-sectoral) ▪ Financial flows/budgeting ▪ Knowledge and information systems ▪ Human rights and equity related to ES, including gender equality and access to natural resources and decision-making
<p>ORGANISATIONS: including government institutions and civil society, community and private sector organisations</p>	<ul style="list-style-type: none"> ▪ Organisational mandates, structures and functions ▪ Internal management, planning and operational frameworks ▪ Administrative and budgetary systems ▪ Personnel management and human resources development ▪ Stakeholder engagement mechanisms (organisational level) ▪ Information and knowledge management systems ▪ Infrastructure, facilities and equipment ▪ Knowledge and information systems ▪ Infrastructure, facilities and equipment ▪ Organisational culture to support ES ▪ Organisational culture Traditional organisations, both formal and informal: e.g., local, community and indigenous systems for managing environment and natural resources
<p>INDIVIDUALS: Women and men in their roles working within government and civil society organisations, and acting as citizens and members of families and communities</p>	<ul style="list-style-type: none"> ▪ Awareness and attitudes: e.g., beliefs, values, motivation and commitment ▪ Knowledge: related to environment and natural resources management; mainstreaming ES and sustainable development (integration of environment, economic, social issues); and information systems/Information and Communication Technologies (ICT) ▪ Skills and behaviours: e.g., specialized scientific and technical skills; interdisciplinary skills, and communication and collaboration skills

Source: UNDP. 2011. Practitioner's guide: capacity development for environmental sustainability. United Nations Development Programme, New York.



Ministry of Forestry Staff, Bhutan



Department of Marine Parks Malaysia
Patrol Staff



Ranger,
Nature Reserve of China

BUILDING INDIVIDUAL AND INSTITUTIONAL CAPACITIES FOR ECOSYSTEMS AND BIODIVERSITY MANAGEMENT IN ASIA AND THE PACIFIC



Menuvii people, Indigenous Community
Conserved Area, Philippines



A patrol team in the Htamanthi Wildlife Sanctuary, Myanmar



Lore Lindu National Park Staff,
Central Sulawesi, Indonesia



Park Staff,
Parishan Protected Area, Iran



Department of Marine Parks
Malaysia Education Staff

UNDP is working with local and national governments, communities, NGOs, and other partners across Asia Pacific to build individual and institutional capacities. Photos: DENR-PAO for NewCAPP, Iranian Department of Environment, Midori Paxton, Doungjun Roongruang, WCS.

HOW HEALTHY IS YOUR HOME?

HOW HEALTHY IS YOUR HOUSE?
EVERYBODY NEEDS TO KNOW.
THESE MEASURES ACT AS
ESSENTIAL SURVEYORS!

Western tarsier, (*Tarsius bancanus*) Sabah, Borneo
Photo: Frans Lanting

A friend from my college days in Britain used to say being able to monitor the health of his home and detect any early sign of its "ill-health" was absolutely vital to maintaining his medieval house. He lived in a traditional thatched cottage built in the 16th century just outside Cambridge.

It is the same for our health – the home for our soul. We go for regular health check-ups especially after the age of 40 to ensure we are in good shape. Doctors give us a series of biological, chemical and physical tests that can be easily undertaken on parts of the body that can be readily accessed. Exactly the same thinking needs to apply to monitoring the health of our larger home – ecosystems and biodiversity.

Working on biodiversity conservation and ecosystem management projects, we often struggle with indicators to show the results of effective biodiversity management and improvement. Trends in species numbers, coverage of protected areas, and forest cover (to name a few) may indicate biodiversity and ecosystem health, but only very partially. In order to have a more integrated measure of biodiversity – to really assess the general health of biodiversity in a given area – we are trying two kinds of index through GEF financed projects in Asia. These two indices have features in common. They are sensitive to pressure, are feasible and cost-effective to implement and sustain, and are unambiguous, simple and clear.

BIODIVERSITY HEALTH INDEX

One index is the Biodiversity Health Index (BHI). This is being applied in demonstration wetland protected areas in seven projects under China's Main Streams of Life (MSL) – The Wetland Protected Area System Strengthening Programme. The index assessment is done through a scorecard with a set of questions under three headings: habitat conditions, species welfare and socio-economic context. Protected Area managers, with specialist support, are expected to identify main threats and locally specific suitable indicator species to be monitored for the BHI. Elements under the three headings are as follows.

BIODIVERSITY HEALTH INDEX HEADINGS AND ELEMENTS FOR MONITORING

HEADINGS	ELEMENTS
Habitat conditions	<ul style="list-style-type: none"> • Maintenance of habitat extent and diversity • Maintenance of habitat quality (productivity, water supply, pollution, damage and physical condition oxygen, temperature, turbidity) • Adequacy of habitat connectivity • Resilience to threats and changes • Levels of existing or planned threats • Stability of site (natural disasters)
Species welfare	<ul style="list-style-type: none"> • Containing and maintaining diversity of representative species (including important target species) • Indicator species show numerical stability or increases (good breeding levels, low mortality rates) • Incidence of hunting, poaching, alien species, new colonisation • Sustainability of harvest of commercial species • Response to disasters (fire, floods, droughts, pollution)
Socio-economic context	<ul style="list-style-type: none"> • Pressures on habitat and species from local communities (degree of dependence on natural resources, sustainability of off-take, etc.) • Additional threats or stresses from external developments (existing or planned) • Success of alternative livelihoods • Impacts from tourism or other disturbance • Levels of respect, support and co-management in protection, monitoring, research, fire-fighting, etc.

Wetlands not only harbour biodiversity, but also provide essential ecosystem services for wildlife and human populations in areas far beyond. Connected with waterways, they are also susceptible to pressure from distant influences, including pollution, water extraction and water diversion.

Information for the BHI can be collected by monitoring a set of variables through day-to-day management actions to safeguard the health of wetland ecosystems. With this index, PA managers are able to gauge the dynamics of constantly changing biodiversity and ecosystem health, just as an investor may follow an endlessly changing financial index.

BIODIVERSITY INTACTNESS INDEX

In Malaysia, in a new project to improve connectivity in the five million hectare Central Forest Spine (CFS) landscape running through Peninsular Malaysia, the Biodiversity Intactness Index (BII) is being piloted. BII was developed to meet the requirements set out by the CBD to provide an integrated measure of biodiversity. To date, the BII has been used to illustrate the state of biodiversity in Southern Africa during the Millennium Ecosystem Assessment (MEA), and has also been adapted and adopted for use in Norway, British Columbia, and for global analyses. It combines datasets comprising land cover, land use, species richness and abundance and impact factors on biodiversity, and synthesises them into a single, integrated index in a scientifically rigorous way. The BII is thus able to indicate the state of biodiversity in a given area, with high sensitivity to increased or decreased pressure on biodiversity as well as responses to the pressure, at a timescale relevant to policy decisions.

The CFS is increasingly fragmented due to pressures that are mainly due to habitat loss to land use change. The proposed response to be supported by the project is the implementation of the interconnected system of PAs and corridors. This makes the BII an ideal indicator for the project. In addition, most of the necessary data sets are already available in Malaysia, which makes it feasible to monitor.

Beyond projects, in order to achieve the national targets that are aligned with the Aichi Targets, countries need to have a robust framework to monitor the state of biodiversity. Countries need to have people on the ground to observe species numbers, movement, vegetation and threats. Countries need specific indicators that show changes in the state of species or elements of biodiversity. However, countries also need a couple of synthetic indices that can speak to the policy makers. For actual changes to occur to reverse the ever-increasing trends of biodiversity loss, conservation practitioners need to be able to communicate in five minutes what the state of biodiversity is and what needs to be done. We need brevity and executive summaries! UNDP-GEF support for these indices provides the opportunity to test the indicators in a country- and area-specific context. This supports future upscaling and provides an essential component of biodiversity monitoring.



by Midori Paxton Regional Technical Adviser, Asia-Pacific



FOOD & WATER

Biodiversity provides the critical foundation for sustainable development and human wellbeing. At the simplest level, it underpins the ecosystem functions that provide us with the basic resources needed for our survival, including food and water. The security of water and food resources in the Asia Pacific region has been compromised by decades of biodiversity loss and ecosystem degradation, driven by economic development. The Asian Development Bank (ADB) estimates that 75% of the countries in the region are facing an imminent water crisis, and in terms of food security, over 20% of the world's undernourished populations live in South and South-west Asia. Going forward, the effective climate-smart management of 'biodiversity and ecosystems for sustainable development' is a regional priority.

SECURING THE FUTURE OF AGRICULTURE IN ASIA PACIFIC

The security of the world's food supply is being compromised as more farmers rely on fewer and fewer varieties of crops and livestock, eroding agricultural biodiversity. UNDP works with countries in Asia and the Pacific to increase the genetic diversity in crops and livestock to secure the future of agriculture against increasing threats from climate change, pests and disease. Sustaining the health of agro-biodiverse ecosystems is fundamental for future food security.

Rice field near Jinghong, Yunnan, China, where China's Ministry of Agriculture is working with farmers to conserve wild relatives of crops.
Photo: Thep Kriti/Shutterstock.com

On a farm in Hainan province in China lies a patch of land where scruffy wild plants grow in sparse tufts. It may not look like much next to the lush green rice crops that carpet the fields on either side, but this apparent scrubland could hold the key to food security for people that rely on the major grains grown in this area. These plants are wild relatives of rice that farmers in Hainan are now voluntarily protecting on their farms, next to fields of cultivated rice, as part of an effort to conserve the country's precious agricultural biodiversity.

Agricultural biodiversity or 'agro-biodiversity' is the world's insurance policy against threats to food security, including climate change, pests and disease. It includes all components of biological diversity relevant to food and agriculture. Traditional crop varieties, locally developed over centuries, are storehouses of genetic diversity. Wild relatives of crops possess characteristics that could come in handy in the future. While not generally edible themselves, some are salt tolerant, high in protein or resistant to drought, flood, pests and disease. Conserving these genetic characteristics is essential to guard world agriculture from untold numbers of pests and diseases and the threat of increased drought, flood and sea level rise under climate change.

But as farmers abandon traditional seeds for new hybrids, and as wild crop relatives are threatened by habitat loss and degradation, this genetic diversity is being eroded. In the last century, an estimated 75 percent of crop diversity has been lost from the world's fields as farmers have abandoned their multiple local varieties for genetically uniform high yield varieties. As world agriculture relies on fewer and fewer varieties, the need to preserve genetic diversity of crop species and domestic animals for future generations becomes increasingly urgent.

Because the Asia Pacific region is the origin of so many important agricultural crops and contains extensive agro-ecosystems of such high conservation value, UNDP and its partners have developed a suite of GEF financed projects to protect agricultural heritage and its associated biodiversity, cultures and livelihoods.

These projects include efforts to conserve plants in fields as well as in seed and gene banks, enabling wild crop species to evolve in changing environments and providing useful information about these species in their natural environments.

In China, where surveys show that the diversity of wild crop relatives is deteriorating rapidly, the 'Conservation and Sustainable Utilization of Wild Relatives of Crops' project has worked with farmers to conserve wild relatives of rice, wheat and soybean in fields on their farms in an effort to reverse this trend. The project, led by China's Ministry of Agriculture, has established 72 integrated conservation sites (8 project target sites and 64 replication sites) for these wild relatives across 15 provinces.

A key innovation lies in the project's demonstration of a new in situ approach that incentivizes farmers to maintain conservation areas for wild crop relatives that are integrated next to their own cultivated crops. Farmers create conservation areas in return for project investment in infrastructure and goods that enhance both community and individual farming livelihoods. In addition, 273 farmers have been given interactive training on wild crop relative conservation and improved production practices. Farmers now understand the benefits of wild crop relatives and have become enthusiastic about conserving them.

Provincial experts report that there has been a visible improvement in the density, spread and variety of wild crop relatives at the conservation sites over the project's lifetime from 2007-2013. Threats to the conservation areas have been reduced by 67 to 80 percent according to the project's threat assessment. Incomes have increased at the project's demonstration sites and in Yunnan province, overall incomes have increased more than four-fold.

In the Lao People's Democratic Republic (Lao PDR), UNDP is partnering with the Ministry of Agriculture and Forestry and FAO to support conservation of agro-biodiversity at both the local and national level. With project support, the country's National Biodiversity Strategy and Action Plan is being updated to pay special attention to sustainable use and conservation of agro-biodiversity. The project is reviewing relevant national policies and laws and has made recommendations to incorporate sustainable use and conservation of agro-biodiversity in the Agriculture Law, Forestry Law and Land Policy.

In addition, the project is working with provincial government and local stakeholders to develop provincial Biodiversity Strategies and Action Plans. These will allocate conservation areas for maintaining agro-biodiversity on the ground. Xieng Khouang province has already allocated 300 hectares of forest for conservation of medicinal plants. Over its lifetime, the project aims to allocate 100,000 hectares of land for conservation areas.

In Bhutan, UNDP's support has helped farmers to reclaim virtually forgotten traditional crop varieties while diversifying their income. In total, 555 farmers at 18 sites benefitted directly from the project, receiving training on improved agricultural practices to enhance production, increase income and conserve native varieties such as buckwheat, barley, soybean, maize, rice, and native breeds of yak, poultry, pigs, sheep and horses. Bhutan's National Gene Bank was also significantly expanded to hold a vast number of crop and animal genetic resources for research and future use, enhancing national capacity for ensuring crop and breed diversity.

HOW THEY HAVE DONE IT: EMBEDDING WILD RELATIVE CROP CONSERVATION INTO RURAL DEVELOPMENT

China is one of eight Vavilov Centres identified by Russian botanist and geneticist, Nikolai Vavilov, as the sources of modern crops. While seven of the Vavilov Centres embrace more than one country, China is the only country to stand alone in its own right. Among its 136 endemic Wild Relatives of Crops (WRC), it has brought the world onions, cherries, peaches, hemp, sugar cane, and, most significantly, rice, soybean, millet and wheat.

China is not just the birthplace of these varieties but also the repository of WRC genetic diversity, a living botanical library that if lost cannot be replaced. Those plants behind the fences might look like weeds, but they are far from that!

With this in mind, in 2001, China began carrying out in situ conservation of WRCs through use of a single methodology: "physical isolation." This consisted of setting up guarded enclosures around the areas where WRCs occur, which are generally located very near to or within rural settlements. However, this made the sustainability of such conservation sites questionable. Maintenance of the site proved too costly, requiring investment for the fencing enclosure and a small watch station needing upkeep and salaries for staff.

In response, the Government, through the UNDP supported GEF financed 'Conservation and Sustainable Utilisation of Wild Relatives of Crops' Project introduced the new 'Mainstreaming-in-Agriculture (MiA)' approach to conservation. In this approach, no physical barriers are used to guard conservation sites and an attempt is made to integrate the conservation of wild relatives with agriculture in and around the conservation area. The MiA approach has advantages in terms of sustainability, livelihoods and stewardship by local people of the conservation site.

The project has succeeded in demonstrating the approach at eight sites located in rural villages in eight provinces. More than 80 percent of the farmers who had land in the eight sites (1,172,968 hectares of agricultural landscape)

have changed their economic activities, reducing negative impacts on the WRCs, while increasing their income between 5 and 48 percent. The area protected for WRC conservation in the eight sites has been not reduced since the project ended and in many of the areas, an increase in the density and spread of the conserved plant was clearly observed.

The secret of success was the project's strategy to mainstream WRC conservation into the rural development and poverty alleviation activities of local government agencies. The project worked with local government officials and communities to design incentive mechanisms suited to each local context. The mechanisms focused on improving farmer livelihoods by supporting sustainable alternative sources of income generation or improving existing livelihoods. Support generally consisted of investment in public works, such as roads and irrigation infrastructure, as well as individual or small group support, such as grants for greenhouses, sheds for animals, access to improved varieties of crops, or micro-credit interest reduction. Seeing support that directly improved their daily lives and livelihoods, farmers embraced the concept of protecting the WRC sites.

"The project's strategy was to embed WRC conservation in rural development," says Dr Qingwen Yang, Chief Technical Adviser for the project. "It is worth noting that the majority of the incentives were financed through local government budgets allocated for agricultural development, poverty alleviation and water resource management."

In Guangxi province's site, for example, the incentive demonstration project actively involved over 20 departments of local government. Li Kedi, a local government official says: "The key to the involvement of these departments has been establishing the clear link between WRC conservation and the work of Chinese agricultural scientist, Yuan Longping, who developed the first hybrid rice variety and demonstrated how the conservation of wild crops can improve food security."



Wild rice conserved at habitat in Guangxi
Photo: Conservation and Sustainable Utilization of Wild Relatives of Crops Project Management Office/ Ministry of Agriculture of China

In addition, in Guangxi, threats to a site that is home to a wild rice variety had been logging of pine for fuel and eucalyptus planting in the surrounding forest areas, which was affecting water resources. Water diversion from the area for rice paddies elsewhere was also a major issue. As an incentive mechanism for WRC conservation, an irrigation system was provided that increased rice production. A road was also constructed that supported increased production of crops, such as watermelons, by providing more efficient access to transport for shipment. Biogas digesters were introduced as an alternative fuel source so that villages did not need to cut down trees. And communities have stopped planting rice paddies in the buffer area to aid the protection of WRC.

Modern development and prosperity living in harmonious proximity to ancient storehouses of genetic wealth – Vavilov would have been pleased!



A BIG BANG FOR YOUR BUCK— CONSERVING TRADITIONAL CROPS IN BHUTAN

Phurba and her freshly prepared field for the next crop of buckwheat. The buckwheat is normally grown in April-May and harvested in October–November.
Photo: Sutharin Koonphol

One of the happiest moments in Phurba's life was cooking traditional buckwheat noodles and pancakes for the Bhutanese Royal Wedding in 2011. "It was very special to see the King and the Queen in real life and to actually do something for them. I was so proud that our local buckwheat was valued by others and placed on the royal table." For her, the revival of this once virtually abandoned traditional crop has changed her life; before, she worked hard in the fields and tended her family.

In Bumthang Valley, farmers have abandoned buckwheat for other cash crops, such as potatoes, when access roads opened the area to trade. Bhutan's wealth of national agro-biodiversity underpins the country's food security. It also provides genetic resources that may become beneficial and profitable in the future. Much of this diversity is held in traditionally cultivated varieties of crops, such as buckwheat. Alarmed by the decline of buckwheat production, Phurba and 14 other farmers formed the Bumthang Buckwheat Group in 2009, supported by the District Agricultural Office and the National Biodiversity Centre.

With the UNDP supported GEF financed 'Integrated Livestock and Crop Conservation' Project (ILCCP), and the National Biodiversity Centre, the group worked on value-added product development and diversification; cakes, biscuits, and pizzas, as well as more traditional products such as buckwheat noodles and pancakes.

The group soon opened a shop in 2011. The project supplied baking equipment, skills training and health benefit information. Buckwheat prices rose three-fold over five years and sales of flour, cakes and biscuits now bring the group a steady income.

The area of land under buckwheat cultivation has more than doubled and buckwheat production in the area has increased by 56 percent since the initiative began. The group yields up to US\$ 60 per day in the peak season from June to August. The group has recently expanded to include 30 additional contract farmers who supply buckwheat grain.

Further expansion is planned to meet growing market demand. With support from the project and district agricultural office, Phurba and her friends have been travelling to biodiversity fairs around the country to

promote their buckwheat products. They also provided training and shared their results with other farmer groups.

The group has now developed 18 products, including buckwheat husk pillows. Waste not; want not! Previously buckwheat husks were discarded but the new pillow contents provide income and are believed to help fight high-blood pressure, facilitate good sleep, and may even prevent snoring.

Buckwheat wine is the next plan and has "good market potential," according to Sonam Tobgay, Chairman of Bumthang Buckwheat Group. To create opportunities for more farmers, the project also created a community seed bank to conserve buckwheat and other traditional crop varieties from the Dzongkhag area.

"We distributed buckwheat seeds for free to those farmers wanting to grow the crop again and plan to introduce a price guarantee scheme," notes Gaylong, the District Agricultural Officer.

Bumthang's buckwheat exemplifies the biodiversity wealth of Bhutan and its close relationship with local livelihoods. Buckwheat is just one of several traditional crop and livestock varieties that the project helped farmers to reclaim and conserve through supply chain development in 18 sites spanning eight districts. Others promoted under this effort included traditional varieties and breeds of barley, soybean, maize, rice, yak, poultry, pigs, sheep, Nublang – a local cattle breed – and horses.

The project targeted some of the poorest communities, living in the most remote regions of Bhutan, with 555 farmers benefitting directly from its efforts. The project also expanded the National Gene Bank to hold a vast number of crop and animal genetic resources for research and long term use, and trained gene bank staff and extension officers at local governments, resulting in enhanced national capacity for ensuring crop and breed diversity.

According to traditional Bhutanese belief, buckwheat is one of the nine essential grains that Lord Buddha gave to mankind. Properly managed they will continue as foundations for realizing high Gross National Happiness.



Sonam Tobgay, Chairman of the buckwheat group, with his wife - Nazom, and the buckwheat goodies.
Photo: Sutharin Koonphol



Various traditional varieties in Bumthang are now kept in the community seedbank
Photo: Sutharin Koonphol



Conserved seeds in Royal Bhutan Genebank, National Biodiversity Centre
Photo: Midori Paxton



The two varieties of buckwheat commonly grown in Bumthang: sweet and bitter
Photo: Sutharin Koonphol

RECIPE FOR PUTTA—LOCAL BHUTANESE BUCKWHEAT NOODLES

Ingredients

- 500 grams buckwheat flour
- 100 grams wheat flour
- 3 eggs, fried and chopped (optional)
- 6 teaspoons chili powder
- 2-3 teaspoons salt
- Half cup cooking oil
- Dry or fresh kichuram gop (chive leaves)
- 2 teaspoons Thingay powder (commonly known as Sichuan pepper)

Method

To prepare the noodles, sieve the buckwheat and wheat flour into a clean bowl. Add water to make a 'fluffy' dough; then wrap the dough in cling film or a plastic bag and leave for 10-15 minutes to prove. Make a number of small balls from the dough and pass them through a noodle or pasta-making machine, one by one. Boil 2-3 litres of water; and add a few drops of oil to the water to prevent the noodles sticking together while cooking. Add about 200 grams of noodles to the boiling water, and cook for about 15-20 minutes. Wash the cooked and washed noodles to a bowl, add the remaining ingredients – salt, chilli powder, some Thingay powder – and mix well. To prepare the garnish and finish the noodles, heat the oil in a large frying pan and fry the chive leaves. Transfer the seasoned noodles to the frying pan too and mix well. Add fried egg, if desired. Once mixed, the noodles are ready to serve.

MANAGING AND RESTORING PRECIOUS WETLANDS IN IRAN AND NEPAL

Wetlands come in many forms – rivers, lakes, mangrove forests, swamps, marshes, coastal floodplains, flooded forests and rice fields. These ecosystems provide essential services. As well as supplying and purifying water, they provide food, regulate the climate, control floods, protect coastlines and are invaluable centres of biodiversity. But the world's wetlands are being lost and degraded faster than any other ecosystem, driven by conversion and development, water withdrawal, over-exploitation, pollution, drought and climate change.

With finance from the GEF, UNDP supports projects in 10 countries in the Asia Pacific region to conserve, sustainably use and restore wetland ecosystems.

In Iran, where competition for water resources and persistent drought severely threaten the country's wetlands, UNDP has worked with the government, NGOs and local communities to pilot strategies to address these pressures. The project developed integrated wetland management plans for wetlands at three demonstration sites – Lake Uromiyeh Basin, Lake Parishan and Shadegan wetland – through a highly participatory process that lasted over two years and drew on inputs from community, local, provincial and national levels, 10 NGOs and 12 community-based organisations. Replication of the project's accomplishments speaks to its success. Integrated wetland management plans are now being rolled out to another 50 wetlands across the country.

With project support, farmers living in and around the three demonstration sites were trained in sustainable agriculture techniques that use less water, control evaporation and have increased yields. At Lake Parishan, volunteers were trained as local eco-tour guides, a visitor centre was built to accommodate tourists, and women were given equipment to develop non-water dependent trades. Diversification of livelihoods reduces pressure on the wetlands and makes villagers more resilient to external shocks, including droughts.

Lake Parishan locals are also helping to conserve key species around the wetland. "Some fish species had all but disappeared from the project's pilot sites. We have taken action to save them by creating several conservation ponds beside the wetlands to ensure their survival through periods of drought," explains Mr. Yaghoobalipour of the Fisheries Organization. More than 100 students, teachers and local villagers were trained to monitor otters living in the wetlands and were involved in developing a conservation plan for this important species.

Persistent drought and water withdrawals have reduced Lake Uromiyeh to 40 percent of its original size in recent decades. The project developed a drought risk management plan for the basin's wetlands. Drawing on the experiences of other countries facing similar problems, this plan established a framework for allocating water rights to each of the provinces surrounding the lake during droughts. It also included provisions on how to optimize water consumption and enforce these rights.

In Nepal, the 'Conservation and Sustainable Use of Wetlands' project demonstrates that collaborative management and sustainable use of wetlands can improve both livelihoods and habitats for wildlife. Focusing on two priority wetlands, the Koshi Tappu Wildlife Reserve and Ghodaghodi Lake Area, the project restored 102 hectares of wetlands, mapped seven critical wetland sites and constructed a sluice gate at one of the sites to regulate water levels. It provided small loans to local community groups to help them adopt new trades, including poultry, goat, fish and pig rearing, leaf-plate making, vegetable farming and bicycle repairing.

As a result, the incomes of 463 wetland dependent households have improved significantly. Community members who adopted these practices have increased their incomes by between 25 percent to almost 90 percent over the baseline average income. Cumulatively these efforts have positively impacted local wildlife. A recent census of wild water buffalo – the flagship indicator species of Koshi Tappu Wildlife Reserve – showed an increase of 18 percent compared to the previous census. Similarly, the cotton pygmy goose, an indicator waterfowl of Ghodaghodi Lake Area, has increased by 19 percent compared to last year's record.

Both projects have culminated in important nationwide changes in Iran and Nepal. The Government of Nepal has for the first time allocated budget for important wetland sites. The Government of Iran has allocated a huge IRR (Iranian Rials) 1.75 trillion for ecosystem management of wetlands and established an IRR 9 trillion fund for water resource management for wetlands. Significant advances have been made toward meaningful wetlands policy and legislation. Iran's new National Wetlands Strategy is currently awaiting approval from Cabinet. In Nepal, a review of policies and regulations by the project has led the Government to draft a Wetlands Act and Regulations.

DID YOU KNOW?

An estimate of the economic value of wetlands per geographical region around the world indicated that Asian wetlands have the highest economic value at US\$ 1.8 billion per year

Siberian Cranes, Fereidunkenar Wetland, Mazandaran Province
Photo: Ali Mohajeran



Haor Khal, Hakaluki Haor wetland, Bangladesh
Photo: Sayam U. Chowdhury



Ruddy shelduck (*Tadorna ferruginea*), Bangladesh
Photo: Sayam U. Chowdhury



Hakaluki Haor wetland, Bangladesh
Photo: Sayam U. Chowdhury

SUSTAINABLE AGRICULTURE CAN SOLVE PROBLEMS FACING WETLANDS

“Less water, more yields!” exclaims Mohammad Sharifi Moghaddam, a wetlands conservation project consultant and instructor for the sustainable agriculture initiative around Lake Parishan near the main South Western Iranian city of Shiraz. Most families living in the villages surrounding the wetland have been involved in farming for generations. Today, as family and plot sizes expand, rainfall decreases and water overuse has become ubiquitous, farming has become much more challenging – and more of a threat to the environment. Unsustainable agriculture and inefficient irrigation methods are one of the main causes for damaging wetlands.

Since 2010, the ‘Conservation of Iranian Wetlands’ project has helped farmers adopt new water management techniques that use water more efficiently, so preserving the wetlands. These techniques, combined with simple agricultural methods such as composting and not tilling the soil, have boosted crop yields. The UNDP supported GEF financed project was conducted by the Departments of Environment and Agriculture. Villagers around Lake Parishan and the project’s two other pilot sites are now acutely aware that preserving the wetland means more than saving the environment. In the long term, it means saving their economic livelihood.

A field farm school was set up as a demonstration site for nine different agricultural and water management techniques. Participating farmers work on the pilot site and replicate these sustainable methods in their own farms. These techniques offer an important alternative to traditional flood irrigation and the use of chemical fertilizer, which both use vast amounts of water. Locally made compost requires nearly two times less irrigation than chemical fertilizers, which need to be sprayed around the wetland.

Using the sustainable techniques introduced by the project, farmers save 42 percent of water previously needed. These techniques have also significantly increased yields, more than doubling average yields for common crops such as tomatoes or watermelons, from 70 to 148 tonnes per hectare.

Mr. Ali Reza Cheraqui, Coordinator of the Sustainable Agriculture Project and Expert in Kazeroon’s Department of Agriculture explains that: “While it is of immense benefit to the wetland, ultimately, the project speaks to farmers in the language of money. It makes business sense for them to work more sustainably: their risk margin is small, so are their plots. They need the field farm school to demonstrate that these techniques will actually work for them before adopting them on their own farms. This pilot has more and more participants for a simple reason: sound environmental management means better business opportunities now and in the future. At first, neither farmers nor the Ministry of Agriculture was acquainted with this kind of approach, so it took some work to implement, but the results are speaking for themselves and have far exceeded our expectations.”

In an effort to expand further the adoption of sustainable farming techniques, and to involve more women in community development, the project has formed a group of 11 women facilitators from villages around the wetland. These women learn about new crop management techniques and extend their use in their own communities. The group has also constituted a micro-credit fund with seed money from the wetlands conservation project (IRR 20 million) and use their own savings to purchase the equipment necessary, such as egg incubators, to develop alternative livelihoods producing and selling natural composts.

The sustainable farming initiative around Lake Parishan has been so successful that it has already been replicated around the Lake Uromiyeh Basin, and leveraged funding from government. In 2012, the project, which was implemented in 72 hectares of farm lands, resulted in 50 percent reduction in water consumption, 44 percent reduction in usage of chemical fertilizers and poisons, and an 18 percent increase in farm performance in a pilot site around SiranGuli wetland (one of Uromiyeh’s satellite wetlands).



Mangrove planting, Bangladesh
Photo: UNDP Bangladesh

Perhaps more so than for any other nation, the fate of Bangladesh – both of its people and prospects for sustainable development – is determined by its relationship with water and wetlands. During the monsoon season, at least seven to eight million hectares or about half the country, may be considered wetland. In addition to providing food and livelihoods for millions of people, these habitats support a huge variety of aquatic life and lie on key flyways for migratory water birds.

But growing human pressure from overexploitation, habitat destruction and pollution is degrading these wetlands and threatening the livelihoods and species that depend on them. UNDP and the Government of Bangladesh teamed up to manage mounting threats to the country’s important wetlands through the UNDP supported GEF financed “Coastal and Wetland Biodiversity Management at Cox’s Bazar and Hakaluki Haor” project, implemented from 2002 to 2011.

The project worked in four of eight sites especially designated as ‘Ecologically Critical Areas’ (ECAs) – wetland sites that harbour significant biodiversity but where degradation has reached or threatens to reach a critical state. The project has successfully developed and demonstrated a collaborative system for managing these ECAs on the ground, with the Bangladeshi Department of Environment, working in partnership with local people, other government agencies, NGOs and ECA coordinating committees.

Through 72 Village Conservation Groups (VCGs) established across the sites, 3,267 local people have become actively involved in protecting, restoring and sustaining the wetlands of the ECAs, including replanting

CONSERVING ECOLOGICALLY CRITICAL AREAS IN BANGLADESH’S VAST WETLANDS

of mangroves in the coastal wetlands of Cox’s Bazar and swamp forests around the seasonal freshwater lakes of Hakaluki Haor, so regenerating habitats. VCGs have also taken an active role in sand dune stabilization, turtle and fish conservation, and anti-poaching measures, with 138 members trained and deployed as conservation guards.

With training in alternative trades and small loans, communities have adopted more sustainable livelihoods, including livestock rearing, homestead gardening, fish selling, tailoring and improved horticulture and agriculture. Collectively the project’s efforts reduced violations of ECA regulations by 70 percent over its lifetime, according to field reports. Hunting of waterfowl has ceased in Hakaluki Haor and turtle mortality has been greatly reduced at the ECAs in Cox’s Bazar.

Conservation management plans and zoning schemes were developed for the sites, though extensive survey work and local community participation, and used by the Department of Environment to govern decision making. The groundwork and experience gained through the initiative will provide valuable lessons to inform the planning and management of four new ECAs established during the project. The Government of Bangladesh will follow up this with another project, the ‘Community Based Adaptation in Ecologically Critical Areas through Biodiversity Conservation and Social Protection’ funded by their Climate Change Trust Fund. This will build on the ECA management model and incorporate climate change adaptation measures.



THE CONSERVATION AND REHABILITATION OF LAKE INLE IN MYANMAR

Photo: Sarah Valenti

Lake Inle lies at an altitude of 900 metres on Myanmar's Shan plateau and covers an area of some 2,500 square kilometres, making it the second largest body of freshwater in the country. Notable for its high levels of endemism (particularly aquatic species of mollusk and fish), its abundant birdlife, physical beauty and the rich cultural traditions of the ethnic minority groups that make its shores and waters their home, Inle is currently under consideration for UNESCO World Heritage Site designation. It is also a lake in trouble.

Poor rains in recent years, combined with other climate change impacts, may be two contributing factors to a fall in water levels and surface area shrinkage. But the driving force behind Inle's woes is primarily anthropogenic.

For example, the local custom of constructing large floating gardens on earth-covered weed platforms has unintentionally resulted in land reclamation as the gardens take root in its shallows. Fertilizer and pesticide run-off from both these gardens and shoreline agriculture is also an issue, along with sewage emanating from households, most of which lack sanitation. Sediment is being washed down from surrounding hills, which are being deforested. Alien species introduced to fuel fisheries yield and water hyacinth infestation are also major concerns.

The challenges facing Inle's environmental integrity and to the sustainable livelihoods of local communities are formidable. But here, like elsewhere in Myanmar, the opportunities for positive change are considerable. Isolated for decades, the country has inadvertently remained a "lost world" and its levels of biodiversity and forest cover are almost unrivalled in South East Asia. If prompt action is taken to conserve this inheritance and reverse degradation, conservationists can remain optimistic.

In 2011, UNDP became a key partner in a series of initiatives to restore Inle's environmental health in collaboration with Myanmar's Ministry of Environmental Conservation and Forestry, conservation and scientific organisations, and with financial support from Norway. UNDP provided USD 0.6 million to set up the 'Inle Lake Conservation and Sustainability' project, aimed at restoring environmental stability and improving the quality of life of local people, empowering them to conserve their fragile and unique environment.

A series of micro-projects focused on improving household waste treatment in disadvantaged communities and planting fruit trees on barren land to act as "wash off traps" were combined with educational programmes designed to foster biodiversity-friendly behaviour and agricultural practices without altering the unique character of Inle life. In addition, a five-year plan based on in-depth consultations with all government ministries and various key stakeholders and the establishment of the national Inle Lake Sustainability and Conservation Committee was developed.

Inle is Myanmar's tourism jewel – with stunning coastal temples, water festivals, silver, silk and weaving markets, and outstanding natural beauty. Visitor numbers will inevitably surge in the country's new environment of openness; protected area entrance fees likewise. A Trust Fund to support local community conservation projects using this increased protected area revenue is envisaged. This is the first of its kind in Myanmar, but in the current climate of change, Myanmar is a nation of 'firsts'.

INTERNATIONAL WATERS –SHARING AND SUSTAINING MARINE, COASTAL AND FRESHWATER RESOURCES ACROSS BORDERS

UNDP's International Waters (IW) programme works to manage and sustain transboundary water systems, such as large marine ecosystems bounded by more than one nation, river basins where water flows from one country to another, multi-country lake basins and groundwater resources shared by several countries. It promotes multi-country cooperation for the management of these shared ecosystems through sustainable, integrated and ecosystem-based approaches.

Since 1991, UNDP's IW programme, financed by the GEF, has supported countries to deliver a cumulative portfolio of projects of US\$ 98.11 million in the Asia Pacific region.

These initiatives address agreed environmental and water resource concerns facing regional waterbodies. The programme builds institu-

tional and system capacity at the national and regional levels for the management of significant shared marine, coastal and freshwater resources. This is vital for the billions of people who depend on these ecosystems for their livelihoods and security.

In the Yellow Sea Large Marine Ecosystem (LME) – one of the most affected by human development – countries bordering the ecosystem have agreed on tangible targets to reduce fishing and pollution discharge into the marine environment. With UNDP support, these nations have introduced sustainable marine aquaculture practices that are more profitable and less environmentally damaging compared to traditional methods; they have approved a network of new marine protected areas; and agreed to establish a regional monitoring network for better understanding of the status of the marine environment and to inform 'adaptive management' in the Yellow Sea.



Photo: Ugo Montaldo/Shutterstock.com

HOW LOCALLY MANAGED MARINE AREAS ARE MAKING A DIFFERENCE

I have always been fascinated by history. When I visit a place I try to imagine what the area or town looked like a hundred years ago and how the people lived. What was life like for the 'king' of the castle, the carpenter or the blacksmith in a medieval town? But what did natural areas look like? Were they just vast untouched wildernesses, devoid of people, or were they already being altered or managed in some way by the humans that shared them? The answer is perhaps surprising.

Throughout history, humans, especially those that depended on natural resources for their wellbeing, have stewarded the land and conserved natural resources, including biodiversity. For example, communities of the Arabian Peninsula have practiced Hima, a traditional system of resource tenure, for more than 1,400 years. Hima literally means "a protected place" and is believed to be the most widespread and longstanding traditional conservation institution in the Middle East (and perhaps on Earth).

On my recent professional introduction to the Pacific, I learned that a similar, albeit less well-known traditional system exists for conserving marine and coastal natural resources. Depending on which country you visit, the system is called by different names – "ra'ui" in the Cook Islands, "tabu" in Fiji, "kapu" in Hawaii, and "bau" zones in Palau. But essentially they all refer to an area where a prohibition on fishing, or fishing for certain species, is declared. As societies modernized, this traditional practice was increasingly abandoned, but has fairly recently been revived as overfishing, overharvesting and insufficient implementation of regulations have depleted marine resources. This has led to the Locally-Managed Marine Areas (LMMA) concept, one that is quickly spreading through the Pacific and the rest of the (marine) world.

For example, the local Ucuivanua community of the eastern coast of Fiji's largest island was the first Fijian community to establish a LMMA in 1997. When the community noticed that populations of kai-koso clams, a staple food source, were declining from the mud flats around their village, they declared a ban on harvesting from inshore

waters over these mudflats for three years, building on the tradition of "tabu" prohibitions.

After seven years of local community management, the clam population has rebounded and village incomes have risen significantly with increased harvests. The success of the Ucuivanua LMMA spread rapidly, and a support network – the Fiji Locally Managed Marine Area Network – grew from this. By 2009, the network had expanded to include 250 LMMAs, covering some 10,745 square kilometres of coastal fisheries, more than 25 percent of Fiji's inshore area. In 2002, the network won the Equator Initiative Prize in recognition of this achievement.

Well-managed LMMAs (and other marine reserves) can support healthy fisheries and secure livelihoods for local fishermen. They can also help degraded ecosystems and depleted fish stocks to recover. With over three billion people depending on marine and coastal biodiversity for their livelihoods, establishing an effective network of LMMAs represents a key strategy for poverty alleviation. UNDP is supporting expansion and strengthening of LMMAs in the Philippines, and (through the Ridge to Reef Programme supported by GEF and UNDP) in the Cook Islands, Federal States of Micronesia and Fiji.

The Ridge to Reef projects work with a range of partners to promote integrated management of natural resources in these archipelagos – from water catchments through to the sea. This will include supporting local communities and organizations to establish and strengthen networks of LMMAs to maximize their ecological viability. The projects will build the capacity of local people and organisations to effectively manage LMMAs. The projects will also support piloting of innovative revenue generation schemes for LMMAs to help them become financially sustainable. We hope that this support to local communities and traditional management practices will contribute to an LMMA legacy that future generations can look back on with pride!



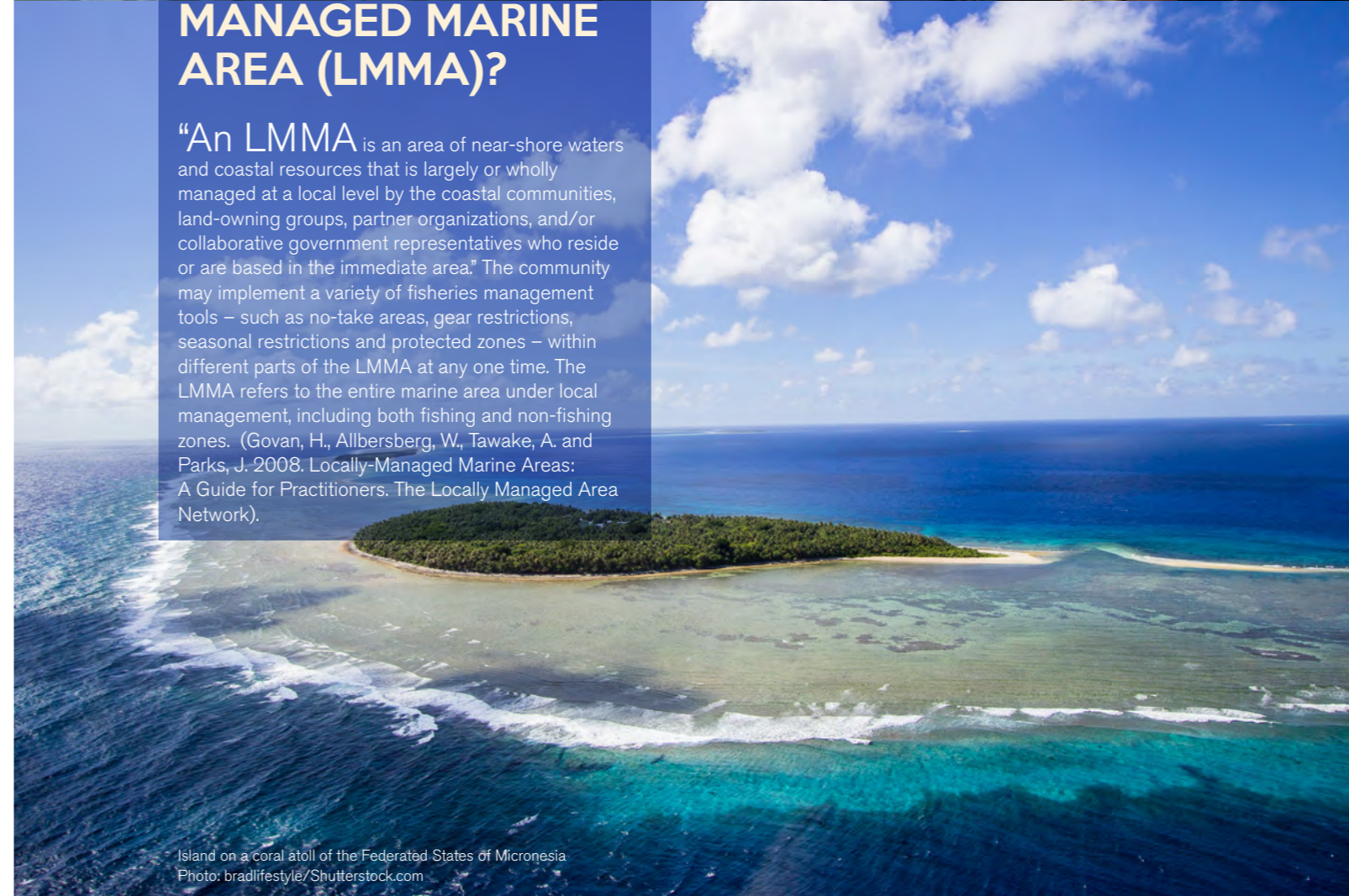
by Johan Robinson
Regional Technical Adviser, Asia-Pacific



Tagbanuan fishing family in their dugout canoe,
Busuanga Calamianes Marine Protected Area Philippines
Photo: Zafer Kizilkaya

WHAT IS A LOCALLY MANAGED MARINE AREA (LMMA)?

"An LMMA is an area of near-shore waters and coastal resources that is largely or wholly managed at a local level by the coastal communities, land-owning groups, partner organizations, and/or collaborative government representatives who reside or are based in the immediate area." The community may implement a variety of fisheries management tools – such as no-take areas, gear restrictions, seasonal restrictions and protected zones – within different parts of the LMMA at any one time. The LMMA refers to the entire marine area under local management, including both fishing and non-fishing zones. (Govan, H., Allbersberg, W., Tawake, A. and Parks, J. 2008. Locally-Managed Marine Areas: A Guide for Practitioners. The Locally Managed Area Network).



Island on a coral atoll of the Federated States of Micronesia
Photo: bradlifestyle/Shutterstock.com



SUSTAINING FORESTS AND WATERSHEDS IN INDONESIA

Madakaripura Waterfall, East Java, Indonesia
Photo: James Jones Jr/Shutterstock.com

In times past, when night fell on the Srimenanti Pekon (village) people of Lampung province in Sumatra, it was either a case of kerosene lamps, candles or lights out. Water, with a little help from UNDP, smart technology, business and government partnerships and local initiative, has changed all that.

Now the remote hill village glows in the darkness of the adjacent protected forests courtesy of micro-hydro electric generators (MHEG), which use the energy of local streams to produce enough power to operate four 15W lamps, chargers for mobile phones and a small television per household. Provided the water flows, the power remains on 24 hours a day.

MHEG power does not just save the people money they would otherwise have to spend on kerosene. It also reduces the risk of fires in the community and, significantly, has prompted residents to take a much greater interest in the health of the watershed and the upstream forests that ensure regular water flow. People are learning that if the rivers run dry, it will be lights out again.

Srimenanti is not alone in adopting micro-hydro. Working with the Ministry of Forestry, UNDP's GEF supported "Strengthening Community Based Forest and Watershed Management Project" (SCBFWM) has successfully channelled US\$ 23 million from the Indonesian Government's Forest Watershed Based Community Management Programme into micro-hydro and hundreds of coffee farmers are now benefitting – in some cases in unexpected ways.

Most communities in this remote region are not connected to the national grid and have traditionally enjoyed an isolated existence. Using micro-hydro powered internet they can now interact more efficiently with the world at large. "With the internet, we can check the

latest conditions of the market price of coffee. In short, we improved our standard of living," says Sunyoto (52), a farmer and Treasurer of a local marketing group speaking in an August 2013 interview published by Kompas newspaper.

Indonesia comprises approximately 190 million hectares of land area of which 133 million hectares are classified as forest. This tree cover serves as crucial watershed, but forest degradation is ongoing and of 17,000 watersheds nationwide, approximately 3,000 are currently considered to be in a critical condition.

Deforestation, particularly in mountainous areas, has negative effects both upstream and downstream in the form of seasonal floods or drought, and results in erosion and deadly landslides. Agriculture and food security for the 52.4 percent of Indonesians living below the poverty line on less than US\$ 2 a day is also negatively impacted. In addition, fisheries and marine ecosystems also suffer with corals and fish nurseries swamped by sediment run-off.

The SCBFWM Project's objective is to catalyse the impact of the Government of Indonesia's new programmes on community based forest management, reforestation and afforestation, and is designed to "address the root causes of deforestation related to poverty, unequal distribution of benefits and weak law enforcement due to lack of inter-sectoral co-ordination and collaboration."

282 watersheds have been prioritized at government level for restoration. These are located in 400 districts in 32 provinces. The government's professed goal is to plant a billion trees, an initiative sustained by massive overseas financial support (over US\$ 1 billion in the last two decades).

To date 1,561,000 seedlings have been planted

in the six watersheds targeted as pilot sites by the SCBFWM project. Seedling planting is not always a guarantee of success – some seedlings, particularly those of favoured fruit or nut trees, are subsequently removed by locals and replanted by their houses. Other seedlings, if improperly planted or planted in the wrong location on degraded land, wither and die. But despite these failures, satellite image analysis shows a forest cover increase in the project pilot watershed sites of 576 hectares.

72 community based organisations have been formed under SCBFWM, including women's groups, and emphasis is firmly placed on incentivizing people to engage in watershed management by offering tangible benefits for good practice. These come in different forms. Electricity is one clear example; employment is another. Raising and selling seedlings, for example, has generated US\$ 3.8 million for the Dahlia women's group in Suranadi village. The guarantee of a clean and reliable water supply due to the provision of pipes and the reduction of sediment in reservoirs has enabled women elsewhere to devote less of their lives searching for safe water and more of their time to generating income through small scale private enterprise such as operating food stalls.

Education is another benefit – 793 community members have received training in fields such as tree nursery management, non-timber forest products development, administration, financial management and agro-forestry. 575 government officials have also received training in watershed management.

The project has facilitated public discussion and consultation at the national level and, as a result, legislation has been enacted such as the Government Regulation Concerning Watershed Management (2012).

RIGHT: Community members conducting rapid hydrological appraisal in the buffer zone area of Rinjani Mountain National Park, West Nusa Tenggara
Photo: Eliza/UNDP SCBFWM Project

FAR RIGHT: Many local farmers living in the buffer zone of Bukit Barisan Selatan national Park are coffee farmers
Photo: Gandhi/UNDP SCBFWM Project





THE POWER OF WOMEN: INTEGRATING GENDER INTO ECOSYSTEM AND BIODIVERSITY MANAGEMENT

It is 6am. My mother wakes me. Her motto is "anyone who sleeps late will not be able to eat their food warm". It's a Bhutanese phrase meaning you can't feed yourself or family or meet their needs. As early as it feels to me, I know she has already spent two hours feeding the animals, fetching a mountain of leaf litter to serve as bedding for the cows and later as manure, and cooking breakfast (which she has grown for us herself) for all of us. This is how most women in my village begin their days. After breakfast, she and other women tend crops, walk to the forests to collect more firewood or leaf litter, and travel far to bring water to irrigate the fields.

Women play a pivotal role in natural resource management; they ensure the wellbeing and very survival of many rural families. Despite the fact that women also play a vital role in the conservation, management and

sustainable use of biodiversity, their contribution is often overlooked. Women stand at the heart of the food-water-energy nexus.

For effective natural resource management, women must be seen and heard. They are the cornerstones of equitable and effective conservation strategies, and have the power to make a project thrive rather than wither. This is why UNDP-GEF follows a proactive approach to ensure the integration of gender considerations into the design and implementation of all ecosystem and biodiversity projects.

ENGENDERING PROJECT DESIGN

During the early design stages of a project, UNDP identifies stakeholders and interests so as to embrace as wide a variety of views and options as possible and ensure adequate balance in terms of gender input and

participation. Women are an essential part of this equation, and where they may not normally be involved in public debate, efforts to listen to their concerns and suggestions must be made. Equally, it is important to build the skills and capacities of both male and female project staff to implement projects. The identification of gender "champions" within Country Offices means that 'gender expertise and priorities' can be embedded into project design and management.

MAKING THE CASE FOR GENDERED INTERVENTIONS

The basic premise for integrating gender in ecosystem management and biodiversity conservation initiatives is that it not only advances the equity agenda, but also improves efficiency and effectiveness.

For example, during the project preparation phase for the UNDP-GEF project 'Western Terai Landscape Complex Project in Nepal', significant gender and ethnic disparities with regard to access to resources, benefits and decision-making were identified. Assessments showed that female literacy stood at around 16 percent in Bardia and Kailali villages (project pilot sites) compared to 42-45 percent for male literacy.

As a result, gender and social inclusion were accorded a high priority in the project. Following a gender and social audit report in 2010, women were encouraged to assume membership and/or chair roles on think tanks and in community organizations (such as the Chamomile Growers Group) promoted by the project. The project also increased the participation of women in community level natural resource management groups (including Community-based Forest User groups) and also built their capacity to participate in community-based enterprises.

Projects that consciously focus on the specific integration of gender considerations into project objectives inspire more sustainable gender outcomes. For example, the 'Mainstreaming Biodiversity Conservation in Production Systems in the Juniper Forest Ecosystem' project in Pakistan has implemented several measures to integrate gender into each of the four goals of the project, including: gender analysis to enable formulation of policies addressing both men and women's role in natural resource management; a review of existing policies and laws to identify barriers to greater community involvement in resource

The Coastal and Marine Biodiversity in Sindhudurg project has looked at ways to encourage alternate livelihoods for fishing communities, particularly women. In Wadatar village, women manage an oyster farm and sell oysters in the local market. Pictured here, Kasturi Dhoke examines oyster spats that form under shells left on bamboo frames.
Photo: Prashanth Vishwanathan/UNDP India

protection efforts; empowering communities to take advantage of opportunities for economic incentives particularly for women, who are the main users and managers of forests; and the creation of village conservation committees to voice women's opinions and encourage the involvement of women resource users in the project.

In other cases, positive gender interventions have emerged naturally because women were closely involved in project planning. For example, the 'Linking and Enhancing Protected Areas in the Temperate Broadleaf Forests Ecoregion of Bhutan' (LINKPA) project which supported the sustainable conservation of the temperate forest and mountain ecosystems in Thrumshingla National Park and its corridors, had several gender directed activities, such as providing grant support to a local women's weaving association (yathra weaving) and providing support for roofing materials in households headed by women.

Similarly, in the case of the 'Gulf of Mannar Marine and Coastal biodiversity' project in India, it was recognized that women from fisher communities held the key to improving local economic conditions and enhancing marine biodiversity conservation. As a result, 2,341 self-help groups were formed comprising 34,699 members, more than 1,800 of which (>76.7 percent) were women's groups with 27,413 (79 percent) women members.

GENDER SENSITIVE MONITORING AND EVALUATION

Projects can only understand and measure gender equality when the right questions are asked, for example, by including sex-disaggregated data in baseline and other surveys. The Nepal Western Terai project adopted Gender and Social Inclusion (GESI) disaggregated data in its reporting. In addition, the project also employed a GESI specialist for the terminal evaluation to ensure that these issues were examined in greater detail. The same project has promoted the use of wellbeing and wealth ranking exercises to better target pro-poor interventions.

As a result of the integration of gender considerations in projects around the world, an increasing number of women and their families are able to eat their food warm.



by Doley Tshering
Regional Technical Adviser, Asia-Pacific

COMBINING SUSTAINABLE FOREST MANAGEMENT AND ENERGY EFFICIENT COOKSTOVES IN CAMBODIA

Cambodia's forests cover almost 60 percent of the country, harbour more than half of the country's threatened species and are essential to local livelihoods. Yet they are being degraded rapidly as a result of logging, conversion to agriculture, development and unsustainable extraction for firewood. UNDP, with GEF finance, has teamed up with the Forest Administration, The Ministry of Agriculture, Forestry and Fisheries of Cambodia, NGO 'Group for the Environment, Renewable Energy and Solidarity' (GERES) and local communities in an initiative designed to help communities manage and use the forest sustainably while improving their livelihoods. Launched in 2011, the project combines traditional community forest management with efforts to reduce demand for firewood by promoting energy efficient cookstoves.

With project support, 30 community forests are being established. Communal land use plans are being developed by the project in four communes to coordinate use of the forest by different communities in a sustainable manner.

"The project is developing management plans for the 30 community forests covering a total area of 11,310 hectares, through a consultative process that involves 8,167 families. These plans also aim to increase the area of woodlots managed by local communities to produce sustainable charcoal, so that they generate income from the forest while using it sustainably," said Mr. Khorn Saret, Deputy Director of Department of Forest and Community Forestry, Forest Administration, The Ministry of Agriculture, Forestry and Fisheries.

Through the project's support, the institutional process for allocating forest to communities is being streamlined and refined, to make it quicker for the government to declare these areas and develop participatory plans for their management.

Once these local communities begin managing their own natural resources, they are able to obtain benefits from using them sustainably. Business plans, as part of the Community Forest Plans, are being developed to support community income generation. Studies conducted through the project's support have identified a number of potential products with good business potential to generate income for the communities through sustainable forest management. These include fuel wood, charcoal, timber, and non-timber forest products

such as honey, rattan and bamboo. At the same time, the project is providing training to build the capacity of government staff and local people to implement sustainable practices. So far, 1,328 people have been trained and have actively participated in their community forest development and management planning.

At the same time, the project aims to reduce demand for fuel wood from forests by promoting use of improved cookstoves that are more energy efficient and require less firewood or charcoal. An estimated 84 percent of Cambodian households rely on firewood and charcoal for cooking. Unsustainable woodcutting contributes to forest degradation. To help tackle this, in addition to the sustainable community managed forests being established, support has been provided to train local people to produce improved cookstoves in Kampong Chhnang province.

The training has enabled local women to take up cookstove production, reducing wood consumption and increasing their income. Sous Chamroeu is 24 years old and lives with her family who are rice farmers. After attending a cookstove training provided by the project, Sous and her cousin Kong Saren started making improved cookstoves in 2012. Today the stoves make a substantial addition to the monthly income of the family. Depending on how much time they have to spend in the rice fields, Sous and her cousin make from 75 to 250 improved cookstoves per month, which she sells to retailers for 3,000 Riels per stove (approximately US\$ 0.75). With an average production of 200 stoves per month, she makes a net profit of about 470,000 Riels (or US\$ 115) per month.

"Making cookstoves makes my income more stable as the combination of two different income sources, rice farming and stove making, makes me more flexible and resilient to unexpected events and changes,"



The cookstove production training provided by UNDP and GERES has allowed Sous Chamroeu to increase her monthly income by almost 50 percent. Photo: Seth Chase

says Sous. "Before, when I made other pottery, I had a monthly income of about 300,000 Riel (about US\$ 73). After the training from the cookstove centre, I have increased my monthly income by more than 50 percent to about 470,000 Riel (almost US\$ 115)."

Long Kong is another rice farmer from Kampong Chhnang who started producing cookstoves in 2012. Now she produces about 150 to 300 Neang Kongrey stoves per month, and is very happy with her new life as a businesswoman. "Before, I had no stable income in addition to the farming. I would help other cookstove producers, but the pay was low, and the working hours and demand irregular. Now I am both my own boss and I make more money than I did before. I think I will make cookstoves for the rest of my life," says Long Kong, and laughs.

The project supported 30 traditional cook stove producers to upgrade their technology to produce improved cook stoves. These offer 11 to 15 percent energy savings over the cookstoves traditionally used by local communities. As a result, 16,230 improved cookstoves have been sold as of June 2013, saving 4,767 tons of carbon dioxide emissions. The project has also built five energy-efficient charcoal kilns, which offer energy savings of 17 percent. Seven sites within the community forests have been identified to supply sustainable fuel wood to these kilns. Next, the project plans to certify the charcoal as sourced from sustainably managed community forest so that it can be sold at a premium price.

GO LOCAL! IN MICRONESIA - PROMOTING THE CHEEF BENEFITS OF LOCAL FOODS



Photos: GEF SGP Micronesia

Spread across 2,500 kilometres of the north-western Pacific Ocean, just above the Equator, the Federated States of Micronesia (FSM) consist of the four states of Chuuk, Kosrae, Pohnpei and Yap and their more than 600 widespread islands—only 65 of which are currently inhabited.

In recent years, as these isolated communities have faced the modern pressures of globalization, they have experienced dramatic changes in consumption, which have led to a range of nutritional disorders.

By 2008, it was estimated that 73 percent of the dietary intake of communities living in FSM came from imported food products, leaving the nation with a highly negative food trade balance, and vulnerable to global food price fluctuations and disruptions to food transport. This was accompanied by increasing neglect of traditional food systems, lifestyle changes and reduced levels of exercise. A World Health Organization (WHO) STEPS assessment in the same year reported that 32 percent of Pohnpei adults had Type 2 diabetes. However, recent studies have also identified locally grown (and globally important) staple foods that could help alleviate vitamin deficiencies and anaemia, including bananas, taro and pandanus. These carotenoid-rich foods can help protect against diabetes, heart disease and some cancers.

The planting of rare diverse cultivars therefore provides a local solution to a range of development challenges—from conserving biodiversity to providing reliable and resilient local food supplies, and meeting healthcare goals to generating new opportunities for sustainable livelihoods.

The global GEF Small Grants Programme, implemented by UNDP, has been active in the Pacific region since 2004. Grants of up to US\$50,000 are awarded to local non-governmental and community-based organizations to conserve and restore the environment while enhancing people's wellbeing and livelihoods. SGP embodies the very essence of sustainable development by "thinking globally, acting locally", demonstrating that community action can maintain the fine balance between human needs and environmental imperatives.

In 2005, SGP awarded a grant for US\$50,000 to the Island Food Community of Pohnpei (IFCP) to undertake activities in the village of Mand. Working initially in Madolenihmw Municipality at Mand Community Project for Agricultural Biodiversity Conservation in the north east of the island, a series of small demonstration projects set out to improve traditional food production and consumption and build awareness of healthy local foods, while improving community livelihoods.

From small beginnings, the project achieved impressive results with global and local benefits.

Through ground-breaking scientific analysis of the nutritional value of local traditional foods, ICFP has shown that the cultivation and consumption of local agro-biodiversity can improve public health. This in turn has led to increased household biodiversity and greater dietary diversity in local communities. It has also stimulated demand for market availability of ready-made local foods in place of imported processed products.

The highly successful 'Culture, Health, Environment, Economic and Food Security' (CHEEF) campaign has driven the demand behind these new markets by promoting the "CHEEF" benefits of growing and eating healthy biodiverse local food. "Through a dynamic mix of media and events, the CHEEF campaign has supported face-to-face nutrition education in schools and been featured in local newspapers and on national radio, reaching more than 30,000 islanders. We have run countless community events that celebrate local foods and showcase local food preservation and processing," explained the late Dr. Lois Englberger, IFCP Executive Director. "By promoting the CHEEF benefits of growing and eating healthy local food, we have revitalized traditional knowledge for managing food supply, strengthened our cultural identity, and contributed to biodiversity conservation."

To conserve traditional crop germplasm, the project has created the only known in situ genebank in the Pacific with conservation sites in various villages. More than 100 heritage cultivars are now grown and managed by local farmers, including most local varieties of giant swamp taro, banana, and pandanus. The genebank, IFCP and the partner communities have become suppliers of these rare species to a number of farmers island-wide and planting materials have been distributed nation-wide to enable other communities to grow rare cultivars, which are more resilient to the effects of changing climate regimes.

Through this success, the project has been able to influence food policy development at multiple levels—governmental, community

and individual. The 'Let's Go Local!' slogan has organically been adopted by government departments, schools and community events, and IFCP served as the key advocate for the new Presidential Proclamation on Food Security 2010. This encourages all government-sponsored events to cater using healthy, local foods. Several state departments have now banned imported foods from their offices, and IFCP has been instrumental in the consideration of the soft drink tax bill.

At the community level, IFCP is currently driving the implementation of the Local Food Policy for community events and activities. At least 10 churches, CBOs, schools and private businesses have agreed on 'local food only' policies.

With a second SGP grant, the project has also catalysed the development of a small food processing industry using locally designed, affordable energy efficient equipment, such as smokeless charcoal ovens and solar dryers to support sustainable livelihoods. Only climate

resilient local foods are processed to decrease the reliance on imported foods on the small islands and prevent the loss of indigenous knowledge on biodiversity.

"By supporting local food growth and value-added production, such as taro flour and banana chips, we are building healthy and resilient communities that are self-sufficient and less vulnerable to global social pressures," explained Dr. Lois Engleberger, Executive Director of IFCP. "We are working directly with the Pohnpei Women's Council and their member groups to improve women's health and livelihoods by training them in the energy-efficient food preparation of biodiverse food crops."

IFCP has now moved on to work with the rural communities of Salapwuk and Rohi, and the urban Kapinga village in the centre of Pohnpei. These communities have invested in smokeless ovens and learned about the benefits of local food through the CHEEF initiative.

In 2011, the FAO endorsed the IFCP approach through the publication 'Let's Go Local!—Guidelines for Promoting Pacific Island Food', a step-by-step guide to replicating the IFCP initiative. Both WHO and FAO recognized the transferability of the initiative and IFCP has begun supporting the development of local initiatives in 3 other FSM states and regionally in Palau, Papua New Guinea, Solomon Islands, Marshall Islands and Kiribati. In 2013, IFCP won the prestigious WHO Healthy Islands Recognition Best Practice Award, and has successfully leveraged US\$100,000 to continue funding the project with a competitive grant from the United States Forest Service.

IFCP is an NGO that works to educate the people of Pohnpei about the relationship between diet and health, and to help generate economic benefits and strengthen cultural identity by using local foods.



WORK & MONEY

Development challenges in Asia and the Pacific are as diverse and complex as the region itself. While the region has some of the world's most dynamic economies, it is home to more than half of the world's poorest people. One of the greatest challenges facing the region is to eradicate poverty while achieving more inclusive and sustainable green growth. The region's ecosystems and biodiversity provide the basis for livelihoods and multiple economic sectors – including water supply, agriculture, fisheries, forestry, health and tourism. Managed effectively and sustainably, ecosystems and biodiversity constitute an important driver for sustainable development. Driven by country priorities, UNDP's work aims to bring about a progressive shift to sustainable models of development that enable countries to maintain and restore their natural capital while unlocking their full potential to support human development.



Photo: Midori Paxton

RECONNECTING PEOPLE WITH THE NATURAL WORLD

My sister recently sent me a challenge: describe what you do in no more than seven words. After a bit of thought, I wrote: "Helping people and the environment. Mostly people." Because at the end of the day, our work on biodiversity and ecosystems is really about people.

The ecosystems we live within and the biodiversity that enriches them form the web of life on which every human being depends. This vibrant and amazing web had endured and evolved for millennia, with human beings safely nestled within it. But as this region has developed rapidly, many people have come to forget how completely their lives depend on priceless natural resources.

So much of the development in this region, and the aspirations of its people, seems set on getting as far away from nature as possible. People aspire to concrete houses in urban cities to get away from the wood and dirt of rural life, to cars that seal them away from their surroundings as they travel, and to air conditioning that insulates them from the heat and dust carried by nature's breezes. Many of our young aspire to creamy pale skin as a sign that they no longer toil in the outdoors, as their parents and grandparents did.

All of these aspirations are valid and worthwhile. The desire for a better, more comfortable life for our families has motivated amazing progress and improvements in welfare for all of us.

But in striving to 'get away from nature', people sometimes forget how irreplaceable nature is for all of us. And how essential sustaining ecosystems and biodiversity is to sustaining progress – nature not only provides our life support; it underpins livelihoods of millions of people and economic activity. The richest, most urbanized sophisticate in the high-rises of Singapore, Shanghai or Bangkok depends on nature every bit as much as a poor farmer in India or tribal woman in the highlands of Papua New Guinea. The water we all drink, the air we breathe and the food we eat can all only come from the web of life around us.

The only difference is that increasing sophistication may lead us to overlook this crucial connection. And this lost connection is the real driver for much of our ecosystem and biodiversity loss today.

Without that connection, the web of life simply becomes a trove of resources to be extracted, converted and sold; a source of money for other needs and purposes. What is gained is too easily measured, but what is lost is overlooked.

Re-establishing this connection has been the central purpose underpinning UNDP's environmental work over the last 40 years. All our various approaches and strategies point to this same goal: rebuilding the link between people and their environment. Better development planning systems and policies that guide what governments do; or valuation and financing work to influence how money is spent; or livelihoods, awareness and community engagement initiatives to reinforce the direct connection between people and their ecological home.

As demonstrated in these pages, UNDP supports the governments, economies and societies of this region to use their skills, resources and technical knowledge to protect their natural wealth. Different approaches with the same underlying goal: reflecting the real value of ecosystems and biodiversity to humanity and shifting to sustainable models of development that sustain the region's life support system.

Protecting ecological infrastructure is fundamental to support livelihoods and to meet country development priorities, including food and water security and resilience against shocks. We must remember our unavoidable dependence on the ecosystems around us. Only by restoring this connection will the people of this region protect their ecosystems. And it's only by protecting their ecosystems that the people of the Asia-Pacific will be able to thrive and prosper in the future.



by Joseph D'Cruz
Regional Team Leader, Inclusive Growth, Asia-Pacific

WHY BIODIVERSITY AND ECOSYSTEMS ARE CRUCIAL FOR SUSTAINABLE DEVELOPMENT

Ecosystems and biodiversity provide our food, water, fuel, medicine and shelter. They shield us from natural disasters and reduce our vulnerability to climate change. They create the very air we breathe, recycle nutrients, control pests and generate the soil in which our food is grown. Nature also provides a wealth of untapped genetic resources with potential to be developed into useful products through domestication, development and improvement. Here are just a few examples of the goods and services provided by nature.

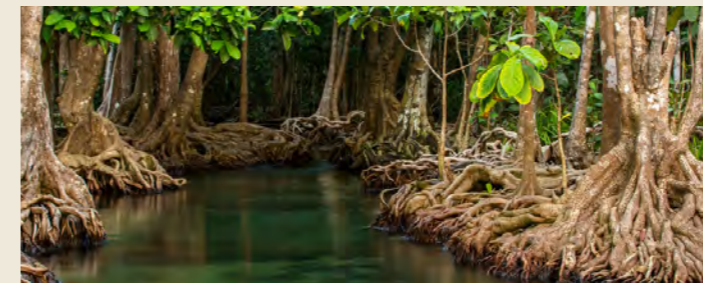


FOOD AND WATER SUPPLY

Food production depends largely on biodiversity and services provided by ecosystems. They regenerate the soil, pollinate food plants and crops, and provide the genetic pool of traits that will be needed to adapt our food systems under changing conditions and keep them resilient to pests, disease and climate change. Ecosystems store, supply and cleanse water.

DID YOU KNOW?

- About 100,000 species of insects, as well as birds and mammals, pollinate more than two-thirds of food plants and are responsible for more than one-third of the world's crop production.
- Globally, fish provides about 3 billion people with almost 20 percent of their intake of animal protein. In areas of Asia Pacific, fish is even more important; accounting for half of total animal protein intake in Bangladesh and some small island developing states, and 50 to 80 percent in countries of the Lower Mekong River Basin.
- The Himalayas are often called the "water towers" of Asia. This collection of snow-clad mountains and glaciers feed rivers, including the Indus, the Ganges, and the Tsangpo-Brahmaputra, which supply water to 40 percent of the planet's population.



PROTECTION

A range of ecosystems act as buffers against natural hazards, providing valuable yet under-utilized assets for climate change adaptation, enhancing natural resilience and reducing the vulnerability of people to floods and the effects of land degradation.

DID YOU KNOW?

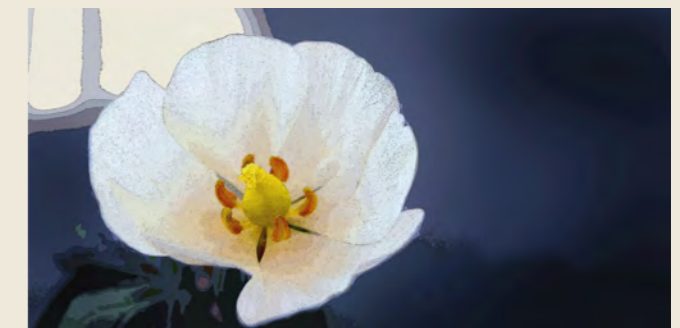
- The largest mangrove forest in the world, the Sundarbans, stretches along the coasts of Bangladesh and India and protects millions of people living along this coastline from the worst extremes of storms and cyclones.
- Planting and protecting nearly 12,000 hectares of mangroves in Viet Nam cost just over US\$1 million. But it has saved annual expenditures on dyke maintenance of well over US\$7 million.

SUPPORT LIVELIHOODS AND ECONOMIC SECTORS

Billions of livelihoods and many economic sectors, including water supply, agriculture, fisheries, forestry, health, nutrition, energy, transport and tourism, depend on biodiversity and ecosystem services.

DID YOU KNOW?

- The world's fisheries provide a source of livelihood and income for millions of people. Commercial capture fisheries had an estimated value of US\$ 274 billion in 2007 and recreational fisheries are worth some US\$ 190 billion to the global economy.
- Ecotourism generates significant employment and is now worth around US\$ 100 billion per year. Many tourism businesses rely fully or partially on biodiversity and ecosystem services. Whale watching alone was estimated to generate US\$ 2.1 billion in 2008, with over 13 million people undertaking the activity in 119 countries.
- Genetic diversity is central to the seed industry. Its 10 top companies had commercial seed sales of US\$ 15 billion in 2006.
- Insects and other animals that carry pollen between crops, especially fruit and vegetables, are estimated to be worth more than US\$ 200 billion annually to the global food economy.



PHARMACIES

80% of people living in rural areas in developing countries rely on traditional plant-based medicines for basic healthcare, according to an estimate by the WHO. But many modern prescription drugs are also derived from substances found in plants, animals and fungi; either directly or by providing biochemical models or templates used to make synthetic compounds.

DID YOU KNOW?

- The alkaloids that cure the cancers Hodgkin's lymphoma and acute childhood leukaemia are derived from the rosy periwinkle, a plant indigenous to Madagascar.
- A drug that made organ transplants viable – cyclosporine – was obtained from an obscure soil fungus found in Norway (*Tolyposcladium inflatum*).
- Marine sponges are rich sources of anti-cancer chemicals – many of these chemicals are tumour suppressants and some have already been approved for treatment of cancer.

Photos: Doungjun Roongruang, Tom Pietrasik/UNDP India, Mazzur/Shutterstock.com, UNDP/India



*Empowered lives.
Resilient nations.*

NATURAL CAPITAL



INSURANCE FOR OUR FUTURE

www.undp.org/biodiversity

Photo: Fadzil VII

THE PRICE OF PARKS - FINANCING PROTECTED AREAS

Karl Marx remarked, "The writer must earn money in order to be able to live and to write, but he must by no means live and write for the purpose of making money." In an oblique way this logic might similarly apply to protected areas. Protected areas need to earn money to support their existence and they must be recognized for their monetary value. But making money can never be the purpose of their existence. If it is all about cash, the whole point of a national park's existence would decay and become meaningless. The value of the park lies in the biodiversity and ecosystem services it provides to support human development.

Underfunding of protected area systems is a universal phenomenon. In Mongolia, for example, the government invests US\$ 2.9 million to develop and manage a vast 27 million hectares of national protected areas. If we are talking dollars and nonsense (no cents!), this works out at US\$ 0.1 per hectare, meaning that one ranger must look after 50,000 hectares alone, even in the relatively well-established Orkhon Valley National Park.

In Myanmar, the government invests US\$ 0.75 million in park management, with less than 600 staff covering 3.2 million hectares. Broken down, this amounts to about US\$ 0.23 per hectare. An ASEAN study sets a benchmark of US\$ 10 to 18 per hectare for parks to be adequately managed. Undervaluation of protected areas is thus one of the main causes for under-investment by governments worldwide. Policy makers are failing to understand that protected areas make vital economic contributions, as national tourism assets, as the providers of watershed services, by maintaining water resources and regulating water flows, and by providing people with basic food and materials.

The value of these invisible and largely unnoticed services is phenomenal. A 2010 Conservation International (CI) study estimated that the value of the natural systems of Qinghai Province, China, is between US\$ 385 billion and US\$ 9 trillion each century. The province, in particular the vast 15 million hectare Sanjiangyuan National Nature Reserve is one of the source areas for the Yellow, Yangtze and Mekong rivers, underpinning water provision for drinking, irrigation and industry supporting over a billion people. Yet, the field operation budget for the park is less than US\$ 100,000 per annum with just a handful of staff.



Photo: Sarah Valenti

Another underlying problem for insufficient financing of protected areas is the fact that park managers or agencies don't know exactly what is required to manage parks to meet conservation and management objectives. This means there is no clear basis for motivating for increased funding.

No request, no results. And definitely no funding.

"Parks staff are typically not business-minded people," says Oyuntulkhur Bandi, the project manager for the GEF financed 'Strengthening the Protected Area Network' project in Mongolia. "They are more focused on conservation work on the ground, but now they also need the skills for ensuring adequate finance for their work. They need to become savvy in showing what parks can do for the society and economy and



Tourists kayaking in Mergui Archipelago, Myanmar. Protected areas make vital economic contributions as national tourism assets. Photo: Ethan Daniels/Shutterstock.com

what they need for the upkeep of the parks."

CONSERVATION IS A SERIOUS BUSINESS AND PAS NEED TO MEAN BUSINESS!

In order to develop capacity for management oriented budgeting, a range of GEF financed projects are supporting development of park business plans. Detailed business plans aim to cost actual biodiversity and the management actions required to manage it, and to clarify how much human and financial resource is needed to achieve the park's intended outcomes. It also looks at the revenue generation potential of protected areas to gauge how the necessary costs can be met for basic and optimal management scenarios.

"The spreadsheet we used was fantastic. All protected area information, such as functions and programme areas, work responsibilities, staff information and financial data, were integrated," explains Gou Xiaocheng, a manager at the Taohe National Nature Reserve. "It is designed to guide staff in costing different essential management activities. For example, how much will it cost to conduct an adequate level of law enforcement patrol? How many days of rangers' time, how much for petrol, vehicle maintenance and over time allowances? And so on. The spreadsheet specifies the required staff, operational resources and one-off investment costs needed to complete work programmes at the current, basic and optimal scenarios. It identifies funding gaps and revenue opportunities, and finally discusses the economic benefits of the protected area."

There are many different ways for filling financing gaps. The Financing Plan for the Mongolia's Protected Area system lists the following as having high potential for the country to achieve financial sustainability: better capturing of revenue and revenue retention, introduction of land use fees, introduction of tourism and other concession systems, and mining biodiversity off-sets. The Protected Area Administration

Department is currently looking into different options.

Various new financing mechanisms for protected areas have been successfully established through GEF financed projects around Asia. The 'Upper Mustang Biodiversity Conservation Project' in Nepal, which ended in 2007, has succeeded in establishing an agreement with the Government to plough back 60 percent of Upper Mustang tourism entry fees into the King Mahendra Trust for Nature Conservation for use on conservation-linked community development activities over the long-term.

With support of the GEF-financed 'Biodiversity Management in the Coastal Area of China's South Sea' project, which was completed in 2012, sustainable financing mechanisms have been developed to support the operational recurrent costs of the Sanya National Coral Reef Nature Reserve in Hainan Province, China. Based on the assessment of operating costs, a financing pattern was proposed which relies on government funds as a major source of funds, complemented by sea use fees (for coral reef use by tourism enterprises) and public donations. Sanya district's Development & Reform Commission and Finance Bureau have cooperated in making a proposal to the authorities for using sea use fees collected annually to bridge the shortfall for the marine park operation and management costs. A proportion of the sea use fees is earmarked to support marine park operational costs.

"By using the business planning template, we learned a brand new way of thinking about our work," says Niu Yunxia, an officer at the Li-anhuashan National Nature Reserve, in Gansu Province of China, who was trained under the Strengthening Gansu Protected Area project. The new way of thinking – management needs based costing – also encourages park managers to focus on objectives of the parks they are entrusted to look after. They must make sure that there will be enough money for safeguarding the biodiversity values they protect.



Empowered lives.
Resilient nations.

IF OUR GRASSLANDS DRY UP
AND WE MOVE TO THE CITY
IS THAT DEVELOPMENT?

IF IT'S NOT SUSTAINABLE, IT'S NOT DEVELOPMENT.

www.undp.org/environmentandenergy

GROWING A SOCIALLY RESPONSIBLE BIODIVERSITY -BASED ECONOMY IN THAILAND

In Thailand, the country's growing population and rapid economic development is putting increasing pressure on biodiversity both inside and outside protected areas. To promote biodiversity-responsible business, UNDP is working with the Biodiversity-based Economy Development Office (BEDO), a public organization under the Government of Thailand mandated to promote biodiversity conservation in production landscapes, improve local community knowledge of best practices for sustainable production, and enhance biodiversity-based economic development.

The UNDP supported GEF financed 'BEDO' project began in 2013 and aims to help BEDO to integrate biodiversity conservation into production and marketing of agricultural, forestry and fishery business, in order to create community incentives to conserve and enhance biodiversity while generating income. This is achieved by supporting the development of biodiversity-friendly businesses, piloting community-based social enterprises, and mainstreaming biodiversity business into the supply chains of high value consumer markets.

Though only in its early stages of implementation, the project has already set up a "BioEconomy Academy" (BEA), an initiative for developing and supporting biodiversity business in Thailand, working with BEDO and law firm Rouse. The Academy provides training and organises workshops for local communities throughout Thailand to promote the use of intellectual property and legal tools to help protect the country's biodiversity and traditional knowledge.

"We are delighted to be working through this project to launch the

BioEconomy Academy, which resonates strongly with BEDO's vision for a thriving and sustainable bio-economy underpinned by empowered local communities," says Wutthipong Sommanas, acting Executive Director of BEDO.

Housed within the Academy is a permanent exhibition of Thai indigenous products and traditional knowledge and a biodiversity law library. It is hoped that these and the project's wider training work will help raise awareness of the value of biodiversity and how community enterprises may protect it.

Fabrice Mattei, executive and Thailand country manager at law firm Rouse, who are partnering with the project on the Academy, adds: "Through the BioEconomy Academy, we plan to empower Thai businesses and local communities by helping them to understand and exercise their Intellectual Property rights." The project is also establishing a Bio-economy Forum to enable policy dialogues and raise awareness among the general public.

The project, working through BEDO and other partners, has also designed and developed a "Bio-responsible product label" to strengthen community-based social enterprises. This certification label will be awarded to products that meet the certification's standards according to how eco-friendly they are, whether they use local ingredients and other criteria. The project has consulted with local communities at four pilot sites – Ranong, Phang Nga, Kanjanaburi and Prachinburi – on biodiversity-friendly product development for community based social enterprises and plans to launch pilot products in 2014.



The BEDO project has consulted with local communities on biodiversity-friendly product development for community based social enterprises. Some of the potential products identified for development under a "bio-responsible product label" include shrimp paste, eco-tourism and charcoal. Photo: KobchaiMa/Shutterstock.com

THE IMPORTANCE OF NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS (NBSAPS) AND BIODIVERSITY FINANCING

UNDP, through GEF financed enabling activities, has been providing support to nations to update their National Biodiversity Strategy and Action Plans (known as NBSAPs). Globally, 42 countries are supported with 6 of those in the Asia and Pacific region – Fiji, Indonesia, Malaysia, Philippines, Sri Lanka and Viet Nam. Countries are obliged under the Convention of Biological Diversity (CBD) to align their NBSAP with the global Aichi Biodiversity Targets, which must be achieved by 2020.

UNDP support entails not simply updating NBSAP documents... A "New Generation of NBSAP" is the slogan of the UNDP support.

The aim is to ensure that NBSAPs integrate the value of biodiversity into national and local development and poverty reduction strategies; provide a concrete plan for mainstreaming biodiversity into development and sector planning; develop a plan for creating incentives and removing harmful subsidies; establish a clear plan for mobilising the necessary financial resources for effective implementation; and incorporate challenges and opportunities linked to ecosystem-based adaptation and resilience.

To support countries around the world working on the NBSAPs, share knowledge and experiences and provide peer review services, an NBSAP Forum has been established (<http://nbsapforum.net>) in close collaboration with the UNEP and the CBD Secretariat.

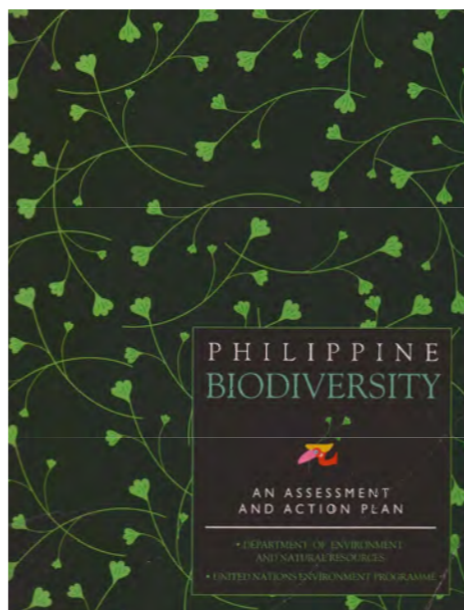
Linked to the NBSAP programme, the European Union, Switzerland and Germany have funded a Global Biodiversity Financing project, known as BIOFIN, including Malaysia, Indonesia and the Philippines as several of the initial 12 pilot countries. The global biodiversity financing workbook was developed under this project as the tool for the participating countries to assess policy and practice drivers of biodiversity and ecosystem change; assess current investment in biodiversity and the costs of implementing NBSAPs; and to develop a resource mobilisation plan.

The BIOFIN project focuses on direct engagement with Ministries of Finance and national development planning agencies. By bringing these critical actors to discussions on biodiversity management and financing, the project assists countries in transforming national biodiversity finance, enabling them to implement their NBSAP and achieve the Aichi Targets.

"NBSAPs are more than a set of plans," says Jamison Ervin, the UNDP senior adviser for the NBSAPs project. "They are pathways to national and global sustainable development. BIOFIN helps to secure the financing to achieve this."



"NBSAPs are more than a set of plans. They are pathways to national and global sustainable development. BIOFIN helps to secure the financing to achieve this." Jamison Ervin, the UNDP senior adviser for the NBSAPs project



Top left: NBSAP Workshop, Bhutan. Photo: National Biodiversity Centre, Ministry of Agriculture and Forests, Royal Government of Bhutan
Others: Delegates from Malaysia, Indonesia and the Philippines at BIOFIN Technical Workshop in Bangkok, 2013.
Photos: Jamison Ervin



BIODIVERSITY IS THE BEDROCK OF THE MALDIVIAN ECONOMY

Photo: R McIntyre/Shutterstock.com

In the Maldives, rapid social and economic change has been outpacing institutional capacities to conserve biodiversity. Home to about 5 percent of the world's coral reefs, which equates to 250 species of coral teeming with over 1000 species of fish, the Maldives is rich in biodiversity. This biodiversity forms the bedrock of the Maldivian economy.

An economic valuation study, commissioned by the UNDP supported GEF financed Atoll Ecosystem Conservation (AEC) project, has recently determined that the biodiversity of atoll ecosystems underpins at least 71 percent of national employment, 89 percent of Gross Domestic Product (GDP) and 98 percent of exports in the Maldives. This study was launched by the President and drew in the support of diverse sectors to protect the biodiversity that drives the national economy.

The AEC project was initiated in 2003 by the Government of the Maldives in collaboration

with UNDP and other partners. It was designed to demonstrate a collaborative approach to biodiversity management and sustainable development in Baa Atoll that could serve as a model for other atolls in the Maldives, building on the existing baseline of national and local institutions, laws and policies. With the project's support, biodiversity conservation priorities were mainstreamed into the Baa Atoll Development Plan, Island Development Plans and land-use plans, which guide future development.

The project supported the establishment of Baa Atoll as a UNESCO Biosphere Reserve and World Heritage Site (WHS) around ten core protected areas. Baa Atoll's resorts are using the UNESCO Biosphere and WHS brand to strengthen marketing and to drive better water, waste and energy management, and to inform biodiversity-friendly practices – such as, working with hotels to buy sustainably and locally caught fish directly from local fishers to serve to tourists.

With grants provided through project support, local people on the islands of Baa Atoll have set up their own small businesses making and selling traditional crafts, such as brewing herbal medicines and rope making from dried coconut husks, which has helped revive traditions and provide income.

The Baa Atoll Conservation Fund, the first of its kind in the Maldives, is expected to sustain this work after the project's close in 2012. It was developed through a Public Private Partnership with the tourism sector, and visitor permits now contribute to top up the Fund and pay for rangers to manage the Reserve. Eight resorts, dive centres and other tourism companies have signed up to support the rolling Fund. Going forward, it will support conservation, livelihoods and outreach work, including the implementation of management plans for the protected areas. The Fund is expected to generate between US\$200-300,000 per annum within two years.



“IF WE DON'T PROTECT THE ENVIRONMENT THAT SURROUNDS US, WHAT IS LEFT TO SAVE US?”
 ABDUL RAZZAQ MOHAMED,
 RETIRED CHIEF OF BAA ATOLL



Photos: Mike Moser

POVERTY ENVIRONMENT INITIATIVE: GREENING INVESTMENTS IN LAO PDR

The Poverty-Environment Initiative (PEI) of the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) is a global programme that supports country-led efforts to achieve a greener and more inclusive development path. In Asia-Pacific, PEI has programmes under way in five countries and provides technical support to four others. The programme has supported Ministries of Planning and Local Government to integrate poverty, environment and climate issues into their planning processes and to work more closely with Ministries of Environment.

In Lao Peoples' Democratic Republic (PDR), PEI works with the government to improve the management and quality of investments, so that they take account of environmental and social considerations. The economy is driven by high inflows of foreign direct investment mainly into natural resource sectors. Natural resource-based growth is putting pressures on traditional livelihoods and valuable natural assets, including the country's forests and

biodiversity. PEI works with the government to develop and implement tools, mechanisms and strategies designed to increase the proportion of quality investments in the country, those that minimize impact on the environment and maximize local benefit. The overall goal of this work is to help achieve more inclusive and sustainable green growth.

For example, a cost benefit analysis conducted by PEI of four different land use practices examined the social and environmental implications of on-going rapid changes in land use from traditional practices to commercial agriculture. The results of the study will support development of guidance on Environmental Impact Assessment for the Agriculture and Forestry Sector to conduct environmental and social impact assessments required under national legislation. In collaboration with the government, PEI is also developing a number of tools and standards, including model contracts for concessions and environmental and social obligations for commercial agriculture and forestry, which should support better ecosystem and biodiversity management and social protection once implemented.



Photo: Poverty Environment Initiative Lao PDR / UNDP Lao PDR

UN-REDD PROGRAMME: CALCULATING THE REAL ECONOMIC VALUE OF FORESTS IN MONGOLIA

Few people deny the value of housing, roads, energy, water treatment plants and other built infrastructure to national economies and human wellbeing. But the goods and services that nature's infrastructure provides are often less well understood and markets generally fail to account for their real value, or the real costs of losing them.

A study conducted by UNDP through the UN-REDD Programme for the Government of Mongolia highlights the hidden value of Mongolia's forests to the country's economy. This work – funded by the UN-REDD programme, which is a United Nations (UN) collaborative programme jointly implemented by UNDP, FAO and UNEP – formed part of Targeted Support requested by the Government of Mongolia to assist the country to prepare for the implementation of REDD+ activities, including reducing deforestation and degradation, restoring, conserving and sustainably managing forests.

The study found that forests are worth around US\$ 310 million (MNT 431 billion) a year to Mongolia's economy and people. Unfortunately, as is the case in many other countries, most of these important values remain "invisible" in official development statistics because the monetary worth of the environment still tends to be calculated just in terms of the raw materials and physical products that it yields. The value revealed through the study is many times that recorded in official GDP figures. The recorded GDP share of the forest sector is currently recorded at less than 0.5 percent; at about USD 40 million or MNT 70 billion. By explicitly considering the multiple services provided by forests – in terms of timber and fuelwood, wild plants and animals, pasture, tourism, watershed protection and climate change mitigation – the study helps to paint a more complete picture of the real value of Mongolia's forest sector.

For example, just the net value-added to rural households from fuelwood use, wild foods and other non-timber forest products and forest grazing is equivalent to more than 12.5 percent of recorded per capita GDP. Conserving the forests that lie to the north west of Ulaanbaatar, Mongolia's capital city is worth around MNT 60 billion a year or US\$ 42.3 million a year to downstream water users. Forest based recreation supports up to 6,000 jobs and generates more than MNT 41 billion or US\$ 34.6 million in visitor spending, sales and wage earnings for the tourism sector.

Furthermore, investing in sustainable forest management brings high development returns. The government earns fiscal revenues of almost MNT 3 for every MNT 1 of public budget allocated to forests, and each MNT 1 of government and donor funding helps to leverage broader benefits to the Mongolian economy worth just under MNT 30.

Another key message of the study is that investment in sustainable forest management remains very low, as compared to the economic importance of the sector. Opportunities remain to further enhance the economic value-added of forest goods and services. Stakeholder meetings were convened with the Ministry of Environment and Green Development (MEGD) to discuss these findings. The challenge, now, is to set in place the policies, markets and investments that can help to mainstream the forest sector into sector agendas and budgets, and help it better achieve its potential as a key development sector in Mongolia. The drive for this initiative forms part of the Government of Mongolia's commitment to transitioning to a green economy, as set out in the National Green Development Policy of 2014 – a landmark piece of legislation that responds to the challenges posed by climate change as well as the range of new economic, social and environmental opportunities it creates.

Photo: Seng Kit/Shutterstock.com



Photo: Azrie Aliamat, ITBC



Photo: Kishneth Palaniveloo, ITBC



Photo: Biodiversity Conservation Agency/Ministry of Natural Resources and Environment of the Socialist Republic of Viet Nam



Photo: Biodiversity Conservation Agency/Ministry of Natural Resources and Environment of the Socialist Republic of Viet Nam

OPPOSITE PAGE: Researcher examining a Lichen in Kinabalu Park. Nature provides many compounds that could form the basis of new pharmaceuticals or other useful products. With UNDP support and GEF finance, Malaysia is developing a full national framework on Access and Benefit Sharing, including a financial mechanism to reinvest funds from ABS agreements back into conservation.

ABOVE LEFT: Research diver taking samples of soft corals at Mantanani Island, Malaysia. Compounds chemically extracted from soft corals have been shown to have anti-inflammatory and anti-cancer properties.

ABOVE RIGHT: A Dao woman harvests herbs in Ta Phin commune, Sapa district, Lao Cai Province, Viet Nam. The Dao people are famous for their traditional medicines and restorative herbal baths made from medicinal plants. A UNDP supported project being initiated in Viet Nam aims to strengthen capacities for ABS and establish a system for protecting valuable traditional knowledge.

LEFT: Dao spa products made using traditional herbs from Viet Nam.

FAIR AND EQUITABLE FRAMEWORKS FOR ACCESS AND BENEFIT SHARING

The natural world harbours vast potential biological wealth for discovery and human development. A myriad of industries – pharmaceutical, biotechnology, seed, crop protection, horticulture, cosmetics, fragrance and flavour, botanicals and food and beverage sectors – use genetic resources from plants, animals and micro-organisms for research and development of commercial products that generate substantial benefits. In 2006, the biotechnology industry had a market value of US\$ 70 billion.

But the custodians or providers of genetic resources – the countries, local communities' and indigenous peoples' territories that house most of the world's biodiversity – are often not business oriented. They have often not been compensated for providing or safeguarding these resources.

In 2010, Parties to the Convention on Biological Diversity agreed to the 'Nagoya Protocol on Access and Benefit-Sharing', making the access and benefit sharing from the use of genetic resources a matter of international law. This landmark international treaty aims to achieve fair and equitable sharing of benefits arising from the use of genetic resources, so that both the providers and users benefit from royalties, research results and other gains from their commercialisation. The agreement also aims to provide that a portion of the benefits will be invested in conservation, to preserve the resources and others yet undiscovered.

The UNDP supported GEF financed 'Access and Benefit Sharing' (ABS) projects assist countries to implement the Nagoya Protocol by building the capacities needed to access, derive and equitably share benefits from the nature-based products that they house. By establishing standardised conditions for access to genetic resources and helping to ensure benefit sharing with the country of their origin, this work aims to create greater legal certainty and transparency for both providers and users of genetic resources.

UNDP is currently supporting Malaysia and Fiji to implement projects in this field. In Malaysia, UNDP work began in 2010 with a project funded through UNDP 'Target Resource Assignment from the Core' (so-called TRAC funds) and the Government of Malaysia, supporting the development of a draft ABS bill. With GEF finance, a full national regulatory and institutional framework on ABS is being developed, including a national law and spurring regulations and financial mechanism to reinvest funds from ABS agreements back into biodiversity conservation. The project also includes building national institutional and stakeholder capacity for implementation of ABS through training programmes, creation of an information gateway for knowledge sharing on ABS, and awareness raising with researchers, industry, indigenous and local communities.

In addition to fulfilling the provisions of the Nagoya protocol, Malaysia is using this project to advance pilot projects on bio-prospecting with fair and equitable benefit sharing provisions, Prior Informed Consent processes (PIC) with indigenous and local communities implemented in accordance with community protocols, and the dissemination of best practices on ABS agreements and PIC processes at regional level.

"This project is timely as the government promotes 'bio-economy' under the New Economic Model (NEM), 2010. The NEM highlights the potential of biodiversity to catalyse the transformation of Malaysia into a high income developed nation," says Nagulendran Kangayatkarasu, the former Deputy Undersecretary at the Ministry of Natural Resources and Environment and an ABS specialist. "What we mustn't forget, though, is to ensure that benefits arising from use of genetic resources also contribute directly to biodiversity conservation in this megadiverse country. This constitutes the very basis of our bio-economy."

In Fiji, a UNDP-supported ABS project, with finance from GEF and the Nagoya Protocol Implementation Fund, will work with the govern-

ment and multiple partners on the discovery and development of nature-based products. Through partnership with the Centre for Drug Discovery and Conservation at the University of the South Pacific and other universities, and training and investment in state of the art technology, the project will strengthen bio-prospecting capacity to identify new compounds from nature. Efforts will focus on Fiji's rich marine and coral reef ecosystems – and screening the seaweed, algae, sponges and other marine organisms that are a rich source of potentially useful compounds (including those that may be used to treat cancer, malaria and tuberculosis) for the pharmaceutical and agrochemical industries.

The project aims to make ABS operational by linking bio-prospecting with marine conservation actions in conjunction with local communities. The project aims to strengthen incentives for conservation at both community and government levels. The project will assist the government to develop and clarify relevant roles, procedures and administrative systems for ABS agreement negotiations between the government, communities and relevant institutions, including roles and responsibilities of the government institutions at the sub-national level. The project will strengthen overall national capacities on: negotiations; instituting engagement processes; advertising bio-prospecting initiatives; satisfying the customary requirements for development; and, monitoring of benefit-sharing and bio-prospecting projects.

UNDP supported ABS projects are also being initiated in Bhutan and the Cook Islands with finance from the Nagoya Protocol Implementation Fund, and in China and Viet Nam with GEF finance. Ultimately, these investments in implementing the Nagoya Protocol on ABS nationally should mean both providers and users of genetic resources are able to fairly and equitably share in nature's bounty.

SUPPORTING SUSTAINABLE, ALTERNATIVE AND BIODIVERSITY-FRIENDLY LIVELIHOODS

Ecosystem and biodiversity loss is a challenge for us all, but it is a particular challenge for the world's poor. Many of the 1.2 billion people living in severe poverty, on less than US\$ 1 a day, depend directly on nature for food, clean water, fuel, medicine, shelter, and reduced vulnerability to climate change and natural disasters. Dependent on ecosystem goods and services for their livelihoods and subsistence, the poor stand to suffer the most from ecosystem degradation. UNDP supports countries to stimulate job creation and safeguard biodiversity by promoting nature-based tourism initiatives, sustainable harvesting livelihoods and 'biodiversity-friendly' business that generate income for local communities.



In India, UNDP, with financing from the GEF, is supporting local communities to develop sustainable agricultural processes and alternative livelihoods. Atula's family, along with the 4,000 other households in the villages of the northeastern state of Nagaland, have witnessed a 20% increase in their average income. Photo: Zubeni Lotha/UNDP India

FROM TIMBER TO TOURISTS: COMMUNITY TRANSFORMATION ON SAMAR ISLAND

Eugene Igdalino knew he was breaking the law and risking arrest every time he loaded his torpedo boat with timber cut from what is now the 450,000 hectare Samar Island Nature Park (SINP), the largest terrestrial protected area in the Philippines. His motives, he explains, were simple; with few other livelihood options available, selling wood to local sawmills was the "only way, the easiest way, to get money."

Eugene still plies the river in his torpedo boat, but his cargo is now legal thanks to the Samar Island Biodiversity Project (SIBP) supported by UNDP and financed by the GEF. Working with the Department of Environment and Natural Resources (DENR), the project has spent the last decade working to ensure the sustainable establishment of the park and the protection of the country's biggest contiguous expanse of old-growth forest. In addition to lobbying for official protected status for the park both at the national and local government level, SIBP (mindful of the importance of sustaining local peoples livelihoods) has adopted the strategy of fostering eco-tourism development.

Eugene is one of many beneficiaries of a project that has seen the establishment of home stay businesses, the creation of trails, the construction of tourist facilities and park staff infrastructure, the development of educational and interpretive materials, and a range of promotional activities designed to put Samar's rich and unique biodiversity assets firmly on the tourist map.

River boat rides are popular with tourists in the Philippines. The Samar Island Biodiversity Project helped local people like Eugene move from illegal logging to alternative tourism-based livelihoods, such as the torpedo boat adventure ride.



Photo: Peter Sobolev/Shutterstock.com

Some locals now guide visitors to attractions such as caves and waterfalls. Eugene loads his boat with tourists and couldn't be happier about it; his income is steady, higher than his timber poaching days and he has become aware of the importance of the forests and the dangers of environmental degradation.

"The floods last year were terrible," Eugene recalls. "SIBP people helped in the rescue – they lent us kayaks and bancas (small dugout boats). Later they explained that the floods were caused by forest destruction and that we needed to stop cutting down trees because without trees, there is nothing to stop water from coming down the mountains."

For Eugene, timber is still integral to his livelihood but with the intervention of the SIBP, he is acutely aware that it is worth much more to him standing than cut. "I am proud now that I help protect the forest and the river," says Eugene. Although three Provincial ordinances have been passed protecting the park and banning logging and mining within its confines, it is this sense of new found local pride, more than any policies or regulations, that gives real hope to the possibility that the magnificent old-growth forests of Samar will be around for generations to come.

The Philippine eagle (*Pithecophaga jefferyi*) is one of the largest and most threatened eagles in the world, listed as Critically Endangered on the IUCN Red List of Threatened Species. Samar Island is one of just four Philippine islands from which the raptor is currently documented (Mindanao, Luzon, Leyte, and Samar).



Photo: Edwin Verin/Shutterstock.com



Woman selling food on Tonle Sap Lake
Photo: Artur Bogacki / Shutterstock.com



The people of Tonle Sap Lake live in stilt houses and make their living from the lake's waters and floating forests.
Photo: Stephane Jaquetmet/Shutterstock.com

MICROCREDIT FOR SELF HELP GROUPS LEADS TO SUSTAINABLE LIVELIHOODS AND GREATER SECURITY IN TONLE SAP LAKE, CAMBODIA

A fisherman glides through the water in his canoe against a backdrop of emerald green trees that rise from the water behind him. Every spring, the monsoon rains deluge the Tonle Sap Lake – a tributary of the lower Mekong River – creating this world of submerged forests and grasslands, where water birds fly overhead, houses stand above the water and schools of fish swim below. Covering between 250,000 hectares in the dry season and more 1 million hectares during the annual flood, this is the largest freshwater lake in Southeast Asia. It supports an incredible array of animals and plants and is an important nursery for hundreds of migratory fish species that swim here to spawn. The people here live in stilt houses and make their living from the lake's waters and floating forests.

The lake and a significant part of the flood plain has been declared a UNESCO Biosphere Reserve, but it faces multiple human pressures from slash-and-burn agriculture, encroachment of farming onto habitats in the flooded forest areas, unsustainable firewood collection, poaching and overfishing.

A UNDP supported initiative "Sustainable Livelihoods Support to the Core Areas of the Tonle Sap Biosphere Reserve" has worked with local people to help reduce their impact on this complex ecosystem. The programme aimed to help residents develop new, more sustainable

alternative incomes and introduced affordable technologies to help them use natural resources more efficiently.

Working through UN Volunteers (known as UNVs), the programme helped residents to establish self-help groups. The Self Help groups started with a handful of families who were given access to savings and loan schemes that enabled them to adopt alternative sustainable livelihoods, such as household fish farming, livestock rearing, and making handicrafts from weeds growing naturally in the lake. More than 500 families became involved in 25 self-help groups, each supported by a UNV.

This support enabled members to avoid expensive commercial moneylenders and manage the loans themselves, greatly reducing costs, and resulting in substantial profits or savings and reinvestment back into the group funds.

Some of the groups increased their initial investment funds four-fold and at least 15 have become totally self-sustaining. Total group savings increased to over Rial 400 million (US\$ 50,000+) and almost half of all group members

increased their incomes by US\$ 40 to US\$ 150 per month. The majority of members were women, who are often the keepers of the family finances. The project developed the leadership capacities of the members and established a platform for other donors to replicate the success in other areas of the Tonle Sap.

The self help groups also provided useful starting points for spreading awareness of eco-friendly practices. Fishing and fish farming have been the mainstays of life on Tonle Sap for centuries, but local shops had been selling unsuitable chemicals to treat fish diseases. Not only did the toxins remain in the lake after use, harming biodiversity, but they were also harmful to human health.

People from the self help groups were informed of the dangers and also given classes to enhance their existing fishing knowledge. The project team and Ministry of Education, Youth and Sports also succeeded in introducing the first environmental education curriculum, training programme and eco-clubs in Cambodia's schools. Through these initiatives, 255 teachers have been trained and curriculums developed to increase environmental awareness.

Villagers were trained in efficient techniques for mushroom farming, and 36 families set up floating vegetable gardens. Both initiatives, using technical advice from the UNVs and local agricultural schools, aimed to reduce the impact of overfishing on the local environment. Cookstoves distributed via the self-help groups used up to 40 percent less wood than the traditional variety, last longer and are safer. Ecotourism was also piloted in village of Peak Kantel, in conjunction with Osmose, a local NGO. Local families were trained in hospitality skills and given equipment to set up. Around 100 paying visitors so far to the ecotourism site have boosted the village's income.

This initiative was undertaken as part of the "Tonle Sap Conservation Project" implemented between 2004 and 2011, a collaboration between UNDP, GEF, UNDP Cambodia, the Wildlife Conservation Society and UN Volunteers /Japan Trust Fund and the Royal Government of Cambodia through the Cambodia National Mekong Committee.

PROTECTING THE MARKHOR: CONSERVATION AND SUSTAINABLE LIVELIHOODS IN PAKISTAN'S NORTHERN HIGHLANDS

Livelihood options for people living in the remote and rugged terrain of Pakistan's northern highlands are very limited. Little of the land among these steep peaks and valleys is arable and poverty is widespread. UNDP, in collaboration with partners including financing from GEF, has supported two interventions strategically designed to improve local livelihoods while conserving the region's rich biodiversity and natural resources.

The region is a storehouse of biodiversity, harbouring the majority of Pakistan's remaining natural forest and several threatened species, including the lynx and Pakistan's national animal, the markhor, one of the world's largest and most magnificent species of wild goat. But illegal hunting by local villagers for food and by outsiders for sport (without permits), along with habitat degradation, was placing heavy pressure on the local populations of markhor.

UNDP in collaboration with GEF, IUCN, WWF, the Government of Pakistan and other local partners, began working with village and valley communities of these highlands in 1995, first through a pilot project and then through the "Mountain Areas Conservancy" project.

These projects identified an opportunity to incentivise local people to conserve the markhor by developing a carefully designed, monitored and controlled sustainable trophy hunting programme. Working in the Khyber Pakhtunkhwa and Gilgit-Baltistan regions, the project helped communities to step up control of illegal hunting, conduct surveys to monitor markhor populations, and implement a quota system whereby only a handful of permits to hunt individual animals were sold or auctioned each year for a huge premium. Each permit fetched up to a huge US\$ 56,000 per individual animal.

By auctioning a limited number of permits on the lucrative tourist market, the scheme made the markhor worth much more to the communities as a species conserved for this purpose than they could make through hunting, even many, animals for food. In return, the communities agreed to cease hunting of animals themselves and instead became "custodians" of the species, reducing overall pressure on the population. The income and community benefits derived from sale of the permits provided a direct incentive for communities to protect local markhor populations and their natural habitats.

The project developed stringent trophy hunting procedures and established a transparent and equitable process for sharing quota allocations of trophy permits and revenue generated by their sale among valley communities. Only older male markhor were selected for trophy hunting to protect the breeding population of younger animals and females, allowing population growth. 80 percent of the profits from the sale of the permits were allocated to communities and 20 percent to local government. Community profits were ploughed into community development, such as building water channels, building and repairing schools and community centres, and community support services. A proportion of the community share was invested into the Valley Conservation Funds established by the project, to be used for habitat conservation.

To coordinate conservation work, the project mobilized communities to form Valley Conservancy Committees (VCCs), with representation from the clans living in a given valley. With project support, they developed Valley and Conservancy Management Plans, pasture and forest management, species recovery and grazing regulations. Collectively these activi-



Markhor (*Capra falconeri*)
Photo: Nataly Karol/Shutterstock.com

ties improved relations between communities and government agencies, and raised awareness of the value of natural resources and the benefits of managing them sustainably. As a result, communities decided to rest high country pastures, reduce livestock numbers and conserve the habitat of wild species. Due to its success, the VCC and conservancy approach was also adopted in other valleys outside the project's target sites. The projects strengthened community capacity for conservation and successfully demonstrated that local livelihoods and incomes could be improved

through the sustainable use and conservation of wild species.

Pakistan will now build on the achievements of this work, with the "Mountain and Market Biodiversity Business" project. As markhor were not evenly distributed among all conservancies, this project specifically focuses on developing community-based biodiversity businesses based on sustainable use of wild species that are widely available across all conservancies to ensure that all communities are able to benefit from sustainable use and conservation. The pro-

ject will support local communities to develop and sell natural products from wild non-timber products found in the forest, such as cumin seed, honey, medicinal herbs and mushrooms. Currently, there is little incentive to conserve these heritage species.

The project will support local communities to obtain voluntary certification of their products based on their adoption of sustainable harvesting regimes and contribution to conservation. The premium they earn from selling these certified 'biodiversity-friendly' natural products

is expected to create new incentives for conservation. The project will especially benefit poorer and more marginal groups, including nomadic pastoralists, women and children, who are the main collectors of these wild non-timber forest species. The project aims to stimulate market demand for certified natural products, so that other communities across the conservancies can benefit from community biodiversity enterprise development through the sustainable harvesting of these wild non-timber forest products.



Wild apricot (*Prunus armeniaca*) kernels
Photos: GEF SGP India



The entrepreneurs

A DISTINCTLY FRUITFUL OUTCOME!



The products

PROFITING FROM WILD APRICOTS – ENTREPRENEURIAL WOMEN CAPITALIZE ON SMALL GRANTS

Here among the soaring Himalayan peaks and plunging valleys of northern India's Kullu district the figures speak for themselves: 65 newly established women's groups, 1,200 members, a communal bank balance of US\$ 15,600. All of this has been fuelled by a grant from the UNDP implemented GEF-Small Grants Programme (SGP), a community-based organisation named Jagriti, and wild apricots.

Ironically, the success of this initiative was prompted by another fruit – the apple. Life in the remote mountain villages is hard. Many are without access roads and are only reachable by paths. One third of people living in Kullu's Gadsa Valley have incomes below the national poverty line and lack of job opportunities force many men to leave the area, meaning that women are faced with the burden of water, firewood and fodder collection, grazing the cattle, raising the children and tending to the elderly.

Eventually, apple farming arrived and rapidly the orchards, owned by men for historical and cultural reasons, sprawled further and higher up the slopes. Native vegetation and biodiversity fell to the axe and Gadsa's face changed. Alarmed by the danger of ecological catastrophe

and social upheaval (people here, particularly the women, have traditionally relied on natural forests for their livelihoods and medicines), Jagriti began to organise women's groups and train members for self help.

One tree significantly threatened by clearance was the wild apricot. This species, whose fruits yield valuable oils, became a keystone of Jagriti's conservation and financial empowerment strategy. With financial and logistical support from UNDP and GEF SGP, Jagriti trained women, mostly from marginalised 'Scheduled Castes', in techniques designed to maximise profits from wild apricots.

They learned about collecting and grading seeds, drying them, using oil expellers, and packaging and selling their products – par-

ticularly aromatic oils, which are increasingly popular in overseas markets. They also planted wild apricots and walnuts, and were introduced to accounting practices, record keeping, group management skills, and issues regarding deforestation, biodiversity conservation and sustainable forest management.

Equipment was procured including a machine to de-shell apricot kernels, which raised the efficiency to 50 kilogrammes per person per day from just three kilogrammes prior to the machine's installation. It also reduced the drudgery involved in the shelling process.

By 2008, nearly 20,000 kilogrammes of kernels yielding 400 litres of oil were being collected in a season yielding an income of US\$ 8,600. By 2010 yield was up, to 1,200 litres and US\$

17,500. The price of one litre of oil, originally US\$ 2 has now risen to US\$ 12. Besides the oils, women started marketing four species of aramant, apple chips, beeswax, rosehip tea and other nature-based products.

Local products are now sold under the umbrella name of 'Mountain Bounties' and with the co-operation of an organic herbal supply company, Herbal Partners, are being certified organic and ethical thereby increasing their value.



HEALTH & SECURITY

Biodiversity and ecosystems represent the Earth's life-support system. Through the goods and services they supply – food, water, medicine, clean air, shelter – they sustain the health and security of our planet, and a growing human population. In particular, healthy ecosystems provide security and a safety net for the poorest and most vulnerable. They provide physical protection from natural disasters, mitigate climate change and increase the resilience of societies to the negative impacts of climate change and shocks. These functions are particularly important in the Asia Pacific region, which has suffered the most casualties from natural disasters during the last decade and faces continuous threats from climate change. UNDP works with countries to increase the socio-ecological resilience of their ecosystems and the people that depend on them.

ECOSYSTEM HEALTH AND HUMAN SECURITY GO HAND IN HAND



Boats on the sand of the empty Hamouns
Photos: Gary Lewis

“Angels will kiss the hands of those who help us,” the man said. The face behind the handshake was grizzled and weathered. His tanned, leathery skin spoke to years of harsh living. The fisherman’s eyes welled with suppressed tears. He yearned, like many in this area, for a time when his life was one of plenty. Lakes brimmed with water, he told me. And fish. His children were happy, splashed about, and life was good.

I was so moved by his story that I impolitely forgot to ask his name. He wanted me to listen and then tell the world about the desperate conditions in Iran’s harshest, poorest region: the Hamoun wetlands of Sistan.

“Wetlands” is really not the right word, for these are parched lands. There is little gainful employment, and more than half the residents get by on welfare delivered through the Imam Khomeini Relief Foundation (IKRF), a parastatal organization. They are – or were – mainly fisherfolk. Almost all are now unemployed. They live amid the decayed ruins of ghost-like villages built on the side of once-thriving lakes. Winds howl around the creaking jetties, empty fish markets, and broken boats, which are strewn everywhere.

The Hamouns comprise three large wetland areas covering 5,660 square kilometres. Two thirds of these wetlands are located in Iran, linked and fed by water from Afghanistan’s Helmand River. Twenty years ago, most of this area was green. Flora and fauna were abundant. The lake teemed with fish. The total annual catch used to exceed 12,000 tons and fisherfolk would regularly haul in large catches weighing 20 kilogrammes. The wetlands also supported agriculture and herds of grazing water buffalo, providing a livelihood for thousands of families. But water levels in the lakes have plummeted with the development of dams and canals in Afghanistan, which are drawing off water to feed agriculture, and the construction of reservoirs in Iran.

What is striking is the pace of the man-made catastrophe that has resulted. In just 20 years, livelihoods have been devastated. Homes are now buried under sands blowing from the dried out lagoon beds of the Hamouns. The environmental crisis has forced thousands to leave the region. The government indicates that in 2012 alone, as many as 5,000 families left the area. In total, 600,000 people have moved out. Most have trekked 2,000 kilometres northwards to Golestan province to start new lives, others are scattered across Iran. The ones who remain simply get poorer, year after year.



This was the fisherman.



Homes engulfed in sand

The slow death of the Hamouns signals a warning for the future. In this century – a century that will make or break our environment – we are beset by challenges to human security. As the exhaustion of the Hamouns demonstrates, water security, ecosystem security and human security are inextricably linked. First popularized by UNDP in 1994, the concept of “human security” shifts the traditional notion of “national security” away from its exclusive focus on the state. It seeks to ensure the security of people; not just borders. It speaks to the hugely destabilizing impact of the relentless challenges facing the poorest and most vulnerable, from hunger, food and water insecurity, disease, pollution, natural disasters and the impact of climate change to water shortages and expanding desertification. These threats can prompt massive movements of populations, potentially millions of environmental refugees, fleeing these afflictions. Such movements can, in turn, prompt desperation, lawlessness, crime and conflict.

So when people ask me about the real human security challenges we face, I lose no time in focusing my gaze on the future. True “security” – human security – must focus on people. In addition to political and economic considerations, it must focus on food, health, community, on the person and on the environment. Nature generates the services that are the foundation of life on earth.

Ecosystems and biodiversity – the variety of life on earth – provide the goods and services that we all rely on. They secure livelihoods, food, water and health for billions worldwide and provide a safety net for the poorest and most vulnerable. They also mitigate climate change and provide a source of resilience – a range of ecosystems from forests to wetlands act as buffers against natural hazards and shocks, absorb and store carbon and guard against land degradation.

Water is our biggest resource constraint in Iran. As water resources come under increasing threat, so does agriculture. Water over-use, over-grazing, deforestation and desertification coupled with climate change, are driving rapid land degradation, compounding this threat and making land less productive. In summary, we are at risk from a “perfect storm” – the combined impacts of water scarcity, land degradation, and climate change. These pressures are being felt all across Iran. The country has 1,000 wetlands, many of which are at risk. To combat this, current water and natural resource management approaches need to be enhanced and climate change resilience strengthened at the community and national levels.

There are several examples of what can be done – and replicated. Since 2005, the “Iranian Wetlands Project” – a GEF-financed joint initiative of the Iranian Government and UNDP – has been working in satellite wetlands surrounding Lake Uromiyeh and others to bring them back to life. I was there and I saw some of them working well. Places like: Qharagheshlaq; Nowruzlu; Shur Gol; Dorgeh Sangi; Dorna Gol; Solduz; Ghorl Gol and Kanibarazan. This project is working together with local organisations and communities to restore wetlands, create integrated plans for their sustainable management and introduce sustainable agricultural techniques that use less water, control evaporation and increase yields.

The project has also provided a scientific evidence base to track Iran’s most emblematic environmental catastrophe in Lake Uromiyeh. Unlike the lesser-known Hamouns, the rapid decline of Lake Uromiyeh has been the subject of much attention. Once one of the world’s largest saline lakes, water extraction and persistent drought have shrunk it by two thirds since 1997. Part of the problem has been diverging interests around the lake have pulled in different directions. The UNDP Iranian Wetlands project has helped to provide a platform for negotiations concerning the lake’s future. It has developed management plans and improved the institutional arrangements for cooperation to address the problem. Crucially, public awareness of the threat has also increased as a result.

Hope can be drawn from initiatives such as the UNDP wetlands project and others – where communities are working to revive their wetlands and implement sustainable management regimes. Most of the solutions we seek lie within Iran. But the problem does not only affect Iran. As we collectively respond to current global challenges, it is clear that we must seek to conserve, manage and restore ecosystems and biodiversity as the key to human security. If we fail, we face the same plight as the Hamouns.



by Gary Lewis, UN Resident Representative
in the Islamic Republic of Iran

MANAGING AND RESTORING ECOSYSTEMS FOR CLIMATE CHANGE MITIGATION AND ADAPTATION IN ASIA AND THE PACIFIC

DID YOU KNOW?

Over 15 percent of global terrestrial carbon stocks are held in formal protected areas, with more in indigenous and community conserved lands, with an estimated value in the trillions of dollars.

Climate change represents a serious risk to efforts to reduce poverty and threatens decades of development gains. Receding forests, changing rainfall patterns, more intense floods and droughts, and rising sea levels exacerbate existing economic, political and humanitarian stresses and affect human development in all parts of the world. Asia-Pacific not only has many of the world's most climate-exposed territories, it is also home to millions of the most vulnerable people. The negative impacts of climate change pose a particular challenge to poor people, who are often dependent on natural resources and are less equipped to cope with climate variability and extremes.

In response to these growing and increasingly evident threats, governments across the region are paying more attention to climate change. Significantly, there is a growing appreciation of the importance of natural ecosystems and protected areas in managing climate change. Restoring and maintaining key ecosystems can help communities in their mitigation and adaptation efforts and support livelihoods that depend on ecosystem services. UNDP supports countries and communities to incorporate nature-based solutions into their strategies for adapting to and mitigating the negative impacts of climate change. Projects in the region are working to support national efforts to address climate change, in this rapidly developing work area, building knowledge and experience on different approaches.

ECOSYSTEM BASED ADAPTATION

Ecosystem-based adaptation (EbA) involves the sustainable management, conservation and restoration of ecosystems to provide services that help people adapt. UNDP supports countries in Asia Pacific to implement EbA approaches that can help vulnerable communities increase their capacity to adapt to the impacts of climate change, and build the resilience of the ecosystems on which their livelihoods and welfare depend.

▪ **IN MONGOLIA**, a UNDP supported project financed by the Adaptation Fund, the Government of Mongolia and UNDP, is supporting EbA approaches to maintain water security in the Altai Mountains and Eastern Steppe landscapes. Working with multiple partners, the project uses traditional knowledge and technological innovation to maintain water provisioning services supplied by mountain and steppe ecosystems. Over its lifetime the project

aims to achieve quantifiable improvements in water quality, water use efficiency and land use practices through improved management and restoration of key ecosystems to improve resilience.

▪ **IN NEPAL**, a project supported collaboratively by IUCN, UNEP and UNDP and financed by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) of Germany, is supporting EbA in mountain ecosystems. The project will demonstrate EbA measures that sustain key ecosystem services and enhance the capacity of local communities and national government to build and better integrate EbA options as part of overall adaptation strategies in Nepal. The project will include an assessment of the cost-efficiency of EbA by considering economic, social and environmental aspects, in order to make the business case for EbA.

UNDP works with countries to strengthen their resilience to respond to climate and other environmental impacts through effective conservation and management of natural resources. Ecosystem rehabilitation and expanding and connecting protected areas to conserve intact forests, wetlands, mangroves and coral reefs provides a natural buffer for vulnerable communities against natural disasters intensified by climate change. For example, the Pakistan Wetlands project has planted more than 130,000 mangrove saplings at various sites in the Makran Coastal Wetlands Complex. In Malaysia, the 'Conserving Marine Biodiversity through Enhanced Marine Park Management and Inclusive Sustainable Island Development' project transplanted coral at badly bleached sites within the marine protected area and developed a coral bleaching response plan.

ECOSYSTEM BASED MITIGATION

Conservation and rehabilitation of natural ecosystems that function as effective carbon sinks contributes to reducing greenhouse gas emissions. UNDP supports countries in developing capacity and accessing new sources of finance to maintain and restore these ecosystems, which include forests, peatlands, wetlands, tidal marshes, mangroves and seagrass beds. Communities are directly supported in securing land tenure and accessing new sources of finance to manage ecosystems effectively and sustainably, using both traditional knowledge and innovative techniques.

UNDP supports projects in a range of countries in the Asia Pacific region to promote sustainable forest management measures. Destruction and degradation of peatlands can lead to the release of greenhouse gases, with a global warming potential that is equivalent to 13-30 percent of the global emissions from fossil fuel combustion. UNDP supported GEF financed projects support countries to reduce carbon emissions from peatlands and increase the resilience of economies and communities.

▪ **IN MALAYSIA** a UNDP-managed project has worked to improve forest condition and restore peat swamps in Sarawak State, Sabah, and South East Pahang. Among other activities, the project developed integrated management plans for the three project sites.

▪ **IN THAILAND**, a new project aims to conserve, restore and manage peatlands to maximise their capacity to act as carbon sinks, as well as their capacity to provide habitat for important species and to support livelihoods. The project will work to expand the area of peat swamp forest under protection, develop and establish integrated management plans for this forest, restore areas degraded by storms and fires and implement systems for preventing encroachment and monitoring carbon flux. In addition, the project will seek to strengthen national policies and frameworks for managing peat swamp forests.



Photo: Midori Faxton



A community lies in the shadow of south Annapurna and Fishtail Mountain in Annapurna Conservation Area, Nepal. Many come to visit these iconic mountains and trek these popular trails, but to the locals that live here, it is simply home. A project supported collaboratively by IUCN, UNEP and UNDP and financed by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of Germany, is supporting ecosystem-based adaptation (EbA) in mountain ecosystems of Nepal. The project will demonstrate EbA measures that sustain key ecosystem services and enhance the capacity of local communities and national government to build and better integrate EbA options as part of overall adaptation strategies in Nepal.



Mongolian family in the Eastern Steppe
Photos: Midori Paxton

'GREAT STEPPES' FORWARD IN MONGOLIA THROUGH ECOSYSTEM-BASED ADAPTATION

Although 60 percent of Mongolia's population now lives in towns, nearly 40 percent of people are reliant on subsistence livestock herding. The livelihoods of these nomadic communities are completely dependent on the ability of the ecosystem to provide surface water and pasture. In recent years, herders have noticed a marked change in rainfall patterns and an increase in temperatures.

The hydrological system has also changed, altering the volume and timing of river flows and floods. Streams and lakes have dried up. Soil infiltration rates and water storage capacity have declined, resulting in deteriorating pasture quality and quantity. In addition, the occurrence of summer droughts and extremely severe winter weather events called 'dzuds' has increased. The 2010 *dzud* killed more than one in five livestock in the whole country, affecting 700,000 people. Changes in climatic patterns are already having noticeable impacts on the herders, exacerbating already serious land degradation problems.

"Good pasture and water mean everything to us," says a 23-year old herder from the Altai region. "Without them, we cannot exist". For people living in this landscape, there is simply no livelihood if surface water and pasture disappear. And for these resources to continue to be available for the present and future generations, it is essential to ensure that the ecosystems in these landscapes, which provide water and nurture pasture, remain healthy and resilient enough to cope with climate change.

Launched in 2012, the 'Ecosystem-based Adaptation (EbA) Approach to Maintaining Water Security in Critical Water Catchments in Mongolia', co-funded by the Adaptation Fund, the Government of Mongolia and UNDP, is working with communities, local and national governments, and NGOs in the Altai and Eastern Steppe landscapes to address this. The project combines traditional knowledge and technological innovation to maintain water provisioning services supplied by mountain and steppe ecosystems, and to incorporate climate change risk responses and ecosystem resilience principles into land use and water resource planning and management at the landscape level.

The project applies the principles of Ecosystem-based Adaptation – working to protect ecosystems and maintain essential ecosystem services in order to reduce the vulnerability of people to climate change

impacts. By working to improve water use efficiency, water quality, land use practices and integrated river basin management, the project aims to achieve specific quantified targets for improvements to ecosystem health. It supports evidence-based decision-making through improved knowledge and understanding of ecosystem dynamics, resilience and the impacts of different land uses. The project also assists community actions to implement EbA principles and practices for the long-term sustenance of their livelihoods.

At the national level, the project supports mainstreaming of the EbA approach in the country's adaptation framework and related sector policies. To date the project has supported the development or revision of three new water regulations and three new forest regulations to incorporate EbA principles. The new or reformulated regulations aim to promote sustainable use of water and conservation of forests, which help to store water, by providing incentives for efficient water use and protection, restoration and sustainable use of forests. It is also strengthening the capacity of key climate change policy and planning agencies to incorporate EbA approaches. The project makes great steps forward for safeguarding the world's largest Steppe ecosystem and its keepers.



The steppe ecosystem that supports the livelihoods of these nomadic communities is characterized by temperate grasslands; the communities are completely dependent on the ability of this ecosystem to provide surface water and pasture.

INTEGRATING BIODIVERSITY INTO REDD+

Reducing Emissions from Deforestation and Forest Degradation (known as REDD+) is a dedicated effort to value the carbon stored in standing forests as a way to incentivize developing countries to protect, manage and restore forests to mitigate climate change. The United Nations REDD (UN-REDD) Programme is a collaborative initiative between FAO, UNDP and UNEP that supports countries to prepare to implement REDD+ activities, including reducing deforestation and degradation, restoring, conserving and sustainably managing forests under the UNFCCC climate change convention. To date, a total of 15 countries have sought support from the UN-REDD Programme in the Asia Pacific region.

The UN-REDD Programme works with national governments to prepare for participation in a future REDD+ mechanism with the active involvement of all stakeholders, including indigenous peoples and other forest-dependent communities. The Programme supports countries to develop national REDD+ strategies that will guide the implementation of nationally appropriate REDD+ activities in the country.

Financial flows resulting from REDD+ will not only reduce carbon emissions, but can also benefit developing countries by generating additional social and environmental benefits, such as conserving biodiversity and vital ecosystem services and promoting local livelihoods. The UN-REDD Programme has developed a set of Social and Environmental Principles and Criteria and a range of decision support tools that are intended to assist countries in developing a national safeguards approach that emphasizes delivery of multiple benefits from REDD+.

This safeguards approach includes applying the principles of Free, Prior and Informed Consent in the context of REDD+ to protect local communities' rights and forest-dependent livelihoods and to reduce risks through ensuring mutual understanding and agreement between all parties concerned. Under the UN-REDD Programme, UNDP has led work in Viet Nam to develop national guidelines on Free, Prior and Informed Consent (FPIC) in the context of REDD+, as part of support to prepare the country to implement REDD+ activities. National Guidelines on applying the principles of FPIC for REDD+ have been developed through an extensive process of consultation and testing, including pilot exercises in Lam Dong province and evaluations of this work. This constituted the first practical example, worldwide, of the application of FPIC principles in REDD+. The guidelines will now be refined through provincial planning processes.

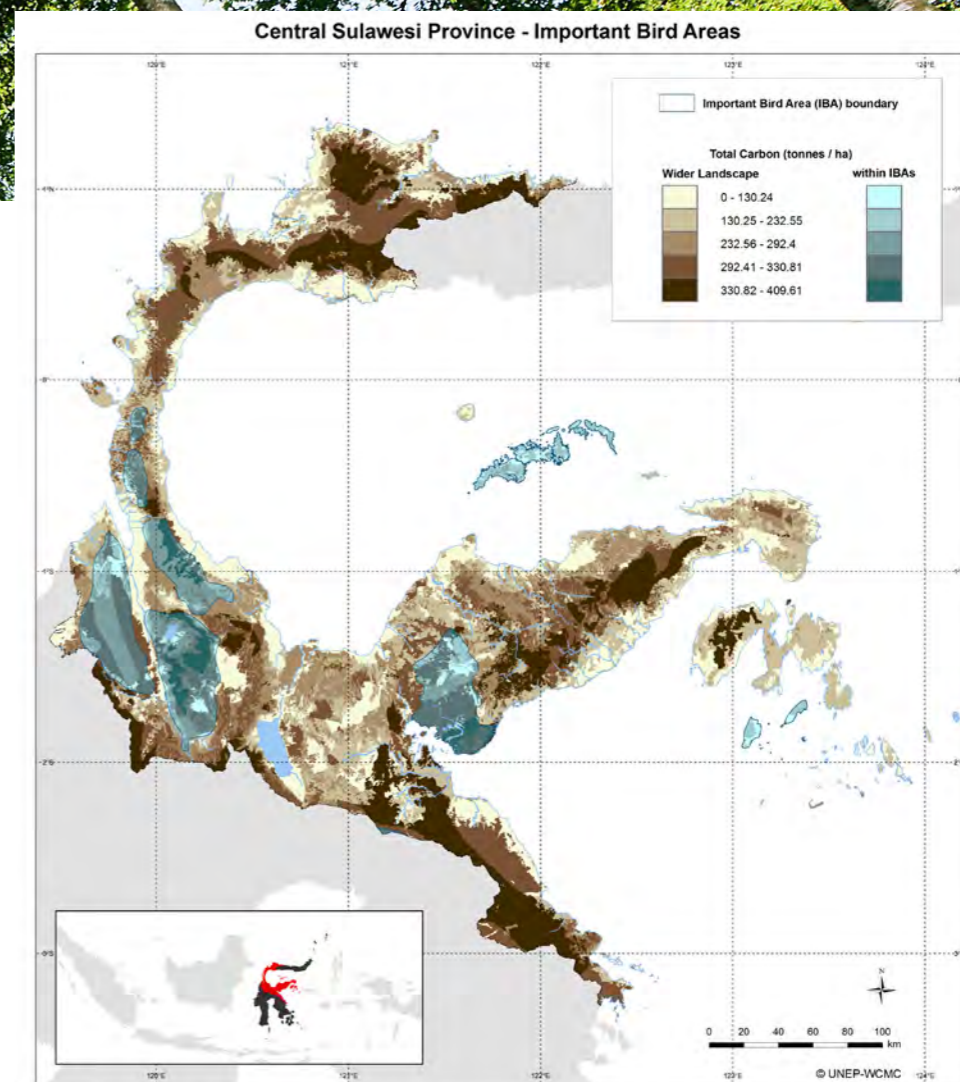
Similar work is on-going in Papua New Guinea, where working national guidelines on FPIC have been developed through a collaborative 3.5 year process involving more than 13 consultations and three full revisions. Papua New Guinea's working guidelines will be tested in REDD+ pilot sites and the lessons learned from these tests incorporated before they are presented to the government.

In the UN-REDD National Programme's pilot province of Central Sulawesi in Indonesia, a set of maps has been developed to support decisions on where and how REDD+ could be put into practice. The maps were developed by UNEP World Conservation Monitoring Centre (UNEP-WCMC) on behalf of the UN-REDD Programme, in collaboration with the Ministry of Forestry of Indonesia and a number of other partners. They have been designed to support the development of plans for REDD+ actions that provide multiple benefits for livelihoods and biodiversity in line with the needs of different stakeholder groups, in addition to storing carbon.

The potential benefits of implementing REDD+ actions in a certain location are influenced by a range of factors, including the biophysical, geographic, socio-economic and cultural characteristics of an area, as well as future development plans. The set of maps includes different data layers that show current land uses, carbon stocks, potential areas for REDD+ activities, current state forest area, population density and the location of areas important for biodiversity. Additional variables, such as planned infrastructure development, can easily be added, if requested by decision makers.

By overlaying this spatial information, the maps demonstrate how different data layers can inform planning and prioritization of areas suitable for REDD+ activities based on selected criteria. For example, data layers showing the location of endangered forest types, of Important Bird Areas, and the nesting grounds of the endemic maleo bird, a flagship species in the province, can be used to assess the importance of different areas for biodiversity conservation. Data layers on slope and watershed boundaries can help to assess the importance of various areas of forest for delivering ecosystem services, such as erosion control. Combining this information with stakeholder analysis and consultation can help planners to identify, for example, areas of forest to maintain that will not only store carbon but which are also of significant value for biodiversity and ecosystem services.

Photo: John Bill /Shutterstock.com



Important Bird Areas (as a proxy-indicator for high biodiversity) and Total Carbon in Central Sulawesi Province, Indonesia

Map showing Important Bird Areas in relation to total carbon in Central Sulawesi Province, Indonesia, a UN-REDD Programme pilot province. This map is one of a set developed by the UNEP World Conservation Monitoring Centre (UNEP WCMC) for the UN-REDD Programme, as a decision-support tool for REDD+ planning that delivers multiple benefits. The maps were developed by UNEP WCMC in collaboration with the Ministry of Forestry of Indonesia, DG Forest Planning, the Regional Forest Service Central Sulawesi and Tadulako University.

COMMUNITY COOPERATION HELPS HERDERS TO COMBAT ENVIRONMENTAL CHANGE

The Altai Mountains of Mongolia's extreme west are harsh, daunting, and offer spectacular views of snow-capped peaks beyond sweeping grasslands, milky rivers that derive their startling colour from glacial melt flow, and immense lakes.

This is home to the Kazakh nomads of the Akhbastau (literally: 'White Springs') community. People here are herders and horsemen who hunt with golden eagles and who live in 'gers' (yurts) decorated with colourful wall and floor carpets. These mountains are also an important area for global conservation, harbouring a number of threatened species, including the snow leopard.

Older generations of the Akhbastau community have witnessed clear environmental changes over the last 70 years. Wildlife numbers have declined as a result of overhunting and overfishing, and pastures have deteriorated. Overgrazing is one of the main causes of environmental degradation in the range, worsened further by the harsh effects of climate change on precious water and land resources. Many herders have stopped traditional rotational grazing methods that involved moving seasonally in search of good pasture, leaving time for other pasturelands to recover.

To remedy increasingly adverse living conditions, in 2006, the families in the Altai Mountain region started forming herder groups, working with the UNDP supported GEF financed 'Community-based Conservation of Biological Diversity in the Mountain Landscapes of Mongolia's Altai Sayan Eco-region' project, locally known as the 'Altai Sayan' project.

The project, executed by the Government of Mongolia from 2005 to 2011, provided small loans and grants to community groups in the region to help develop tourism, grow vegetables for the first time, repair winter shelters and improve the quality of their milk and wool products. Through project support, 7,000 herders received training in new trades, including weaving and felt-making, dairy product processing and marketing, tourism and wildlife monitoring and management.

"I think we have been able to achieve changes in herders' perceptions," says Amangul Sakeyi, the project's social mobiliser. "Through forming a community group and taking charge of managing a defined area of land, people feel much more responsible for caring for their pasture and wildlife resources."

Forming a community group with other households has also helped individual herder families. They cooperate in sheep wool sheering making the process much more efficient, collectively they plan rotational grazing and also hay making in preparation for winter months and *dzud*. The community even decided to decrease the number of livestock to reflect what the grasslands could support.

They also established a hospitality ger for tourists who want to experience the nomadic life of Kazakh people, and the region's breath-taking vistas, wildlife and spring flowers. Horse trekking has also proven a success with tourists. 15 percent of tourism income is put into a community fund and the rest is divided among the households.

Diversification of livelihoods makes the herders more resilient to external shocks such as *dzud*, and reduces pressure on pastures. "We now have more options and different income sources," says Naranbek Ristan, an Akhbastau herder who is in charge of wildlife monitoring activities. "And we are better prepared for harsh winters. The *dzud* impact in this community was minimal last year, which I believe is owed to the work of our organisation."

The initiative instituted 20 environment units within the local government office to support the community groups. Altai and Sayan conservation plans were developed through expert support from the project, which provided essential biodiversity information for land use and local development planning.

As a result of the project's advocacy efforts, Mongolia's Environmental Protection Law was amended to include clear legal provision for community-based natural resource management. The 64 officially registered community groups, which include 912 herder families, manage natural resources on land covering more than half a million hectares. After the project ended, the local government environmental units took over to support the community groups and their conservation efforts. The Government officially expanded the overall project approach to conservation and livelihoods nationwide through a June 2011 Ministerial decree.



Photo: Midori Paxton

"We now have more options and different income sources. And we are better prepared for harsh winters. The *dzud* impact in this community was minimal last year, which I believe is owing to our organisation."

**NARANBEK RISTAN,
AKHBASTAU HERDER**

Naranbek Ristan, an Akhbastau herder who has participated in several activities funded by the project, including training courses on wildlife monitoring. The Altai Mountains, which straddle Mongolia, China, Kazakhstan, and Russia, are part of the Altai Sayan Ecoregion, identified as a global priority for conservation by WWF.



Most of the Endangered giant panda's (*Ailuropoda melanoleuca*) habitat is located in Sichuan province.
Photos: Sichuan Province Environmental Protection Bureau



The project has supported ecological rehabilitation planning in earthquake-hit areas of Sichuan.

EMERGENCY BIODIVERSITY CONSERVATION MEASURES SUPPORT RECONSTRUCTION IN EARTHQUAKE-HIT AREAS OF SICHUAN PROVINCE, CHINA

The 2008 Wenchuan Earthquake left more than 69,000 people dead and millions displaced when it hit Sichuan province in South-west China on 12 May 2008. As well as the devastation it caused to human life, the 8.0-Richter scale-earthquake also caused an ecological catastrophe. Sichuan province is one of the most important areas for biodiversity in China, harbouring more than 100 threatened species, including the Endangered giant panda. The earthquake damaged 35 Nature Reserves covering 400,000 hectares, and an estimated 60 percent of the panda's natural habitat.

To support recovery and rehabilitation efforts following the earthquake, the Government of China, with UNDP support and GEF finance, began emergency biodiversity conservation measures in affected regions of Sichuan province. Working through the Foreign Economic Cooperation Office under Sichuan Province Environmental Protection Bureau and China's Ministry of Environmental Protection, the project aimed to mainstream biodiversity in the recovery and reconstruction process and to strengthen the affected protected areas.

To inform sound decision making in the recovery process, the project quickly undertook a number of assessments to evaluate the damage caused to biodiversity and livelihoods. Within its first year, the project investigated impacts on 19 local communities and villages surrounding eight national nature reserves. Their findings were used to recommend a series of practical measures to improve local farmers' livelihoods. The project also assessed damage to the eight national nature reserves and surveyed the extent of damage to habitats of 10 key endangered species, to inform conservation and rehabilitation strategies.

The Sichuan Province Environmental Protection Bureau used these findings and the recommendations of the "Ecological Function Regionalization Plan" developed by the project to update its "Ecological Rehabilitation Plan in Sichuan Earthquake Areas". This rehabilitation plan has played a guiding role in reconstruction efforts made by all sectors under the Sichuan Government, coordinating stakeholders' actions and defining their responsibilities in biodiversity conservation in the reconstruction.

Sichuan's draft Biodiversity Strategy and Action Plan, which guides conservation and sustainable use at the provincial level, was also reviewed and strengthened in the context of the earthquake. As a result of the updated BSAP, projects to monitor and conserve the giant panda population and its habitats and to integrate biodiversity indicators into the performance system of green city construction are being implemented.

The project has provided critical support to identify and monitor changes in environmental conditions in earthquake hit areas – from aquatic biodiversity to pollutants to natural vegetation that is the habitat of the giant panda. It supported two ecological monitoring stations in the cities of Dujiangyan and Mianyang. "The project has updated our technology and equipment, expanded coverage of field monitoring and improved staff expertise and skills in ecological monitoring," confirms Mr. Wu, Deputy Director of Dujiangyan City Environmental Monitoring Station of Sichuan Province. The data collected by these stations have been used by the Government for decision-making in the reconstruction.

Technical guidelines for ecological and environmental monitoring developed by the project have been used in Sichuan and also in Gansu Province, North-west China where another earthquake hit after Wenchuan.

Rehabilitation actions in 32 nature reserves affected by the earthquake have been guided by the "Reconstruction Framework for Protected Areas" developed by the project. The project also developed a plan for strengthening protected area management capacity at two national nature reserves, which was used to inform revitalisation efforts in other earthquake-damaged reserves.

The project has also updated field and office equipment in earthquake-hit nature reserves. Twenty-one nature reserves were provided with a range of equipment, including wildlife-monitoring cameras. "Forty infrared cameras provided by the project to monitor endangered species such as golden monkeys, takins, black bears and wild pigs... provided information on their population size and behaviour, which have served as important evidence for conservation measures," says Mr. Shen Liming deputy-director of Tangjiahe Nature Reserve.

Community-based Reconstruction Centres for Ecological Civilization in five villages established through the project have played an important role in helping to support and comfort local farmers who experienced the earthquake, raising their awareness around biodiversity conservation, improving their production techniques and increasing their family incomes. For example, farmers from Guanba Village tripled their honey production following practical training provided at the centre.

Sichuan Province Environmental Protection Bureau has made budgetary provisions to continue to support the affected nature reserves, including key giant panda habitat, ensuring the sustainability of this work.

CONSERVING MOTHER NATURE'S MEDICINE CABINET IN INDIA

Aspirin derived from willow bark, digitalis from foxgloves, the childhood leukemia combatant, vinblastine, born of the Madagascar periwinkle – perhaps three of the most frequently cited examples of the pharmaceutical treasures unlocked from Mother Nature's medicine cabinet. But there are thousands, ten thousands more, some already discovered, some waiting to be discovered, and more than a few on the verge of being forgotten or, due to habitat loss, climate change or unsustainable over-exploitation, becoming extinct.

India, where the UNDP, along with the Government of India, with GEF support is operating the "Mainstreaming Conservation and Sustainable Use of Medicinal Plant Diversity in Three Indian States" Project, is a case in point.

The value and role of medicinal plants was detailed in the Atharva Veda scripts over 3,000 years ago and today, with an 11 percent annual global increase in the botanical and plant-derived drugs market, the estimated yearly turnover of the herbal industry in India is estimated to be Rs 8,800 crore (US\$ 17.6 billion). And growing.

Over 90 percent of medicinal plants (MPs) traded in India are gathered in the wild, frequently by women and marginalized tribal or caste communities with low incomes and insufficient capacity to sustainably meet or cope with the demands of an increasingly demanding mass market.

The village of Bodmalla lies in Himalayan Uttarakhand State, which borders Tibet and Nepal. Uttarakhand, known as The Land of the Gods, due to its density of religious sites, is also an area of high biodiversity. The UNESCO World Heritage Site, Valley of Flowers National Park, for example, contains 520 species of higher plants. Such is the region's floral abundance that legislators have christened it the "Herbal State."

Bodmalla, is one of the Project's target sites and although small (population just 400) it serves as a microcosm of what is happening on a much larger scale. Since time immemorial, Bodmalla has depended on a shrub; Tejpat to the locals, Indian bay leaf to the layperson, *Cinnamomum tamala* to the botanist.

Historically the community made and applied its own rules for collection; only one collector per household, leaves to be gathered from alternate branches, only twigs to be plucked. But the resulting, moderate if sustainable supply, could not meet increased demand. Harvesting methods changed. Whole branches were ripped off making the plants vulnerable to fungal infection or simply killing them outright. A boom in 'production' translated into loss, not just of natural resources, but of the harvest. With insufficient capital to invest in correct processing, much of the excess tejpat, which is prone to contamination if not correctly treated and packaged, spoiled.

"Unless we learn to identify and document the resources, we cannot conserve and manage them," Mr. Girish Chandra Gutholiya, Forest Guard, Uttarakhand, known as "The Herbal State".

The Project seeks to reverse this self-defeating trend by employing several strategies. Two are aimed directly at Bodmalla and the thousands of other villages like it:

1. Demonstrate replicable models of in-situ and ex-situ MP conservation
2. Promote MP-related cultivation and livelihood generation.

"Unless we learn to identify and document the resources, we cannot conserve and manage them," says Mr. Girish Chandra Gutholiya, Forest Guard, Uttarakhand, known as "the Herbal State".

In Bodmalla, this involved gathering a Task Team comprised of State Forest Department staff, MP collectors, traditional healers, women's groups (30 percent involved in the project are women) and other parties who were then exposed to communities where sustainable MP collection was already being practiced. The visits inspired participants. Project-supplied uniforms helped provide a sense of identity and purpose. Wasteland was converted into tejpat plantations, Task Team members compiled accounts of regional floral biodiversity that were subsequently integrated into People's Biodiversity Registers, a bio-resource database that promotes the equitable sharing of resource benefits and acts as proof of previous community knowledge to prevent bio-piracy.

It is not only the plants that require protection. Ancestral knowledge is equally vulnerable both to exploitation and degeneration as socio-cultural environments change. Traditional healers and ancient medicinal practices are dependent on a ready supply of ingredients and, to this end, the project has proactively engaged in direct cooperation such as assisting with medicinal plantations, sapling donations and even the construction of medicinal plant clinics to enable practitioners to keep traditional techniques alive and sustainable. But for permanent change, the involvement of government is essential.

Legal rights to intellectual property (traditional knowledge) are to be strengthened through new Project-supported legal initiatives. A report on a legal mechanism to protect traditional knowledge related to MP cultivation, harvest and sustainable use was submitted this year, in addition to a proposed policy framework for a national strategy for the conservation and use of medicinal plants.

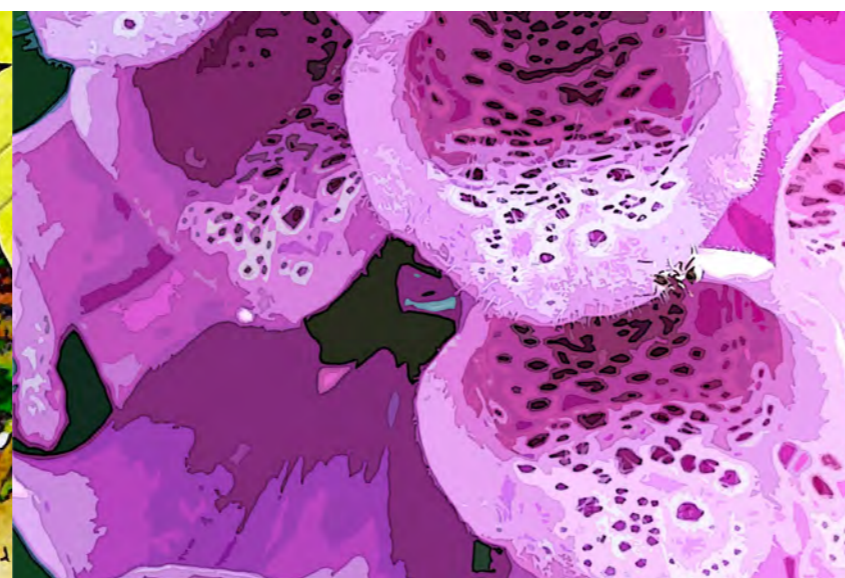
Modern science and newly direct market linkages forged by the project to ensure equitable profit sharing, wedded to traditional knowledge and practice make for a formidable alliance. At the request of collectors, the project, in cooperation with the Uttarakhand State Medicinal Plant Board and the Foundation for the Revitalisation of Local Health Traditions, is compiling easy to read materials offering guidance on sustainable collection, meshing traditional practice with scientific information on tejpat regeneration. Publication is eagerly anticipated by locals keen to apply it themselves and the Task Team, eager to roll it out to other suffering MP-dependent communities.

Tejpat is currently classified by IUCN as Vulnerable meaning that it is likely to become Endangered unless the circumstances threatening its survival and reproduction improve. Here in India's Himalayan 'Herbal State' improvement is in the air. The seeds of tejpat sustainability are not just being sown but are already growing, ensuring that there will be forever green gold in these hills.

Bartundi/Noni or Indian Mulberry (*Morinda citrifolia*). Often called 'Starvation Fruit', it has health benefits for cancer, infection, arthritis, asthma, hypertension and pain.



Foxglove (*Digitalis purpurea*) is used as a diuretic against dropsy. In folk medicine it is used for fever, cold and catarrh. Its isolates are used in modern medicine as a heart stimulant.



Star Anise (*Illicium griffithii*) is a globally significant medicinal plant found in Northeastern States of India and has anti-bacterial and anti-fungal properties.



Glory Lily (*Gloriosa superba*) is used by traditional healers from tribal communities across India for wounds, reproductive health and rheumatism.



Illustrations: courtesy of UNDP India

A NATIONAL FRAMEWORK FOR SAFE USE OF BIOTECHNOLOGY IN MALAYSIA



Photo: aodaodaod/Shutterstock.com

Since scientists developed the first genetically modified plant in the 1980s, modern biotechnology has generated a range of potentially useful products – from drought and pest resistant crops to potential new medicines and improved fibres and fuels – as well as controversy. While advances in biotechnology have great potential use, they must be developed and used with adequate safety measures to guard biodiversity, the environment and human health.

The Cartagena Protocol on Biosafety aims to ensure that countries safely transport, handle and use living modified organisms (LMOs), commonly termed genetically modified organisms (GMOs). The protocol sets out international standards of regulation to derive maximum benefits from biotechnology while also safeguarding biodiversity and human health from possible negative effects of LMOs. As an international treaty under the Convention on Biological Diversity, countries are obliged to implement national legislation in accordance with the Protocol.

UNDP, with GEF finance, has supported Malaysia to implement the Protocol. Through this 'Capacity Building for Implementation of Malaysia's National Biosafety Framework' project, Malaysia has successfully created its own fully operational national system to assess, manage and monitor the long-term risks posed by LMOs to biodiversity and human health.

Malaysia passed a Biosafety Act in 2007 to ensure its rapidly growing biotechnology industry is developed safely and in accordance with the Cartagena Protocol. The Department of Biosafety in the Ministry of Natural Resource and Environment (NRE) began implementing the project with UNDP support soon after.

The project has seen much success. Biosafety regulatory bodies necessary for administration, risk assessment and management, decision making and compliance were established, and their staff trained to equip them with the skills needed to carry out their biosafety functions with efficiency and confidence. In total, the project built the capacity of 351 staff in areas such as regulation, detection and enforcement. Top international experts were hired to train staff in state of the art practices for GMO detection and mobile detection laboratories were provided for use at ports.

The regulatory bodies established comprise Malaysia's national biosafety framework. As a result of the project's support, these bodies are now fully operational and are working together to receive, administer and provide assessments and decisions on notifications and approvals for LMOs. A range of outreach activities, including workshops, seminars and communication materials developed by the project have built public awareness of biosafety and encouraged stakeholder participation throughout the project.

GLOBAL WARNING – INVASIVE ALIEN SPECIES ARE COMING!



Photo: Prashanth Vishwanathan/UNDP India

Water hyacinth (*Eichhornia crassipes*) an aquatic plant native to the Amazon basin, has done extensive damage to wetlands in Nepal, where it is not native and grows rapidly, invading habitats and choking water bodies by causing eutrophication that starves native species of oxygen and light.

Invasive alien species (IAS) are now recognized as one of the five main drivers of biodiversity loss. Globalisation of trade, travel and transport is accelerating the rate at which species can move from the location in which they evolved to others, where they are not native and can cause significant convulsions.

UNDP VS. THE ALIENS: TWO CASE STUDIES

In Nepal, local communities have worked with the 'Conservation and Sustainable Use of Wetlands Communities' project to remove invasive plants to restore critical wetland areas in the Ghodaghodi Lake Area. Importantly, the project also piloted ways for local communities to turn the invasive plants collected to good use; the pests if properly processed yield fuel, rich compost and fibre for making mats and other local handicrafts to sell.

In this instance, the project supported skills training of women's groups, and facilitated their access to market, in collaboration with private companies, Organic Village and Knot Craft. Several trained women's groups have formed a cooperative of their own and established a small workshop and factory. Female members of the cooperative harvest water hyacinth, processing them for fibres and dyes, and produce various items in their workshop.

As a result, the income of women and men at the project site has significantly increased. The project has also piloted the use of water hyacinth to prepare compost and mulch and as raw feed material for a biogas plant. In addition, the project has developed guidelines for management of invasive alien species at wetland sites.

In Sri Lanka, the 'Strengthening capacity to control the introduction and spread of alien invasive species' project seeks to strengthen policies and legislation for effective IAS control. The project is supporting the finalisation of Sri Lanka's National IAS Policy and National IAS Strategy and Action Plan through stakeholder consultations. Following the principle that 'prevention is better than cure', the project aims to enhance integrated management planning and action, and institute financial and technical support for the prevention, detection, and management of invasive alien species.



Photo: M. Balan

REDUCING CONFLICT BETWEEN WILDLIFE AND COMMUNITIES

As human populations expand and natural habitats shrink, people and animals are increasingly coming into conflict over living space and food. From elephants destroying crops in Nepal to snow leopards killing livestock in Mongolia, human wildlife conflict can result in damage to crops, livestock, property and sometimes deaths of both people and the animals involved. If conservation efforts are to succeed, human wildlife conflicts must be reduced. Recognising this, UNDP supported projects have implemented activities to help address this problem.

In Nepal's Western Terai, deforestation and a rising population have increasingly brought people into conflict with large mammals, particularly elephants and one-horned rhinos, in and around the buffer zones of Bardia National Park and Sukla Phanta Wildlife Reserve. The UNDP supported GEF financed 'Western Terai Landscape Project' (WTLP) has worked collaboratively with local people to minimise this threat through a number of initiatives. Solar electric fences were constructed at critical locations of the buffer zones to protect settlements and farms. These fences have reduced the vulnerability of 5,000 households to crop damage and human injury. Where it was not possible to build fences, watch-towers were constructed to help warn villagers of approaching rhinos and elephants. To provide immediate support for damage already caused by wildlife, the project contributed Rs 3.6 million (about US\$ 36,500) to establish a relief fund to help affected communities in the protected area buffer zones.

In addition, natural solutions promoted by the project have helped to both mitigate wildlife incursions and improve livelihoods. The project supported farmers living in areas close to the protected forested areas to cultivate wild mint and camomile. These high value aromatic and medicinal plants grow well in the region and act as a natural deterrent – rhinos dislike the smell of the plants, which prevents them from eating them and deters them from entering settlements and farmlands beyond. The project provided high quality seeds, technical knowledge, and herb processing and marketing support to 995 farmers to cultivate wild mint and camomile in over 100 hectares of land in 2011. From these crops, the farmers yielded 2,800 kilogrammes of essential oil, which they were able to sell for Rs. 1,200 (US\$ 12) per kilogramme of wild mint oil and Rs 23,000 (US\$ 233) per kilogramme of camomile oil.

Human casualty data from Bardia National Park and Shuklaphanta Wildlife Reserve Data show that the number of injuries caused by wildlife declined between 2008 and 2012. As damage caused by wildlife has declined and local people have seen improvements through project support, the project reports that local support for protected areas has increased.

In Mongolia, training and supporting local communities to become responsible for wildlife monitoring and management has also helped to reduce conflict among wildlife and people. Training in wildlife identification and monitoring provided by the UNDP supported GEF financed Altai Sayan project to herders in Mongolia's Altai Mountains has helped this community to avoid human wildlife conflict. This training enabled the community to better predict attacks on livestock by wildlife, such as snow leopards, and take precautionary measures.

Human wildlife conflict is a major challenge in Bhutan, where large animals live in close proximity to rural communities. To address Bhutanese farmers' concerns over this, Bhutan's Nature Conservation Division of the Department of Forests developed a National Human-Wildlife Conflict Management Strategy. The strategy was developed through the support of UNDP Bhutan, WWF Bhutan and the Bhutan Trust Fund for Environmental Conservation, and provides a concrete basis to understand and mitigate human-wildlife conflicts in Bhutan focused on human welfare and poverty alleviation.

The National Strategy addresses both crosscutting and species-specific issues, proposing actions to address conflict between humans and carnivores (large cats, bears, dholes), wild pigs, deer, elephants and primates. It gathered inputs from a range of stakeholders and 80 national and international experts to analyse the root causes of human-wildlife conflicts and potential solutions to address them.

Based on these analyses, it proposes concrete action plans, such as improving herd management to reduce the vulnerability of livestock to kills by predators, community compensation and insurance programmes and implementing monitoring programmes to understand and mitigate conflict hotspots. The National Strategy provides a critical guide for action by managers, researchers, and communities to work towards alleviating poverty and improving livelihoods for rural Bhutanese while protecting the mega-fauna that characterize this Kingdom.



HAPPINESS & LOVE

From sacred mountains in Bhutan to sacred groves in India. From marine waters protected by traditional “tabu” rules in Fiji to the bright and colourful bird of paradise plumes worn by tribesmen in Papua New Guinea, the natural world has held strong spiritual and cultural significance for people all over the region for millennia. Our natural wonders and heritage provide many intangible but valuable benefits to humanity, including recreation, tourism, education, enjoyment and mental wellbeing. Our relationship with these wonders is particularly relevant in a rapidly changing world, where communities, including indigenous peoples, face profound, rapid and apparently continuous changes to their societies and circumstances. This is leading in many places to the erosion of the values and institutions that provide social cohesion, adaptability and resilience. Driven by the priorities of countries and communities, UNDP’s work aims to strengthen the capacity of people to recognize and respond to this change while conserving and sustainably using the biodiversity and ecosystems that we all depend on.

CULTURE, LIVELIHOODS, AND NATURE (CLAN): TIBET'S "JEWELS OF THE LAND"

Photo: Marc Foggin

Tibetan nomadic pastoralists have lived in the extensive rangelands and mountain areas north of the Himalayas for millennia, depending largely on their domestic yak and sheep for their livelihoods.

With average elevations over 4000 metres above sea level, the Tibetan plateau is known for its harsh and unpredictable environment. The vegetative growing season is short and snow-storms can devastate herds of animals, both domestic and wild; in fact, snow can cover the grasslands during any month of the year. Yet this place is still known and valued as 'home' by many Tibetan herding communities.

The Tibetan plateau also is home to a wide array of native ungulates and other wildlife, including the wild yak, white-lipped deer, kiang (or wild ass), Tibetan antelope, Tibetan gazelle, blue sheep and argali, as well as the Endangered snow leopard, Pallas' cat, musk deer, black-necked crane, saker falcon and many other species of local, national and global interest. The biodiversity of the Tibetan plateau is both a wonder to cherish and a global asset to preserve.

For the yak and shepherds living on the plateau, this extraordinary biodiversity has also long been a part of their cultural heritage. Their lives and livelihoods – and their identity – are intimately tied to the environment on which they depend. As such, the maintenance of proper ecological functioning in their grasslands and wetlands is not optional; it is vital.

The yak is essential for the survival of communities in the Tibetan plateau environment. Yaks provide milk, which can be drunk or transformed into butter or cheese. Yaks also are source of wool for making tents, fuel (yak dung), transportation, and ultimately meat. Without the yak, nomads would never be able to adapt to the conditions of the high plateau. The wildlife is equally central in herders' culture, as they feel that animals are like the "jewels of the land" and without them there would be a sense of sorrow and loss.

If sustainable development is meant to achieve wellbeing for people, then 'culture' – which develops from the long-term sharing of experiences and represents the soul of a community – must also be considered integrally with other pillars of sustainability, including economy and environment.

In the case of Tibetan nomadic pastoralists, people's livelihoods and their relationships with the natural environment have formed much

of their sense of identity. By starting with 'community and culture' when designing and planning initiatives for sustainable development – rather than simply applying development models or conservation models that generally assume only market-driven motivations by local people – new synergies and pathways could emerge to support effective natural resource management.

Studies show that many factors bring us happiness and wellbeing – a sustainable livelihood combined with good health and education, adequate living standards, involvement in decision-making and community, care of the environment, and cultural continuity are key. According to Bhutan's innovative Gross National Happiness (GNH) Index, maintaining ecological diversity and resilience is central to happiness and wellbeing.

People-centred approaches to wildlife and nature conservation and management are already taking place in the Sanjiangyuan area of Qinghai Province, China, through the introduction of collaborative forms of natural resource management and more generally by strengthening local governance. Greater participation and ownership by local communities in the management of the provincial level protected areas system is proving very successful.

Building on a variety of grassroots projects and provincial government initiatives, UNDP with support from GEF has recently commenced a large scale project entitled 'Strengthening the Effectiveness of the Protected Areas System in Qinghai, China' to conserve globally significant biodiversity. Executed by the provincial Forestry Department, the project specifically seeks to strengthen the protected areas system to safeguard globally significant biodiversity.

Through enhanced management effectiveness, the protected area system will be able to better protect rare and threatened species as well as maintain healthy grasslands and wetlands, which are important both for local resource users and for mitigating climate change through carbon sequestration. Piloting new models of co-management of the protected area system, the project aims to mainstream biodiversity and ecosystem priorities into development and sector planning frameworks while strengthening critical institutional and management capacity. By incorporating culture and livelihoods into dialogue with local communities, more effective management and more equitable distribution of benefits from biodiversity and its sustainable use are envisaged.

By J Marc Foggin, Senior Research Scientist Mountain Societies Research Institute University of Central Asia Kyrgyzstan





BIODIVERSITY AND ECOSYSTEMS: ESSENTIAL INGREDIENTS FOR HAPPINESS

Some people use Gross National Products (GNPs) or Gross Domestic Products (GDPs) (or both), but in Bhutan they have dispensed with that sort of thing; this small but beautiful and tradition-loving Himalayan nation is going for Gross National Happiness (GNH).

The philosophy of GNH was formulated in 1972 by the "Fourth Dragon King – Jigme Singye Wangchuck", and it rests on four pillars: promotion of sustainable development; preservation and promotion of cultural values; conservation of the natural environment; and the establishment of good governance. In keeping with these lofty goals and principles, the conservation of its globally significant genetic resources is a key priority of the Government of Bhutan today. Dr. Tashi Yangzome, Programme Director of the National Biodiversity Centre (NBC), speaks of this approach with a characteristically friendly Bhutanese smile on her face.

A vet by background, Yangzome joined the NBC – a Centre mandated to coordinate biodiversity conservation and sustainable utilisation activities in the country – in 2007. Yangzome describes her years in practice as "most fulfilling" and her current work at NBC as "both challenging and rewarding." Her principle motivating factors, she explains are "the compassionate leadership of our beloved Kings and the strong conservation ideals that Bhutan upholds." The thing that excites her most is working hard towards an inclusive, "people-centric" conservation approach.

With her dedicated team at NBC, Yangzome is currently working on a bio-exploration programme to generate revenue from conservation for conservation; implementation of the Nagoya Protocol on Access and Benefit-Sharing; integrated ex situ and in situ conservation

programmes to benefit farmers as well as researchers; and establishing a science-based information and knowledge base that can be translated into policy decisions.

One intriguing project in progress is the Bhutan Biodiversity Portal – a consortium of different biodiversity stakeholders in the country – that aims to create a common platform for biodiversity-related information.

Yangzome was also instrumental in the implementation of the UNDP supported GEF financed 'Integrated Livestock and Crop Conservation' project, which supported conservation of traditional crops and livestock breeds through an holistic approach, as well as mainstreaming agro-biodiversity conservation into national policies and programmes. It broadened the outreach of the centre in terms of advocacy and education on agro-biodiversity conservation by enabling the participation of farmers from all parts of the country.

Yangzome says with confidence that there is certainly strong support for maintaining the rich agro-biodiversity of Bhutan since it features in draft policies on livestock and agriculture as well as in food and nutrition security policy.

With the support of UNDP, Bhutan has also been able to access US\$ 1 million through GEF for an Access and Benefit Sharing project. Among other objectives, the project will seek to spearhead a bio-exploration programme in Bhutan and generate better understanding of the valuation of the country's biological resources.

Most importantly, Yangzome hopes that this project will result in tangible benefits through the strong involvement of local communities

and create a vibrant conservation model where benefits are ploughed back into communities. Yangzome says that she is committed to developing an ABS landscape that will benefit not only Bhutan but also other countries that are seeking to do the same.

When asked about the highlight of her career, she says: "The most satisfying moments are working with the excellent and committed team at NBC on strengthening biodiversity conservation and sustainable utilisation in the country. It has also been immensely gratifying to meet people from the global family who have helped us with their expertise, knowledge and who have shown such good-will towards my country."

"The challenge that we would like to overcome is how to sustain our agro-biodiversity in the wake of emerging pressures, such as lack of farm labour, rural-urban migration, human-wildlife conflict, and rapid urbanisation." The greatest challenge, however, is to build a strong scientific community that will generate data that can be used in conservation strategies and policy decisions.

One key advantage of her work on biodiversity conservation is that the country still has large swathes of intact biodiversity. Bhutan publicly aspires to become the world's first totally organic nation and the constitution upholds the maintenance of "at least 60 percent of the total land under forest cover at all time". The figure currently stands at just over 70 percent and this, combined with spectacular topography ranging from sub-tropical jungle in the lowland hills to permanent "polar-type" environments in the snow bound peaks over 7,000 metres above sea level, ensures that Bhutan, despite its modest size, is a treasure trove of biodiversity in the region.



Close to 200 species of mammals are known to occur in the country, including 27 globally threatened species. Bhutan is also known to be rich in wild cats, harbouring 11 of the 36 species globally recorded. The remarkable sighting of a Royal Bengal tiger at an altitude of 4,200 metres above sea level, in Jigme Dorji National Park, was the highest altitude tiger sighting recorded among the tiger range countries. Bhutan is home to about 700 species of bird, including 18 globally threatened species.

She attributes this natural wealth to the "conservation leadership of the Kings combined with political will, and a strong policy and legislative framework which provides an enabling environment and engenders strong commitment to ensure that it remains so." Yangzome says that the greatest inspiration on biodiversity conservation comes from the words of the 4th Dragon King who said: "Throughout the centuries, the Bhutanese have treasured their natural environment and have looked upon it as the source of all life. This traditional reverence for nature has delivered us into the new millennium with our environment still richly intact. We wish to continue living in harmony with nature and to pass on this rich heritage to our future generations".

This is the 'conservation anthem' for every Bhutanese citizen. Yangzome sings it with pride, determination and, yes, happiness!

Dr. Tashi Yangzome, Programme Director of the National Biodiversity Centre
Photo: Midori Paxton



TIGER MAN OF MALAYSIA!

Dr. Sivananthan Elaqupillay, Director at the Federal Department of Wildlife and National Parks and the National Project Director of the UNDP supported GEF financed 'Protected Area Financing' project
Photo: Midori Paxton

The 4.5 million hectare Central Forest Spine (CFS) in Peninsular Malaysia is the last remaining habitat of Malayan tigers, a Critically Endangered species. Only an estimated 500 are left in the wild. Going...going...but not gone. Thanks in large part to Malaysia's very own Tiger Man – Dr. Sivananthan Elaqupillay!

Dr. Siva's first field sites were a government-run cattle ranch in Pahang State and another at Tanjong Malim in Perak State. The year was 1982 and his role was the species monitoring and research officer of the Department of Wildlife and National Parks (DWNP). "My job," he explains "was tracking tigers and reducing the number of cattle killed by tigers."

Siva had a local interest at heart. "I considered this work as a contribution to my community, as Tanjong Malim is my hometown," says Siva, currently a Director at the Federal DWNP and the National Project Director of the UNDP supported GEF financed 'Protected Area Financing' project.

In the 1980s, deforestation characterized these areas leaving only pockets of forest remaining – each harbouring tigers and panthers – preying on easy meals of cattle. Over 300-400 head of livestock were lost per year in Perak and Pahang states. Siva, with the consent of the Director General of DWNP and farm managers, deployed field rangers, developed monitoring mechanisms, advised improvements to fencing, moved cattle away from the forest edge and captured "problem tigers" for relocation away from settlements.

Siva is now known as the "Tiger Man" in Malaysia. He has been appointed by the Director General of DWNP to represent the country in regional and global fora for tiger conservation and heads various initiatives towards the national target of doubling the tiger population in Malaysia. He is also renowned as the "Protected Area Man" due to the wealth of knowledge and experience he has accumulated over the 30 years of his career in the Department and through his academic studies, which unearthed a large number of previously unknown facts about the country's protected areas.

Prior to 1996, there were only about 10 protected areas in Peninsular

Malaysia that were thought to be under the jurisdiction of the Federal Government for biodiversity conservation. Through the mandate given to him by the DWNP to head several protected area related projects, especially his research of national archives as part of the Protected Area Master Plan project in 1996, he revealed that there were indeed many more protected areas that were previously designated. But these had been somehow forgotten during the pre-Independence era and the reclassification of many of the forested and protected areas as security areas in the 1990s due to the communist insurgency in the country.

As a result, 40 designated protected areas covering an area of more than 750,000 hectares were rediscovered as already gazetted. His passion for protected area conservation led to the DWNP recommending Siva to pursue a PhD in the United States supported by a Malaysian Government scholarship.

He sees his appointment by the Government to head the 'Protected Areas Financing' project, which started in 2012, as an unparalleled opportunity to assist the DWNP and other stakeholders to train younger officers to work to further improve the management effectiveness of the protected areas system in Peninsular Malaysia.

"This project will soon be complemented by another – the 'Improving the Connectivity in the Central Forest Spine' project – that starts in 2014 under the Forestry Department to create connectivity between forest blocks," he says. "This will link critical habitat for large migratory mammals, such as the Malayan tiger and Asian elephant, and will help to preserve critical water catchments."

Tigers feature prominently in Malaysia and in local Malay folklore. Two of these big cats are even part of the national emblem, depicting the symbol of strength. The tiger is the name of the national football team and the logo of a leading bank. The Hindu Goddess Durga rides on a tiger with unlimited power, using it to protect virtue and destroy evil. "The tiger is in the heart of Malaysia's natural and cultural heritage," says Siva. "I am confident that Malaysians will give their unlimited support to save our national heritage. Protected Areas sustain our lives and our country."

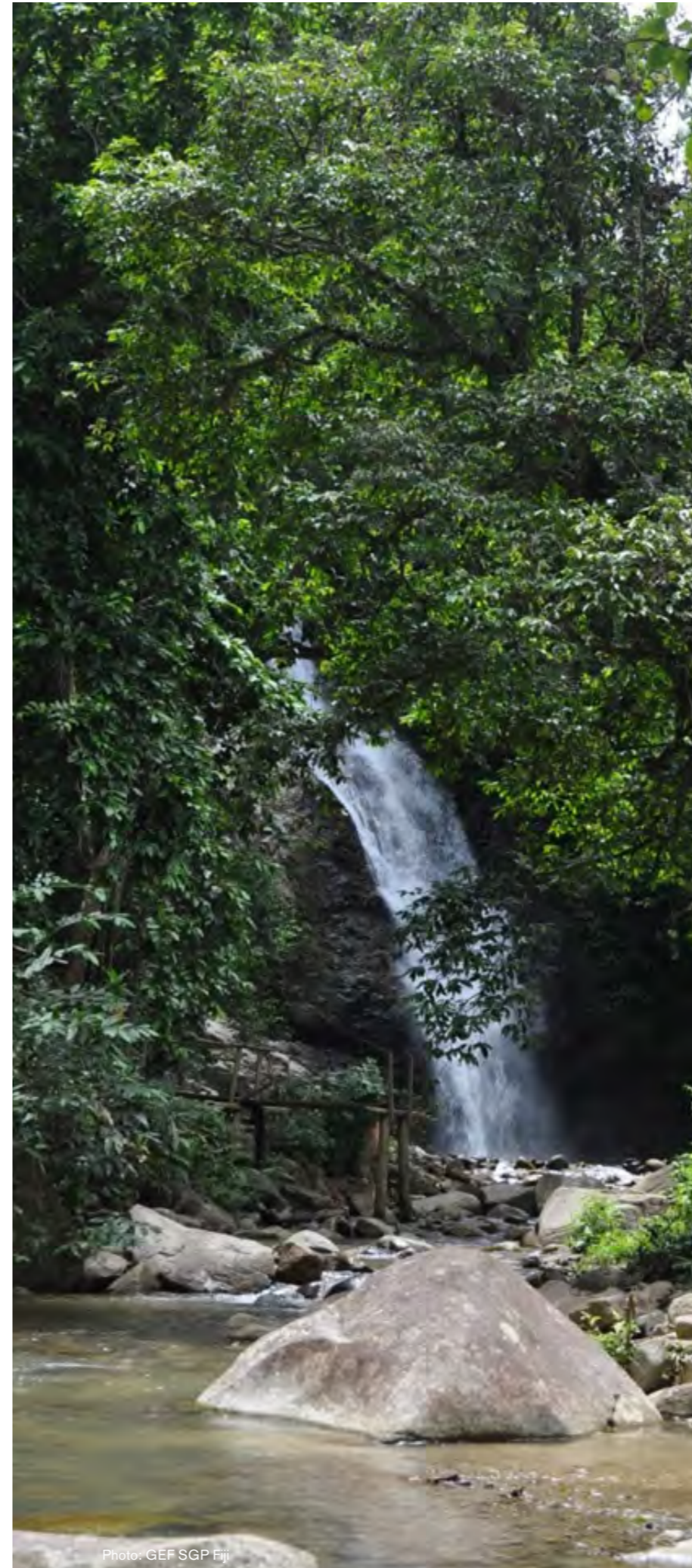


Photo: GEF SGP Fiji

COMMUNITY-LED CONSERVATION OF FOREST BIODIVERSITY IN FIJI

Fiji's Korolevuwai district is home to Biausevu village with approximately 200 hundred residents. Since the mid-1980s, the village has been offering tourists a short walking tour to a nearby waterfall. Over time, this initiative began showing signs of becoming a classic case of natural capital being "loved to death".

The area is an important forest and water ecosystem environment for the island, but the track that crosses the creek nine times has caused vegetation loss and major erosion around flood-prone areas. The riverbanks were being trodden under well-meaning ecotourist feet, furthering erosion already begun by the loss of tree species along the path and more trees being cleared in the vicinity, ironically for eco-tourism development. The landscape was becoming increasingly stressed, barren and tired.

The Global Environment Facility's Small Grants Programme (known as GEF SGP), implemented by UNDP, awards small grants to prevent small problems from growing bigger. In this case, a small grant helped the Biausevu Tourism Committee improve the environmental management of the Biausevu Waterfall Tour and develop a more sustainable approach to managing tourism in sensitive areas.

Key activities included helping the community to identify the effects of logging on waterfall and creek water quality, raising their awareness of the biodiversity in the area, and developing a strategy to manage and minimize future damage on the ecosystem.

In particular, the Biasevu Tourism Committee received training at the University of the South Pacific (USP) and the Department of Forestry (DoF) on sustainable environmental management practices and participated in knowledge exchanges on sustainable forestry management and rehabilitation, forest-based ecotourism, and best practice on governance for resource owners. The project



Photo: Terence Hay-Edie

also developed an Environmental Management Plan and organized community workshops to ensure implementation of these practices.

To tackle soil erosion and divert water away from the track and back into the stream, the project constructed a more sophisticated drainage system led by the DoF, and planted over 700 native tree and plant species beside the creek and waterfall to minimize water pollution.

The results are encouraging, not just in terms of securing a valuable natural asset, but also by yielding other benefits. Following knowledge transfer between experts and the community, the project has helped recover and revive traditional knowledge on medicinal plants and sustainable use of native plant species. It has promoted intergenerational communication by encouraging youths to work side by side with village elders.

In addition, the USP Herbarium Department has documented wild plants living along the track. Visitors can not only learn about the importance of the wildlife and vegetation of the area, but also participate in tree planting activities along the path.

The project also started a series of activities to promote sustainable alternative livelihoods to alleviate pressure the area from tourism, including the production of handicrafts and food for sale by local women and training of community members as tour guides. To date, the project has generated over 100 jobs including forest tour guides, waterfall attendants, nursery attendants, storytellers, caterers, tour coordinators and handicraft sellers.

Most importantly, the GEF SGP project has worked with the local authorities to impose a capacity limit on the number of people accessing the track per week to mitigate adverse environmental impacts caused by the excessive trampling of overcrowded tours.

GEF SMALL GRANTS PROGRAMME: LOCAL ACTION, GLOBAL IMPACT

Launched in 1992, GEF SGP supports activities of non governmental and community-based organizations in developing countries towards climate change abatement, conservation of biodiversity, protection of international waters, reduction of the impact of persistent organic pollutants and prevention of land degradation while generating sustainable livelihoods. Since its creation, GEF SGP has provided over 18,500 grants to communities in over 128 developing countries. Funded by the Global Environment Facility (GEF) as a corporate programme, GEF SGP is implemented by the United Nations Development Programme (UNDP) on behalf of the GEF partnership, and is executed by the United Nations Office for Project Services (UNOPS).

GEF SGP has been supporting communities as 'champions' of biodiversity conservation since its launch. Nearly 8,000 GEF SGP grants for biodiversity conservation awarded globally since 1992 have contributed significantly to protected area management, reduction of threats to threatened species, improved environmental governance, sustainable natural resource management, and the conservation and sustainable use of agro-biodiversity. GEF SGP's cumulative experience and results have demonstrated that supporting communities in their efforts to achieve more sustainable livelihoods is not only possible, but necessary to achieve global environmental benefits.



"THE SMALL GRANTS PROGRAMME HAS SUPPORTED US TO RESTORE THE WETLAND AND HELP MORE WOUNDED WHOOPER SWANS AND OTHER MIGRANT BIRDS TO RETURN TO BLUE SKY."

MR. YUAN XUESHUN,
WEIHAI WHOOPER SWAN
PROTECTION ASSOCIATION,
SGP GRANTEE FROM CHINA

"WITH THE ECO-NATURAL DYES PROGRAMME FROM THE SMALL GRANTS PROGRAMME, WE LEARNED THAT THE MAHOGANY AND JACKFRUIT TREES THAT GROW IN OUR VILLAGE ALSO HAVE ECONOMIC VALUE AND THAT WE CAN PROTECT THEM BY NOT CUTTING THEM DOWN AND ONLY TAKING THE TREE BARK AND LEAVES FOR BATIK DYE."

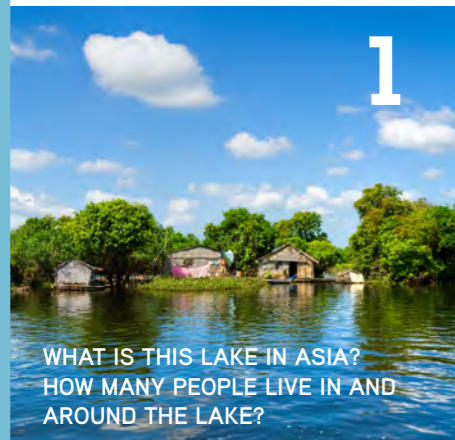
AMBAR, BENDOSARI, SGP GRANTEE FROM INDONESIA



"THE SMALL GRANTS PROGRAMME HAS HELPED PROMOTE ENVIRONMENTALLY, SOCIALLY AND ECONOMICALLY-FRIENDLIER SUSTAINABLE AGRICULTURE, WHILE ENHANCING THE CONSERVATION AND SUSTAINABLE USE OF AGRO-BIODIVERSITY. THROUGH THE USE OF COMPOST AS A GROWTH ENHANCER, THE PRODUCE IS ABLE TO GROW TO ITS FULL POTENTIAL."

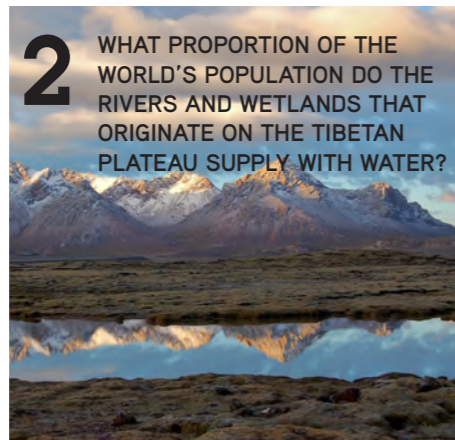
VENKATA SUBBAROW NARAYANAN, CAP
EDUCATION OFFICER, SGP GRANTEE FROM
MALAYSIA

ECOSYSTEMS QUIZ



1

WHAT IS THIS LAKE IN ASIA?
HOW MANY PEOPLE LIVE IN AND AROUND THE LAKE?



2

WHAT PROPORTION OF THE WORLD'S POPULATION DO THE RIVERS AND WETLANDS THAT ORIGINATE ON THE TIBETAN PLATEAU SUPPLY WITH WATER?



3

HOW MUCH ARE INSECTS AND OTHER POLLINATORS ESTIMATED TO BE WORTH TO THE GLOBAL FOOD ECONOMY PER YEAR? A) USD 200 MILLION, B) USD 2 BILLION, C) USD 200 BILLION?



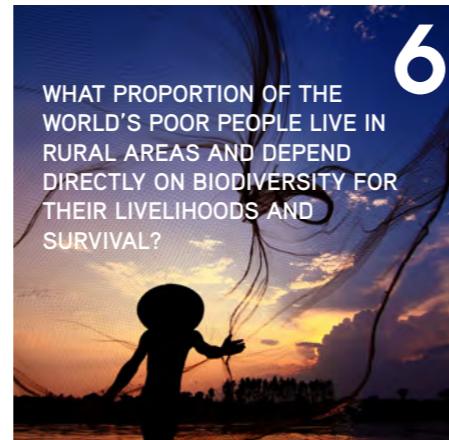
4

WHAT PROPORTION OF THE GLOBAL POPULATION RELIES ON FISH AS A MAJOR SOURCE OF PROTEIN?



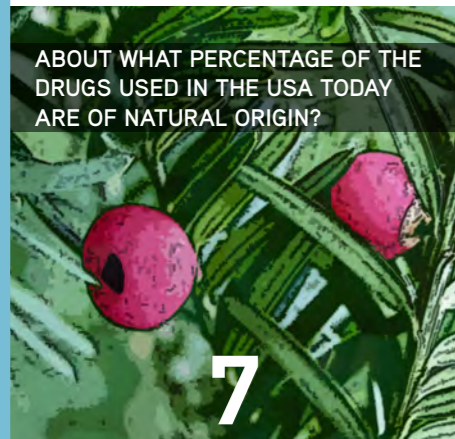
5

THE ASIA PACIFIC REGION INCLUDES A CENTRE OF DIVERSITY OF WHICH OF THESE IMPORTANT SPECIES OF CROPS: RICE, EGGPLANT, SOYBEAN, BANANA, COCONUT?



6

WHAT PROPORTION OF THE WORLD'S POOR PEOPLE LIVE IN RURAL AREAS AND DEPEND DIRECTLY ON BIODIVERSITY FOR THEIR LIVELIHOODS AND SURVIVAL?



7

ABOUT WHAT PERCENTAGE OF THE DRUGS USED IN THE USA TODAY ARE OF NATURAL ORIGIN?



8

HOW MUCH ARE TOTAL GLOBAL ECOSYSTEM SERVICES IN 2011 ESTIMATED TO BE WORTH?



9

HOW MANY NEW SPECIES ARE DESCRIBED EACH YEAR ON AVERAGE? A) 62; B) 620; C) 6,200

Ecosystems quiz photos: Luciano Mortula/Shutterstock.com; Marc Foggin; Sarah Valenti; Doungjun Roongruang; Worraket/Shutterstock.com; Kitsadakron Photography/Shutterstock.com; UNDP India; Bildagentur Zoonar GmbH/Shutterstock.com; Nathan B Dappen/Shutterstock.com.

1 Tonle Sap Lake in Cambodia. More than 1,000,000 people live in this UNESCO Biosphere Reserve, mainly in the buffer and transition area. Some sixty floating villages are found on the lake. This area is vital for the economy and nutrition of Cambodian people, since its fisheries provide 80 percent of the protein consumed within the country. 2. One-third of the world's population, 3. C: 200 billion USD. 4. About 41 percent of the world's population. 5. All of them. 6. 70 percent of the world's poor live in rural areas and depend directly on biodiversity for their livelihoods and survival. 7. Studies show that more than 50 percent of the drugs on the market in the United States are based on plants or other natural products. 8. USD 125 trillion per year to USD 145 trillion per year according to one estimate. 9. C: At current rates, an average of 6,200 new species are described each year. In spite of 250 years of taxonomic classification and over 1.2 million species already catalogued in a central database, one estimate suggests that some 86 percent of existing species on Earth and 91 percent of species in the ocean still await description.

ANSWERS

ACKNOWLEDGEMENTS

We would like to thank and recognise the many project teams and partners who have contributed to the projects profiled in this publication and to the publication itself, and to thank the Global Environment Facility (www.thegef.org).

This book is the result of dedicated work by many people. We are very grateful to the photographers for contributing their beautiful photos. Thank you to everyone who provided material, information and advice to support the publication, including: Katarina Atalifo-Malo, Lat Lat Aye, Ankhbayer B, Oyuntulkuur Bandi, Marta Barai-bar, Bunchingiv Bazartseren, Timothy Boyle, Tan Cheng Cheng, Norng Chinda, Marita Cisneros, Supaporn Daophises, Adriana Dinu, Tashi Dorji, Sivananthan Elaquipillay, Floradema Eleazar, Thomas Enters, Jamison Ervin, Marc Foggin, Pek Chuan Gan, Janette Garcia, Carsten Germer, Mahtab Haider, Cherie Hart, Terence Hay-Edie, Alamgir Hossain, Aminath Ibrahim, Srinivasan Iyer, Gulnagam Jamy, Ashish John, Gordon Johnson, Houman Jowkar, Chimeg Junai, Mehdi Kamyab, Nagulendran Kangayatkarasu, Sameer Karki, Asfaazam Kasbani, Vijay Prasad Kesari, Akihito Kono, Pramod Krishnan, Iwan Kurniawan, Chaode Ma, Henrieta Martonakova, Vinamra Mathur, Sovanna Nhem, Karen Nielsen, Htun Paw Oo, Ruchi Pant, Charles Paxton, Kimberly Paxton, Karma Raptan, Caroline Petersen, Chaode Ma, Norzilla Mohamed, Mike Moser, Ali Nazaridoust, Keiko Nomura, Hari Ramalu Ragavan, Saeful Rachman, Floyd Robinson, Doungjun Roongruang, Prashanthi S, Joel Scriven, Nik Sekhran, Leylanaz Shajji, Darshan Shankar, Mr Song, Chhum Sovanny, P.S. Sodhi, Paul Steele, Grace Tena, Saw Doh Wah, Sonam Wang, Sonam Wangchuk, Shimpay Wadhwa, Yoko Watanabe, Mina Weydahl, Tashi Yangzome, Celina Yong. We are very grateful to Cathy Maize, Wallaya Pinprayoon, Noparat Uathamthaworn and Sirintharat Wannawong for support. The compilers and contributors are deeply grateful to all those who have contributed to the achievements of UNDP supported GEF financed projects in Asia and the Pacific.

THEME INTRODUCTION PHOTOS:

Home: Travelling nomads and their yak herd criss-cross the hills of the Sanjiangyuan National Nature Reserve on the Tibetan Plateau, China. Nomadic herders have lived in the high mountain landscapes of Central and North Asia for millennia, relying on pasture to graze their livestock for their main livelihood. Photo: Kieran Dodds.

Food and Water: Traditional Intha fisherman, Inle Lake, Myanmar. Photo: happystock/Shutterstock.com.

Work and Money: Women of the stilt village in Kompong Phluk on the Tonle Sap lake in Cambodia generate household income from guiding tourists through the flooded forest. Photo: Midori Paxton.

Health and Security: Women clearing invasive water hyacinth in Jeypore village, coastal Odisha, India. Water hyacinth contaminates water, reduces soil fertility, spreads diseases and blocks waterways and causes water logging. Twice a month, 70 women volunteers clean out the water hyacinth that grows in water bodies in Jeypore village. As a result of their efforts, the water quality has improved. Today, the villagers use the pond for duck farming, and fishing. Photo: Prasanth Vishwanathan/UNDP India.

Happiness and Love: Prayer flags rustle in the breeze above Phajoding Monastery on the outskirts of Jigme Dorji National Park, Bhutan. For centuries a strong religious and cultural ethos based on Buddhism and respect for all forms of life has provided a safe refuge for the extraordinary biodiversity found within this Himalayan Kingdom. Photo: Jesse Montes.

Cover photo: Sylvia sooyoN/Shutterstock.com. Bajau people in Semporna, Sabah, Malaysia. For most of their history the Bajau people, an indigenous group of the Southeast Asian seas, have lived a nomadic life at sea.

**Published by the Asia-Pacific Regional Centre
United Nations Development Programme
Bangkok
Thailand**

Compilation and editing: Midori Paxton, Sarah Valenti, Hugh Gordon and Penny Stock.

Contributors: Ana Maria Currea, Joseph D'Cruz, Marc Foggin, Sutharin Koonphol, Gary Lewis, Karma Lodey Raptan, Jessie Mee, Johan Robinson, Nik Sekhran, Doley Tshering.

Design: Bleho Media

Printing: Clung Wicha Press

Citation: UNDP. 2014. Biodiversity for Sustainable Development: Delivering Results for Asia and the Pacific.

ISBN:

Copyright © UNDP, October, 2014

All rights reserved. This publication or parts of it may not be reproduced, stored by means of any system or transmitted, in any form or by any medium, whether electronic mechanical, photocopied, recorded or of any other type, without the prior permission of the United Nations Development Programme.

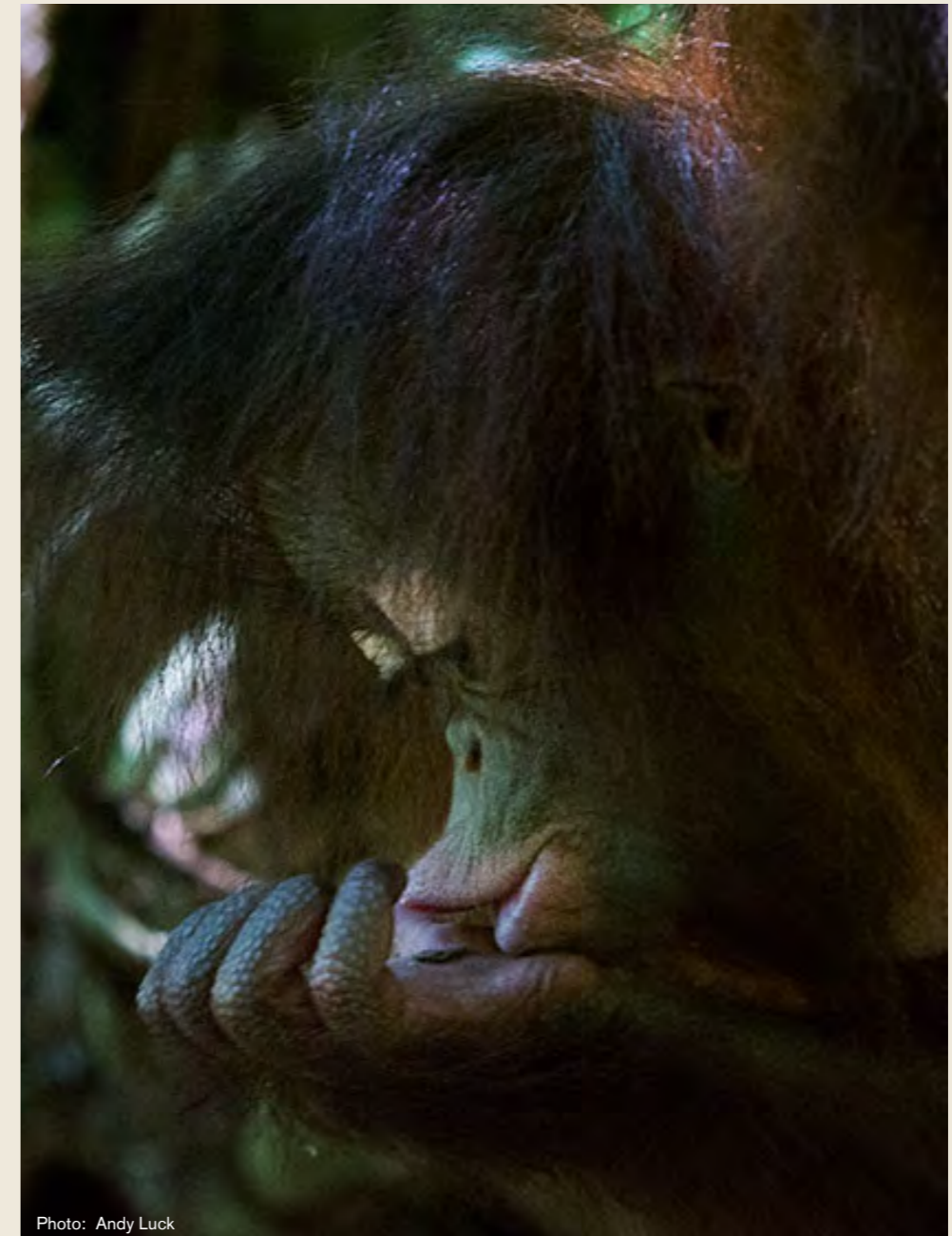


Photo: Andy Luck