



50  
YEARS

*Empowered lives. Resilient nations.*

A close-up, profile view of a woman's face, looking upwards and to the right. The lighting is dramatic, highlighting the contours of her face against a dark background.

# VOICES OF IMPACT:

SPEAKING FOR THE  
GLOBAL COMMONS

STORIES FROM 25 YEARS OF ENVIRONMENTAL INNOVATION FOR SUSTAINABLE DEVELOPMENT



**VOICES OF IMPACT:**  
SPEAKING FOR THE GLOBAL COMMONS



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Empowered lives. Resilient nations.

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The Global Environment Facility (GEF) was established on the eve of the 1992 Rio Earth Summit, to help tackle our planet's most pressing environmental problems. Since then, the GEF has provided over \$15.61 billion in grants and mobilized in excess of \$84.91 billion in additional financing for more than 4237 projects. The GEF has become an international partnership of 183 countries, international institutions, civil society organizations, and private sector to address global environmental issues. [www.thegef.org](http://www.thegef.org)

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For a full list of photo credits see page 96.

FRONT COVER Namibian woman

THIS SPREAD Wind turbines, Eastern Cape, South Africa



## MESSAGE OF SUPPORT



AS ONE OF THREE FOUNDING PARTNERS of the Global Environment Facility (GEF), the United Nations Development Programme (UNDP) has contributed significantly to the well-being of our planet's life support systems which are at the heart of the global sustainable development agenda – the stories told by the *Voices of Impact* in this 25th anniversary publication stand as compelling and inspiring evidence of this.

The GEF was established in 1991 to help tackle our planet's most pressing environmental problems. Since its inception, over one third of its grant financing to developing countries has been mobilized by UNDP working with partner countries. These GEF investments have helped to preserve threatened ecosystems and species, build sustainable communities, boost food and water security, address land degradation and develop integrated mechanisms for managing pollution. In close partnership with UNDP, the GEF has also sought to empower women and other vulnerable groups, and respect the dignity, human rights, economies, cultures and traditional knowledge of indigenous peoples.

In this landmark year, which also marks UNDP's 50<sup>th</sup> anniversary, we are proud to reflect on the successes achieved together. We have made significant progress. But, we also know that there is still much work to do – the global environment continues to deteriorate, threatening the realization of our development ambitions.

Last year, the adoption of the Sustainable Development Goals and the Paris Climate Agreement were turning points for the global community. They made clear that protecting the global commons – from land, biodiversity and forests, to the oceans and climate – is essential for sustainable development. And, that we need transformational changes in our energy, urban and land use systems.

Shifting to a low-carbon and resilient trajectory will require co-ordinated, integrated solutions to catalyse the transformation of three key economic systems: energy – how we power our homes, offices and industry, and move goods and people; urban – how we live in cities and build new ones; and land use – how and where we produce food, and what we eat.

Building on the legacy of the past 25 years, as we look to the future, we will work alongside our partners to find bold and imaginative ways to accelerate transformational change, enable new alliances, and create social and economic opportunities to provide the stable planetary conditions necessary for sustainable development, poverty reduction, peace and justice.

The UNDP, as a vital partner, has a pivotal role to play in this ongoing story, as we work together to ensure that individual successes add up to the systematic changes we need to safeguard the global commons for current and future generations. It's the wisest investment we can make.

Dr Naoko Ishii  
CEO, Global Environment Facility

## FOREWORD

THIS IS A LANDMARK YEAR FOR UNDP, as we celebrate both our own 50<sup>th</sup> anniversary and the 25<sup>th</sup> anniversary of our partnership with the Global Environment Facility (GEF). Over the past two and half decades, the results-driven and strategic nature of the GEF-UNDP partnership has contributed to the achievement of high-impact environmental benefits, in support of sustainable development.

As an implementing agency of the GEF, UNDP has supported countries in accessing a total of US\$ 5.8 billion over the years in grants from *the GEF Trust Fund, the Least Developed Countries Fund, the Special Climate Change Fund, and the Nagoya Protocol Implementation Fund*. Around the world, this funding has enabled countries to deliver quality results for people and our planet. These investments have helped to transform markets, strengthen the resilience of vulnerable communities, and address the root causes of environmental degradation. They have also built the capacity of countries to safeguard their natural capital as the foundation of their overall sustainable development.

At UNDP, we are celebrating these successes with a collection of stories told by the people who have made them possible. Taken together, these *'Voices of Impact'* celebrate 25 years of environmental innovation and development impact which have been enabled by the GEF.

The stories illustrate the wide spectrum of GEF-financed, UNDP-supported programmes. These are stories of individual triumph over adversity; community empowerment; industry-wide capacity development and partnership; collective action at the national level; and multi-country co-operation. Some stories focus on a specific issue in a particular country, some deal with cross-cutting issues in a region, and others describe the impacts of the full portfolio of projects in an entire country.

The achievements described are the result of the collective efforts of thousands of people around the world – without their commitment and hard work, we would have no stories to tell. But, as we reflect on our successes, we are mindful that our world continues to face both new and persistent challenges. The outlook for people and our planet is complex – on the one hand we have climate change, serious conflicts, political turbulence, economic inequality, and planetary boundaries being exceeded. On the other hand, we see an unprecedented global consensus about the best way forward – as expressed in the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change.

At UNDP we envisage a world in which all people can prosper, societies are more inclusive, and the planet maintains the integrity of its ecosystems and is protected from the worst effects of climate change. This is what guides our work. In strong partnership with the GEF, and other partners, we are committed to helping advance the 2030 Agenda and to supporting countries to turn the vision of long-term prosperity, human development, and environmental well-being into reality.



Helen Clark  
Administrator, UNDP



Peruvian women and child

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## VOICES OF IMPACT: A PREAMBLE

“STORYTELLING IS PART OF THE FABRIC that holds human societies together – stories connect us to our humanity, providing links to what has been, and a glimpse of what might be to come.

Spanning all 25 years of UNDP’s partnership with the GEF, the stories in this anniversary publication represent a small sample of the thousands that could be told. These stories stand as evidence that our work to protect the health of the planet is bringing about real improvements in people’s lives and changes in the way governments, businesses and civil society think about the environment, develop policies and do their work.

The storytellers include people from all walks of life, including subsistence farmers, civil society leaders, captains of industry, environmental practitioners, renowned academics and government ministers. The common thread that binds their stories together is the message of transformational impact that promises a brighter future.

The topics of their stories vary widely, ranging from strengthening the governance of protected areas, to increasing the resilience of vulnerable communities to climate-induced risks, empowering women through sustainable land management, ridge-to-reef approaches to conserving threatened species and improving local livelihoods, building models for community conservation, partnerships for improved management and governance of oceans, renewable energy solutions for greening the reconstruction of war-damaged countries, and reducing the risks to human and environmental health through improved management of harmful chemicals.

From the foothills of the Himalayas in Bhutan, to the coastal fishing grounds of Cuba, the arid plains of Kenya and the small islands of the South Pacific, the ‘voices’ featured in this book speak of the profound impacts that these projects have had on their own lives, on their communities and institutions, and on the planet itself. The stories speak of strong partnerships involving people and institutions in all sectors of society – these are the *‘Voices of Impact’*, the champions of our shared heritage who are speaking for the global commons. ■

# Bringing the land to life

BUILDING GRASSROOTS CAPACITY FOR IMPROVED LAND STEWARDSHIP IN KENYA

“I WAS MARRIED AT A YOUNG AGE – I did not have much say in the matter. After school, I started studying at teachers’ college, but, after only one year, my first child was born and I had to take on my duties as a mother.

As is usual for Maasai, I have always relied on keeping livestock for my livelihood – as much as I might have wished to grow crops, this area is too dry for that. But, relying only on animals gave us many problems. We used to move from one place to another searching for grass for our cattle – finding water became a big challenge, especially during the dry periods. Our cattle and goats grew thin, and some died. It became risky to depend on livestock alone because we could not be sure of the rains, the droughts became long and there wasn’t enough water and pasture. I was afraid of losing everything, so I sold most of my cows at a loss.



**ESTHER KULUO**, is a member of Ilaretok Farmer Field School, and is Treasurer of the Ilaretok Water Management Committee in the Rift Valley of Kenya. Now in her sixties, Ms. Kulo is a mother of seven children and a widow. She makes her living as a farmer and pastoralist.

About two years ago, I was given a new chance. Some project officers came to our community looking for a group of farmers who they could work with. At first it was difficult, because the group was made up only of men – in the Maasai culture, women were not allowed to join the same groups with men. But, the project officers helped us form Ilaretok Farmer Field School (FFS) with 56 members – men and women! We were trained in new ways to farm.

Our lives have been made better in so many ways. We now have a borehole and a water pan for holding rainwater. Before, it would take about four hours to go to the river for water, but now we can get water in a much shorter time. So I have more time to work on the farm, look after my livestock and dig terraces. It is also better for the children – they no longer have to fetch water at the river after school. Instead, they can spend time on their schoolwork – and stay out of trouble!

Before, our land was being depleted of ground cover, and the soil would wash away. Now we can grow grass for our animals – we didn’t know before that grass can be *planted*, we thought it just grows by itself. But the project enlightened us and gave us seeds and I have gratefully taken this up. We have planted fast-growing trees for woodlots, so we no longer cut down the woodland trees for fuel wood. And we have taken up better ways of farming that use soil and water conservation, so there is less soil erosion.

We are proud because we no longer have to rely on relief food. I farm in different ways and can earn a better living. In the previous rainy season, I conserved water on my farm and the water run-off was very little. As a result, from 4 acres, I managed to harvest 55 bags of maize and 10 bags of beans – from the same land where before I used to get 2 bags or nothing at all! Since upgrading my local chickens using the new cockerels, my birds fetch up to four times the price I



Farmer Field School members preparing a demonstration plot for experiential training in Suswa, Narok County

used to get at the market. We can now cater better for household needs such as paying school fees and buying food. I am proud to say that last year I could pay the fees for my last-born child who is at the university.

Since joining the Farmer Field School, we feel safer working together and see good changes in our homes. We have even started a savings group through which we buy utensils for use in our homes.

Women now have a voice! Before, a woman would

not stand and address a gathering of men, but what we have done with the Field School has made it possible for women and youth to be involved in decision-making, both in households and in the community. Our skills and talents have been sharpened and many of our members have even been elected to serve in leadership positions in the community.

I can truly say now: *‘mambo si kama zamani’* (‘things are not like in the past’) – our lives are better.” ■

## MAINSTREAMING SUSTAINABLE LAND MANAGEMENT IN AGRO-PASTORAL PRODUCTION SYSTEMS IN KENYA.

Land degradation is a barrier to sustainable development, especially in drylands, which account for about 80 percent of the land-surface of Kenya. Sustainable Land Management (SLM) is a comprehensive approach to addressing land degradation through improved land stewardship, with benefits for both the environment and the people who depend on it.

Working in support of the Government of Kenya, UNDP has helped develop and implement a project to address chronic poverty, hunger and

land degradation by building capacity for sustainable land management, especially amongst women. The project, of which Ms Kulo and her community were beneficiaries between 2010 and 2015, worked to improve carbon stocks, promote water conservation and climate-smart agro-pastoral practice in order to enhance food security, build sustainable livelihoods, and restore the ecological integrity of arid and semi-arid landscapes.

The objectives of the project were achieved

through knowledge-based land-use planning and community-based experiential learning using the Farmer Field School model, bringing direct benefits to 11,448 farmers (two thirds of which were women), and indirect benefits to 243,633 community members. Over 100,000 hectares of degraded land were rehabilitated through pasture re-seeding and tree planting. The work was funded by the GEF, with co-finance from the Government of Kenya and civil society partners.



# Rays of hope

GREENING THE RECONSTRUCTION OF LEBANON

“**S**AÏDA GOVERNMENT HOSPITAL was established in December 2006 following the war in Lebanon. I came on board as a maintenance engineer back then, and was in charge of completing maintenance checks, both preventive and corrective. Electricity supply in Lebanon was highly unreliable then, and we had to rely heavily on diesel generators – a hospital cannot provide proper medical care without hot water and electricity.

One of my tasks was to perform daily inspections of the generators and boilers to make sure oil and diesel levels were correct. There was no proper record-keeping system for tracking diesel usage, as we lacked qualified personnel and funds to invest in a state-of-the-art monitoring system. Using my manual records, I could estimate our fuel consumption at between 150 - 200 litres of diesel per day – *solely* for hot water! This was an astronomical figure, especially considering that this is a public hospital and most of the patients are poor, coming from war-affected areas, and cannot afford private medical care.

In 2009, the government raised donor funding to promote the installation of solar technology to supplement energy supply to public buildings. Energy engineers conducted a site assessment for Saïda Hospital, working out our

**MR. HISHAM ABBAS**, is the Director of the Clinical Energy Department at Saïda (Sidon) Governmental Hospital in South Lebanon. He holds a degree in electronics and electrical sciences and has occupied his current position at the hospital since 2010. Mr. Abbas manages all aspects of the operation and maintenance of hospital equipment, and is responsible for planning and record-keeping.



diesel consumption – for lighting, hot-water usage and general electrical supply – and comparing this to our needs, taking into account our bed-capacity and operating hours. During that period, the hospital management team was also restructuring the maintenance department, and this gave me the opportunity to become involved in the solar water heating project – partly in my capacity as the maintenance manager, and also because I was simply an enthusiastic technician.

The first few months after the installation were the most critical, as we were not too sure how the system would function, and whether it would generate enough hot water – a critical matter in a hospital. To our relief and pleasure, the system proved to be highly efficient. The use of this technology resulted in a cost saving of over US\$7,000 per year – much-needed funds that could then be used for other upgrades or the purchase of new medical equipment. Most of the savings were realised through a drop in diesel consumption by the old boilers – a decrease of 70 percent, to only 50 litres per day.

The solar water heating installation has made a real difference to the operation of this hospital. We had an incident about a year ago that confirmed this for me. One of the water pumps broke down and I had to call

in contractors to repair it. I immediately switched on the back-up boilers and hardly expected anyone to know the difference. To my surprise, within a few hours the hospital manager called me up asking why there was a shortage of hot water – the boilers take much longer to heat the water than the solar panels do, and the hospital had grown used to the greater efficiency of the solar heating system.

I have had both staff members and patients ask me whether this technology can be installed in their homes – remember that electricity shortages do not only affect public buildings in Lebanon; in their homes, people often experience long power blackouts and carry the heavy cost of buying generators and diesel for meeting basic needs such as hot water, and have to suffer the impacts on their health of living

with all the diesel fumes.

I understand that one of the main reasons for converting to solar technology is that it helps in the fight against climate change. Reducing the use of diesel results in lower emissions of carbon dioxide – in the case of Saïda hospital, we have calculated that use of the solar panels will reduce our carbon emissions – just from *this* hospital – by about 28.74 tons per year. But, what I have seen here is that it also brings a real improvement in the kind of care the hospital can provide, and the patients are better off. Now that our maintenance team have experienced first-hand the installation, operation and maintenance of this relatively new technology, we can play an important role in bringing it to other hospitals, hospital staff, patients, and the general public in this southern part of Lebanon.” ■

Solar water heaters, Saïda Government Hospital, Lebanon



## ENHANCING MARKET READINESS FOR SOLAR TECHNOLOGY IN LEBANON

**T**he Republic of Lebanon faces complex socio-economic challenges as it works to reconstruct its war-torn financial and physical infrastructure, restore its social fabric, and protect people's lives and livelihoods from the increasing risks posed by climate change. In the aftermath of civil war in the 1990's, Lebanon has not upgraded its electrical infrastructure, and large discrepancies exist between supply and demand. This causes acute and chronic power shortages, sometimes resulting in 12-hour

long blackouts, especially in remote areas.

The GEF-financed Solar Water Heaters project described by Mr Abbas, was initiated in 2009 by UNDP to assist the Government of Lebanon in taking the first step to increase capacity for the installation of solar water heaters, and to provide financial mechanisms to promote the uptake of this technology at the national level. This has been followed by a series of renewable energy and energy efficiency projects funded by the GEF and other

partners – known by the acronym CEDRO – to develop and implement a fully-fledged sustainable energy strategy and build capacity for a low-emissions development pathway to address socio-economic issues and mitigate the causes of climate change. The CEDRO project has implemented larger-scale thermal solar systems in Saïda Hospital as well as in public institutions across the country including other hospitals, army facilities (barracks), orphanages and other public buildings.



# Knowledge is our strength

BUILDING RESILIENCE TO FLOODING IN BOSNIA AND HERZEGOVINA

ABOVE The beautiful but dangerous Vrbas River, near Banja Luka

“WE EXPERIENCED SEVERE FLOODS twice in 2014. In the first flood in May, the water started flowing at night and the flood reached its peak in the early hours of the morning. People tried to move everything to the upper storeys of their homes, but the water level rose so high that it did not really help. Our emergency services did their best to evacuate people, but the people didn’t want to leave their homes – they had no idea how bad the flood would become. Also, our Fire Brigade and Police did not have proper training for such situations. These floods damaged homes, the school and other public infrastructure and many people lost their possessions – the cost of the damage exceeded the entire year’s budget of the Municipality!

**MR MIROSLAV BABIC** lives in the town of Celinac, which straddles the Vrbanja River (a tributary of the Vrbas), in north-west Srpska, Bosnia and Herzegovina. Born and educated in the nearby city of Banja Luka, he studied economics at university, before relocating to Celinac, where he is now employed by the Department of Economy in Celinac Municipality. He serves on the Emergency Situations Committee and Civil Protection Unit and is responsible for disaster management.

In August, the floods were devastating, worse than anything ever recorded before – none of the older citizens here can recall any flood that was ever this bad. The floods seem to be getting worse and more frequent here in Celinac – before, floods came every 10 to 15 years but now they are happening about every five years, and they are much more intense. In the August flood, the greater part of this municipality was destroyed – there were landslides, buildings and roads were extensively damaged, industries were lost, and, in the rural areas, agricultural lands were destroyed – a terrible thing, because those communities are poverty stricken and many of them previously suffered terrible hardship in the War. The worst thing for me to witness with this flood was the loss of human lives.

We were totally unprepared and had no equipment or plan for how to deal with this. Things were made worse by the fact that poor planning and ignorance meant that buildings had been erected along river banks where they could not be protected. I remember being so frightened – we had no communications, no road connections, no water, no food, the electricity substation was underwater, the city bridge was washed away, people’s homes were flooded and their belongings ruined. We were completely cut off from everything. My Director and I went on an inspection round late on the night the floods

hit – it was totally dark, there were no people around, just destruction everywhere and the roar of water. We wondered then if the city would ever recover.

What these floods did was expose how weak we were. This is why we are so grateful to be involved in the flood management project that the GEF and UNDP are supporting in the Vrbas River Basin – I co-ordinate the Municipal Working Group for this project. The first thing we have done is to undertake a socio-economic analysis and mapping exercise to identify risk zones. This forms an important part of our developing emergency response plans, and training in flood-specific civil protection. The Early Warning Systems the project is installing will also mean that we are never caught unprepared again. Hydrological equipment for monitoring, assessing and forecasting flood risks is also being upgraded. At the Hydro-Meteo Institute, they have gone from having no automatic

hydrological stations to having the best data collection, analysis and distribution systems in the country. Community training for flood-preparedness will also be important as in the earlier floods people made the situation worse because they did not know what to do.

Before, ‘Civil Protection’ and ‘Adaptation to Climate Change’ were just ideas on paper – we had no information, no plans, no equipment and no capacity. One of the greatest contributions this project has made so far is that it has given us knowledge. And that gives us the power to protect ourselves, our homes, and our livelihoods.”



Flooded streets of Celinac

## TECHNOLOGY TRANSFER FOR CLIMATE RESILIENT FLOOD MANAGEMENT IN THE VRBAS RIVER BASIN

Bosnia and Herzegovina is still recovering from the devastating effects of the 1992 – 1995 war. It faces significant threats from climate change, but has limited capacity to address and adapt to negative impacts, such as the increased frequency and magnitude of floods. These impacts have the most severe effect on the vulnerable communities within river basins, and economic sectors such as agriculture and energy-generation (hydropower).

The Vrbas River basin is characterized by a large rural population comprising the poorest and most vulnerable communities, including war returnees

and displaced people who have suffered successive deprivations due to conflicts in the region. They are now also faced with high exposure to flooding and its devastating impacts. In May 2014, Bosnia and Herzegovina experienced its worst flooding in 150 years, which resulted in 23 deaths and billions of dollars worth of damage equivalent to 15 percent of GDP, with serious economic ramifications.

The UNDP-supported project “Technology transfer for climate resilient flood management in Vrbas River Basin” (2015–2020) will enable the government of Bosnia and Herzegovina, and particularly the

communities of the Vrbas basin, to adapt to flood risk through the transfer of technologies for climate-resilient flood management.

Working closely with state, local government and other institutions, the project will enable strategic management of flood risk through the legislative and policy framework, and appropriate sectoral policies and plans that incorporate climate change considerations. This project forms part of a broader programme of work funded through the GEF to address similar climate-related risks in the greater Balkans and Caucasus regions.

# GloBallast

REDUCING INVASIVE SPECIES RISK THROUGH  
GOVERNMENT-INDUSTRY-UN PARTNERSHIPS

“AS A RESPONSIBLE GLOBAL SHIPPING CARRIER, APL is dedicated to protecting ocean biodiversity. With ballast water identified as a major threat to the world’s marine ecosystems as a key vector for invasive species transfer, effective ballast water management (BWM) has been a hot topic of discussion among the global shipping industry and scientific community over the years.

My involvement with the GloBallast Programme (a partnership between the GEF, UNDP and the International Maritime Organisation, IMO), commenced when I was approached to represent APL on the GloBallast Global Industry Alliance (GIA). This is an innovative public-private partnership created under GloBallast to assist in finding common solutions to address ballast water issues, including new technologies, along with capacity-building activities to benefit the

participating private sector companies.

GloBallast was naturally very keen to approach the shipping industry as a partner, as some concerns had been identified within the industry, particularly regarding the added cost of introducing new and costly technology that had not been truly tested during real ship operations.

One of the many milestones of GloBallast was their highly awarded documentary, *“Invaders of the Sea”*, co-produced with the BBC. In one scene, an Iranian fisherman in the Caspian Sea graphically explained the dramatic impact of the invasive comb jelly on the local economy, and the lack of alternative resources to support his family. This was the ‘poster story’ that was necessary to raise awareness about the damage caused worldwide by harmful invasive aquatic species, estimated at a cost of US\$ 100 billion *per year*.

It is important to understand that marine bioinvasions are the source of important environmental and socio-economic impacts that go beyond the reduction in fisheries production due to competition or predation; they also include impacts on aquaculture and coastal infrastructure; or can jeopardize the development of a tourism industry, for example through physical fouling of beaches and severe odours from algal blooms. This can place at risk any efforts made to provide solutions for poverty alleviation in coastal communities. Moreover, unlike most other threats to the marine environment, aquatic invasive species are

**MR SHAJ U. THAYIL** is the Chairperson of the GloBallast Global Industry Alliance (GIA) Task Force. A marine engineer by training, with a Master’s degree in Business Administration from the University of Strathclyde, he has extensive maritime experience in building and managing ships. As APL’s Head of Global Technical Services and Managing Director of Neptune Ship Management Services Pte. Ltd., he is responsible for technical and ship management operations and has played a leading role in the expansion of APL’s new vessel fleet.



A tanker putting out to sea

nearly impossible to eradicate, multiplying their impacts many-fold.

Participating in the Global Industry Alliance has helped APL to partner with technology providers, the scientific community and governmental organizations, in addressing ballast water issues. In 2011, APL started installing ballast water treatment systems onboard its vessels, to reduce the risks associated with the discharge of non-native aquatic species in foreign waters through the vessels’ ballast water. However, the technologies and applications that APL was pioneering with the industry and solutions-providers were not perfect. Preliminary implementation efforts saw equipment design flaws and operational issues, while repairs and maintenance support by system makers are still inadequate.

The Global Industry Alliance, however, was resolute in overcoming the challenges to be ready for the entry into force of the Ballast Water Management (BWM) Convention. APL also strived to lead the way in implementing ballast water treatment technologies on board its fleet and, today, almost 60 percent of APL-owned vessels are equipped with ballast water treatment equipment. The remaining 40 percent deploys mid-ocean ballast water exchange, currently

the most widely available method of mitigating the spread of non-indigenous species in ballast water.

APL recognises that active engagement, coupled with on-going training efforts to educate system providers and their representatives on maritime safety, is vital in finding common ground with stakeholders. Meanwhile, the rigorous operational procedures implemented by APL’s maritime crews, supported by training and upgraded safety and control measures, have helped to improve the optimal functioning of these treatment systems. Resulting from these ongoing efforts, the functionality of APL’s installed systems has improved from a low 37 percent in 2014, to 73 percent in 2016.

I am proud to say that through the Global Industry Alliance, and our involvement with GloBallast, APL is contributing to better ballast water treatment technology. The BWM technology market, valued at US\$ 30-50 billion for the period 2014-2021, includes the creation of GloBallast TestNet, an association of 16 worldwide testing organizations to promote and increase levels of standardization, harmonization and openness in testing ballast water management systems. The GloBallast TestNet is a neutral platform





for information sharing and will help to ensure that all testing is comparable and in conformity, while delivering a greater level of transparency to the end-users of the treatment technologies.

APL has also collaborated at the GloBallast Research and Development Forum. Organized every two years, the Forum has established itself as one of the most important international conferences on ballast water management. The Forum brings together regulatory bodies, the maritime industry, academia, leading scientific experts and leaders in technology development, to share the latest innovations and practical answers for ballast water management issues.

The sharing of technical and industry knowledge across the shipping community, scientific experts and government bodies has enabled the Global Industry Alliance to develop a dynamic e-learning portal on the GloBallast website. Available both online and offline, it offers courses which train stakeholders – including seafarers – on the operational aspects of ballast water management.

Collectively, these efforts have enhanced the implementation of the Ballast Water Management Convention, and dramatically reduced the damage caused by marine invasive species. As the global shipping industry gets ready to comply with the Convention guidelines once they enter into force, public-private sector partnerships, exemplified through the GloBallast Global Industry Alliance, will raise global momentum in tackling the ballast water issue and developing effective solutions collaboratively.”

Sampling ballast water

REDUCING THE TRANSFER OF HARMFUL AQUATIC ORGANISMS IN THE BALLAST WATER OF SHIPS

**S**hips' ballast water serves as one of the main vectors for the transfer of aquatic species from one part of the world to another. When introduced to a new area that is outside of its natural geographic range, the species which has been transferred is commonly known as an alien species. If the environmental conditions in this new geographic area are suitable, the alien species may not only survive, but also multiply and establish pest populations – causing harm to the local environment, economy, or human health. Invasive aquatic species have thus been identified as one of the four greatest threats to the integrity of the world's oceans.

As the potential scale and nature of the problem became clear, proper control and management of ships' ballast water emerged as a priority issue on the environmental agenda for the International Maritime Organisation (IMO) and the global industry. In 2004, the Ballast Water Management Convention and its Guidelines were adopted by IMO's Member States, with the aim to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments – on 8 Sept 2016, the latest ratification of the BWM Convention was received, which will bring the Convention into force

on 8 September 2017.

IMO joined hands with the GEF and UNDP to launch the GEF-UNDP-IMO GloBallast Programme (2000-2017), which has supported and promoted the development of uniform legal, policy and institutional reforms in several developing countries, and has undertaken a major capacity-building programme in over 70 countries, to foster technological innovations in ballast water treatment through the GIA, Global R&D fora, and other mechanisms. The collective efforts and impacts of GloBallast have clearly played a significant role in bringing the Convention forward and its now-confirmed entry into force in 2017.

# Planting power

EMPOWERING WOMEN TO ADDRESS LAND DEGRADATION IN INDIA

“**I** WAS BORN IN NAGANIMORA VILLAGE and was schooled only as far as the ninth class, before my marriage to a man from Leangyu village was fixed, and I had to move here. In these mountains we have always relied on *jhum* for our food and most of our income. We clear patches in the forest and then plant a mixture of crops – some of these are wild plants and others are domestic varieties. After a few years, the harvest gets poorer, so we leave the patch to recover and plant a new area. This used to work well and we were able to meet most of our food needs. But, as more people settled here, there was less land, and the soil washed down the slopes. Sometimes we could only produce food for a few months. Also, the government didn't want us to cut down any more of the forest trees.

About five years ago a project started up here to work with *jhum* farmers. Through this we set up a Self-Help Group, and I was elected as the chairperson. We were trained on many different things that have improved our standard of living – not only for our Group, but for everyone in this village.

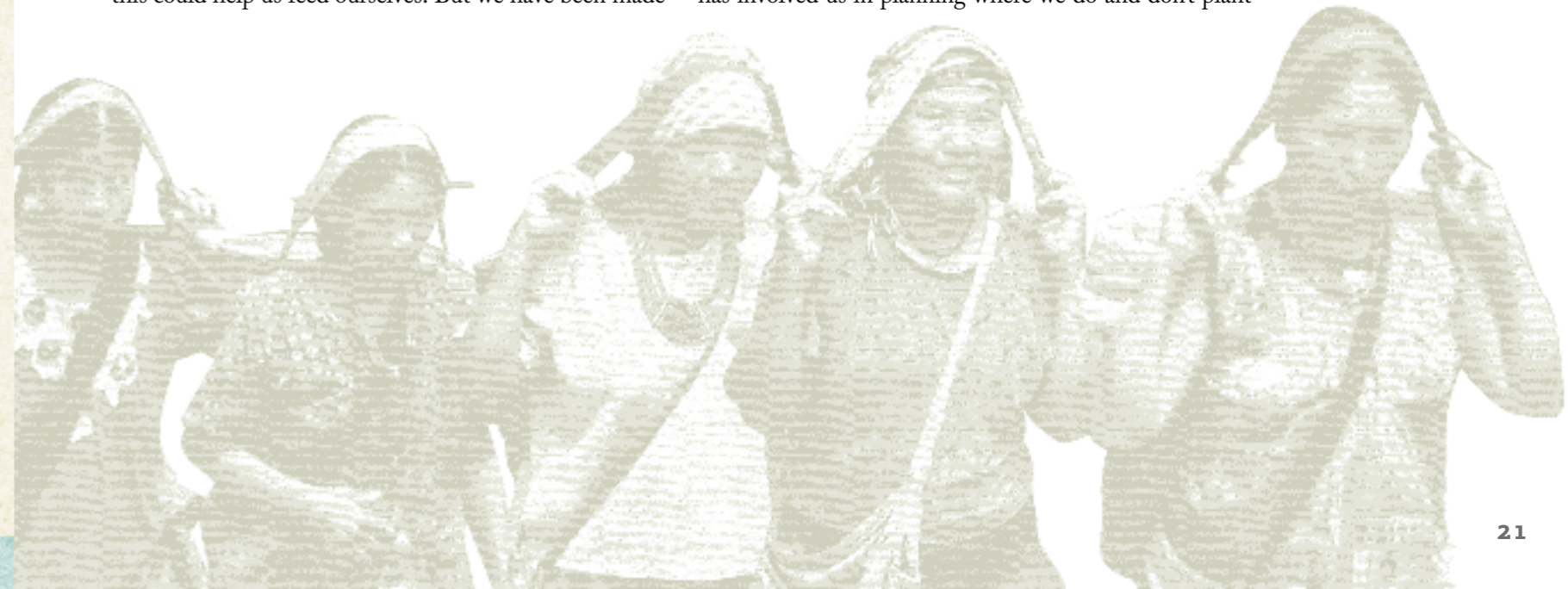
My thoughts about the natural environment have been greatly changed. I did not know much about things like conservation, or biodiversity or climate change – or how this could help us feed ourselves! But we have been made

**MRS NYIEMAN** is the secretary of the Mercy Self Help Group in Leangyu village, in Mon District of Nagaland, in north-east India. Originally from the Kongan region, she moved to Leangyu Village upon her marriage. A mother of one daughter, she supports her family's income through her own handloom business and earnings from a traditional form of shifting cultivation called *jhum*.



aware now of these issues, and we have learnt to care for the soil, save water and leave standing trees in our fields. Since we have been using these methods, I can see visible changes in the surrounding environment. Our crop yields are better and we have increased income through sale of *jhum* crops.

Since we have been involved in Land Use Committees, we take part in planning how the land is used. This has involved us in planning where we do and don't plant



and how we plant. We have marked some areas of the forest where the trees are protected – we do not clear or burn there – and we keep areas next to the forests where we do not clear. The Land Use Committees have brought all the different village groups under one umbrella and there is much better co-operation and unity in the community. Also, we have been involved in drawing up by-laws that govern *jhum* and we find that people follow these more diligently.

Having community groups like the Land Use Committees and the Self Help Groups has made a great difference to our community. Before, all decision making powers rested with the Angh (the traditional king) and the Village Council, which was made up only of men. The kinds of groups we have formed through the project include all sectors of the community – church members, students, youth, women, landless farmers, the elderly. These committees have become places where all members of the community can share their ideas and opinions and have a say in making decisions.

For me, the most important difference that these structures have made is the better status of women. In

traditional Naga customs, women have a lowly position in the community, and even within family structures. We cannot own land and had no say in decisions about land, even though women have always played an important role in tending the *jhum* lands. We cannot serve on the Village Council. But, our involvement in the Groups and Committees has given us a much better position in the community – in meetings we can present ideas and be involved in decision-making. This is a very big step that has given us equal rights to men when it comes to decisions about land. We can now attend and even preside over meetings in the same way as men. In fact, the day before a Land Use Committee meeting, the women meet to talk about the issues they want to discuss at the meeting so that we go there well-prepared.

In the old days, the only way a woman like myself could make money was to sell produce from the *jhum* lands. Now that our harvests are better, we can earn more money this way and this raises our standard of living. But we have also been trained in financial matters – book-keeping and financial planning. Through our Self Help Group, we were introduced to the idea of setting up an inter-loaning scheme among our members (called a revolving agricultural fund) – we can borrow money from this scheme at much cheaper rates than the private money-lenders would charge us. And we earn interest. This has made it possible for me to set up my own hand-loom business, so that I have more economic power – I am earning three times what I did before. I am using this to pay for my daughter’s university education – she is busy with her post-graduate studies.

I could never have imagined before how much our lives could be changed – we have learnt skills, we can teach others and earn our own money. And we have standing in the community.” ■

Zubeni Lotha at the market in Mokokchung Town, Nagaland



Mrs Nyieman and members of the Mercy Self Help Group

#### SUSTAINABLE LAND AND ECOSYSTEM MANAGEMENT IN SHIFTING CULTIVATION AREAS OF NAGALAND

India’s north-eastern state of Nagaland is recognised as an ecoregion of global importance for biodiversity conservation. Its topography, isolated geographical location and range of climatic conditions have shaped the state’s unique ecosystems that are home to a highly diverse forest flora and fauna, including numerous endemic and threatened species, and an especially rich endowment of birds. It is also home to some 2.2 million people, most of whom make their living from agriculture.

Shifting cultivation, locally referred to as *jhum*, is the main form of agriculture as it is socially preferred and well-suited to the agro-climatic conditions and steep terrain of the region. *Jhum* is a form of agroforestry that makes use of alternating short-cropping phases interspersed with natural or semi-managed fallow periods. Changing lifestyles and

increasing population pressures have resulted in more land being brought under *jhum* (with a corresponding increase in deforestation), and shorter cropping cycles. This has meant that there is not enough time to restore soil fertility or for plant cover to regenerate, resulting in increased soil erosion and disruption of hydrological cycles. The net effect has been increased land degradation, lowered productivity, and rising poverty and food shortages, all of which are made worse by the effects of an increasingly erratic climate.

In 2009, the Government of Nagaland partnered with UNDP to implement a GEF-funded project to reduce land degradation and promote sustainable *jhum* practices, in support of the livelihood needs of local communities. The project provided assistance to *jhum* farmers in

70 villages in three districts (Mokokchung, Mon and Wokha), by introducing participatory land-use planning, generating awareness, building institutions and supporting integrated farm development that enables ecologically sound land stewardship. A key factor in the success of the initiative has been the establishment of women’s Self Help Groups, of the kind described by Mrs Nyieman, through which women have been empowered to play a vital role in arresting land degradation, addressing food-security and building resilience to climate change. To sustain the gains made during the project, the government of Nagaland has invested a further US\$ 1 million in scaling-up activities, and plans are in place to replicate the lessons learnt across the state through an upcoming project supported by the International Fund for Agricultural Development (IFAD).

# We are a large ocean state

ENVIRONMENTAL INNOVATIONS FOR SUSTAINABLE DEVELOPMENT OF SEYCHELLES

“WHEN I FIRST BECAME INVOLVED with environmental programmes, they involved a small group of professionals implementing biodiversity conservation projects focussed mainly on Protected Areas. Over the last 8-9 years, I have seen this programme of action – which has been catalysed by the GEF and UNDP – expand enormously, away from a pure Protected Areas focus. As a result, the number of NGOs in Seychelles has mushroomed, a variety of CBOs have been formed, and many of these groups have established partnerships with the private sector – everyone started to get involved. The Small Grants Programme, in particular, has played a big role in this, catalysing interest, establishing groups and providing seed funds – NGOs and CBOs were then able to mobilize twice as much from the private sector and from the government’s own Environmental Trust Fund.

The Biodiversity Mainstreaming project catalysed engagement with the tourism sector, which is now not only aware of conservation issues, but initiating its own activities and engaging with communities who live around their properties. A tourism sustainability label was developed, with a number of hotels now enrolled in the programme. The project also engaged directly with

fishermen – who previously had not thought about conservation at all, only being concerned with catching fish and selling them for income. Our seas were open access, people could fish as much as they liked. We first got the fishermen organized into associations, then got them to limit fishing of breeding stock, then got them involved in stock assessment, and so on. The project initiated a fisheries management planning process – led by the fishermen themselves – covering key fishing grounds on the Mahe plateau. Now the fishermen are taking the initiative, standing up at meetings and talking about fisheries management plans and eco-labels – you never heard that before! This trend will be sustained and scaled-up under a Blue Bond initiative which is jointly financed through the GEF, World Bank and private sources.

When I became Principal Secretary, my experience was mainly limited to biodiversity and endangered species, especially plants. Close engagement with UNDP-supported, GEF-financed projects broadened my interests and knowledge significantly. Every time we developed a new project, we sat down and discussed the development challenges facing Seychelles, and how best to address them through environmental innovations; we discussed where to invest the money, and how to use it to leverage additional funds to support the national effort. In my professional life this has helped me to tackle a

**DIDIER DOGLEY** is the Minister for Environment, Energy and Climate Change in the Republic of Seychelles. His first involvement with conservation was at the age 15, when he worked part-time with a team of rangers. He went on to study Landscape Management at the University of Erfurt, followed by a Masters Degree at the University of Reading. He joined the Ministry of Environment in 1989 as a horticulturalist and later become Director General of Nature Conservation. Promoted to Principal Secretary for Environment in 2007, he worked closely with UNDP to establish a GEF Programme Coordination Unit, as a cost-effective, programmatic approach to country management of the GEF portfolio. He took on the role of GEF Operational Focal Point from 2007 to 2015, and was appointed as Chair of the National Planning Authority in 2012. After two years as Special Advisor to the Minister, he was, himself, appointed as Minister for Environment, Energy and Climate Change in February 2015. He is committed to mainstreaming environment and biodiversity within national development, and to the pursuit of a national goal of 100 percent for renewable energy.



ABOVE Local Fishermen at Beau Vallon Beach getting ready to go out fishing

range of issues we face here on our small islands. Recently we have shifted gear towards climate change mitigation projects. Investment in solar technology and resource-efficiency projects has effectively raised national interest in renewable energy technologies. We have put into place a rebate scheme to support investment in photovoltaic technology and loan schemes to support investment in energy efficient appliances.

I became really interested in this and adopted the ideas personally – I believe in leading by example. The work initiated through the projects has helped me to assess my own contribution to the environment and how to reduce my own carbon footprint. My partner, Frauke, and I have invested in retro-fitting our home with energy-efficient lighting and appliances, solar water heating, a rainwater harvesting system and tank storage to supply our garden (I still love gardening!); we have a compost plant and recycle a third of our household waste. I firmly believe that it is feasible for countries today to achieve 100 percent renewable energy, if the political will is there and the necessary resources are made available. In Seychelles, we have

initiated a project to determine how we can achieve this target and become carbon-neutral before the UNFCCC target date of 2050.

In these islands, we used to think only in terms of our terrestrial area, or maybe the coastal zone up to about 35 km from the shore – and we thought of the rest of our 1.4 million km<sup>2</sup> of ocean territory as something that ‘sat there’ without really needing to be managed. Our Protected Area projects have been crucial in developing baselines for marine spatial planning to guide the utilization of our ocean space. We were able to survey and accumulate data for the whole ocean space on everything from biodiversity, to fishing efforts, to oil and gas exploration areas, and put it into one database. This process is showing us how to plan for the future, helping government to define a Blue Economy approach, centred on the effective utilization of our ocean space. The planning process has, in turn, led to the recently-concluded Debt Swap, and we will use the debt relief

Endangered Seychelles Magpie Robin *Copsychus sechellarum*





BELOW Top of the Morne Blanc Nature Trail with sweeping views of Mahe's Western Coast

to fund both marine conservation and socio-economic development of the marine environment and our country. This is something that many other SIDS are taking as an example. In fact, we no longer consider ourselves as *Small Island Developing States*, but as *Large Ocean States* – the portfolio of projects funded through the GEF has made a major contribution to this transformation.

The Biodiversity Mainstreaming project has had major impacts. It brought together the Ministries responsible for environment and land-use planning and housing, who used to be at loggerheads before. The project created a database identifying ecologically sensitive areas, and areas that were best suited for development. We now hear the land-use people referring applicants to the environmental guidelines, telling them what they have to do from an environmental perspective to secure planning permission, rather than us having to tell them. The project also financed two ground-breaking tourism carrying capacity studies. The study for La

Digue island really woke up the Government by showing how close we were getting to mass tourism, which is not what Seychelles is about and certainly not what visitors to Seychelles want to see. Following this, the Government moved quickly to put a moratorium on the development of any further large hotels in Seychelles, and is now financing carrying capacity studies for the main islands of Mahe and Praslin, to reassess how to go about future development of the country.

Over the years of my involvement as GEF Focal Point, we have seen a clear evolution from simply working on protected areas and endangered species, to working on challenges of sustainable development, putting the tools, measures, action plans and strategies into place that I think will guide Seychelles for a long time to come. I am especially happy to see our children turning into trained young professionals, who are organized and engaged, and who really believe in sustainable development. We are reaching more people than ever before, and building our future environmental leaders.” ■



Lionfish

#### SAFEGUARDING BIODIVERSITY, BUILDING THE ECONOMY AND STRENGTHENING RESILIENCE IN A SMALL ISLAND DEVELOPING STATE.

Nowhere else is the inextricable connection between people's well-being, economic prosperity and the environment clearer than on small islands. Since its inception, the GEF has been a strong partner and supporter of environmental programmes that promote sustainable development in Small Island Developing States (SIDS), such as the Republic of Seychelles.

The Seychelles archipelago consists of around 115 islands, with a total land area of 455 km<sup>2</sup>, spread across 1,374 million km<sup>2</sup> of the western Indian Ocean – the 'Large Ocean' referred to by Minister Dogley. The Seychelles is a developing country, with a significant portion of its population still living close to the poverty line, engaging in artisanal fishing and small-scale agriculture for their livelihoods. Land is a scarce resource, land-use pressure is intense, and Government has to juggle the needs of a growing

population for land and housing, and the demands for ever more tourism development, with its commitment to the environment and biodiversity conservation. The islands, like others, also face challenges from climate change and unsustainable use of natural resources.

With the support of GEF finance, and in partnership with the UNDP, the Seychelles Government and civil society are able to tackle these issues head-on. Over the years, a series of projects under different thematic areas has provided essential support to the development planning process, establishing a legal framework for environmental and land-use planning; addressing prioritization of land management issues and expansion of the Protected Area system, and marine spatial planning; exploring innovative Protected Area management scenarios and financing mechanisms; and mainstreaming biodiversity into the tourism and fisheries sectors that together employ half the population.

This support has motivated the country to commit to protecting 50 percent of its land area and 30 percent of its ocean territory, using funding leveraged through innovative mechanisms such as the landmark Debt-for-Adaptation swap that was signed in 2015, and private sector support. The country has set itself a further target of achieving 30 percent renewable energy by 2030, and 100 percent renewable energy before 2050. The Seychelles has established an energy policy that focuses on energy efficiency and up-scaling of the solar energy programme that was supported by UNDP through GEF-supported projects. All of this has contributed to developing a holistic Blue Economy approach, placing ocean governance in the forefront of sustainable development, and coupling this with a drive to win climate finance for the renewable energy agenda – a dual approach that is setting an example for SIDS globally.

# A chemical shake-up

INTEGRATED MANAGEMENT OF HAZARDOUS CHEMICAL WASTES IN ECUADOR

“ON SATURDAY 16 APRIL of this year, my town was torn apart by a terrible earthquake – one of the worst that has ever happened here. Everything collapsed, from streetlights to houses; motor vehicles were crushed and, worst of all, was that people were trapped under all the debris from fallen buildings. Many people died. It was a heartbreaking and desperate time.

We were all so scared, but once I calmed down, I first made all the necessary arrangements to make sure that my family was safe. Then I went to see what had happened at the school where I am the Principal. When I arrived there I noticed that the damage did not seem to be too bad. An electrical post had

**IVÁN BASURTO** was born in Bahía de Caráquez, in Manabí Province on the west coast of Ecuador. He is the Principal of Rodolfo Chávez Rendón School in Las Gilces, (Crucita Province), a position he has held for eight years.

fallen, and the transformer was hanging off it, broken – it had spilled oil all over the schoolyard. My first reaction was to feel relieved. I thought to myself that, with all the other wreckage and even loss of life in the area, a fallen electrical post was not too serious. I had no idea that the transformer and contaminated soil presented a health risk to the children and teachers at the school.

Shortly before classes were due to re-start, some foreign aid workers who were assisting with disaster recovery in the wake of the earthquake, passed by the school. The moment they saw the fallen transformer they stopped, and we could see they were concerned. They explained that the spilt oil may contain dangerous chemicals and must be cleaned up as a matter of urgency. We were put in touch with the Ministry of Environment (MAE), as, together with the UNDP, they run a GEF-funded project that deals specifically with managing these kinds of chemical wastes.

Within a matter of hours, I received a call from the co-ordinator of this project. They explained to me that the spilled matter was dielectric oil, which may be contaminated with substances called polychlorinated biphenyls (PCBs for short) – harmful pollutants that can cause serious illnesses, even cancer. This was shocking news!

The project officers co-ordinated with the people from the Manabí Electric Company – which is responsible for

this kind of equipment – to remove the broken transformer. They performed diagnostic tests at the site to establish if there were in fact PCBs present, and when the test proved positive, they arranged for all the contaminated soil to be removed and replaced with clean soil.

I am forever grateful that we received timely professional advice and practical help through the PCB project to deal with this hazardous oil spill at my school. Children are our future – they need to be kept safe, especially at school where they spend a lot of their day, learning and playing. What worries me is that it took something like an earthquake for us to realize that we had dangerous chemicals right on our doorstep – and I suppose there must be many other places around the city where this is the same.

The good thing about this is that the PCB project is now driving an awareness-raising program amongst the community about these substances, and helping the government to put in place a plan of action for improving how dangerous chemicals are managed in our country.” ■



Children at Rodolfo Chavez Rendon School

## INTEGRATED AND ENVIRONMENTALLY SOUND MANAGEMENT OF CHEMICAL WASTES IN ECUADOR

Polychlorinated biphenyls (PCBs) have been widely used in industry due to their characteristics of heat resistance and high stability. Their most widespread use has been as a cooling oil component for electrical equipment, or dielectric oil. PCBs are classed as Persistent Organic Pollutants (POPs) under the Stockholm Convention, to which Ecuador is a signatory, and are harmful to the health of all living beings – the International Agency for Research on Cancer (IARC) has classified PCBs in Group I, the highest level of cancer-causing compounds.

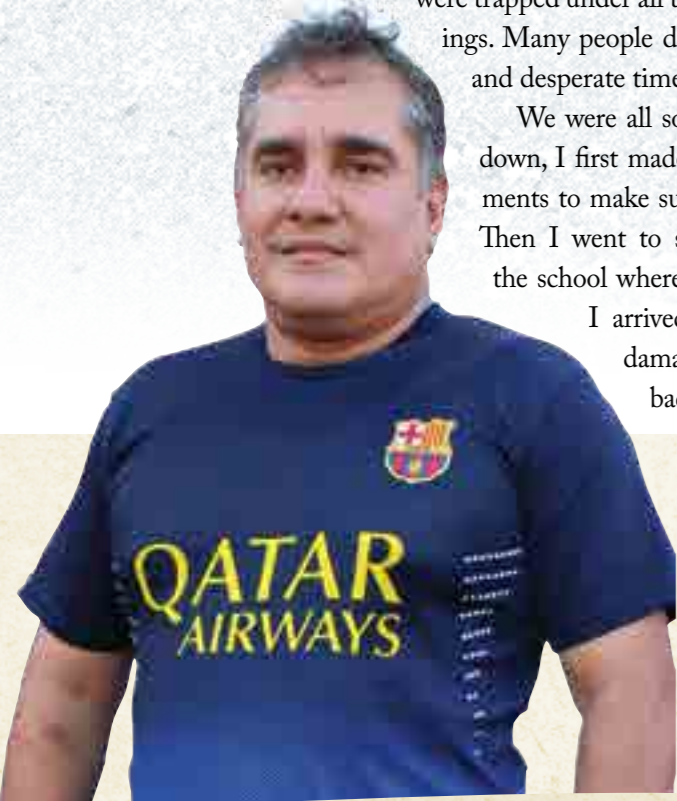
In 2014, the Ministry of Environment of Ecuador (MAE), with support from the GEF and UNDP, began implementing a project to achieve integrated and environmentally sound management of PCBs in Ecuador. The objectives of the project are to contribute to policy development and institutional capacity in Ecuador for environmentally sound

handling, storage and disposal of chemicals and hazardous wastes, with particular attention paid to the management of PCB stocks in Ecuador's public electrical system.

The earthquake described by Iván Basurto, (which, at 7.8 on the Richter scale was one of the strongest to hit Ecuador in decades), provided compelling reasons for raising community awareness to the dangers of polychlorinated biphenyls, and improving their management, in the interests of preventing environmental contamination and safeguarding human health. In addition to their planned programme of work, the PCB project played an unexpected but important role in the earthquake recovery process, monitoring disaster sites for chemical contamination, and assisting local agencies and government departments with appropriate management of harmful pollutants.



OPPOSITE BELOW Safe disposal of toxic chemical wastes





# Food for tomorrow, in any weather

FOSTERING RESILIENCE FOR FOOD SECURITY IN BENIN

“I HAVE BEEN A WIDOW FOR MANY YEARS, so caring for my children has weighed heavily on me. For women like me, even when our own children are grown up, we have our grandchildren to look after and feed, because their parents go to the towns to look for work – there is no other work for them here. The mothers come back home to the village when it is time to have their babies, and then we care for the children when the mothers go back to the city.

Agriculture is the only activity I know, since this is what I did with my husband before he died. Here in the villages, we have to be able to look after ourselves because it is not easy to travel to the towns to buy food or supplies – the roads are bad (especially when it rains), and we often have to travel by boat. So we grow food to feed our families and if there is anything left we can sell it at the market – that is the only way we can earn money to afford the other things we need, so it is important that we can grow enough to feed the children and care for them properly.

Before this project came to our village, our farming activities were limited to sowing maize or rice once a year. If the rains didn't come on time, we would lose our crops and there would not be enough food. But since being supported by the PANA-1 project, everything has changed. Now, thanks to the weather station, we receive regular information on rainfall. We know when to sow and when not to,

**LEONTIN TOHOU** is the leader of a women's group in Damé Village – an agrarian community of some 1,200 people in the Savalou Commune in north-central Benin. In her mid-fifties, Madam Tohou is a mother of four children, and a grandmother of six. Like most of the women in her community, she is a farmer, raising food to meet her family's needs and to earn a living.

and we are spared from losing our crops. The improved seeds we have received through the project have allowed us to plant and harvest twice a year – this has never happened before in this village. We can also grow different kinds of crops now. What's more, even when there is no rain, we can use the water from the water reservoir built for us by the project to grow tomatoes, vegetables and chilli pepper.

It is because of the weather information and the training and equipment we received that we can now

harvest twice a year, we can grow food all year round, our harvests are much better and I can sell more of my produce. Because of this, I am now getting three times more income than I did before. This makes me very happy because I am making a decent living now from selling maize, rice and vegetables; I can afford more of the things that we need. For many years before the project,

the roof of my house was broken and the children and I were exposed to the weather. Now, I have been able to fix the roof and I am even building another house – this is better for the health of the children. I am also able to buy more clothes and can dress better.

We can now feed our children and send them to school, even in the times when the weather is harsh.” ■

Farmer inspecting his maize crop



Young boy carrying a basin of food



## PROMOTING CLIMATE-RESILIENT AGRICULTURE AND FOOD SECURITY IN LEAST DEVELOPED COUNTRIES

**B**enin is heavily reliant on largely rain-fed, subsistence agriculture for employment and livelihoods. Increasingly unpredictable rainfall and more frequent severe weather events (high winds, extreme heat, floods and droughts), have resulted in declining crop yields, increased crop losses, disruption of the agricultural calendar, dwindling farm incomes, and escalating degradation of land and natural resources. This has resulted in increased food insecurity, with marginalised groups, including women and children and the rural poor, amongst the worst affected.

Benin is working to increase its resilience to the adverse impacts of climate change through

both near- and long-term adaptation measures in affected sectors, areas and communities. As part of this process, UNDP has supported nine projects to date, focussed on different aspects of climate change. These projects are geared to help the country gain a better understanding of the complexities of climate change, address its root causes and adapt to its impacts, through interventions that span the full development agenda.

The project featured in Leontin Tohou's story, 'Combating adverse effects of climate change on agricultural production and food security in Benin' (commonly known as PANA-1), emerged in response to

urgent climate change adaptation priorities identified in Benin's National Adaptation Programme of Action, and was funded by the GEF through the Least Developed Countries Fund. PANA-1 worked to improve capacity for forecasting, assessing and managing impacts of climate variability, and implemented climate-resilient agricultural practices to reduce poverty, alleviate hunger and build sustainable livelihoods, especially among women. Activities were implemented in 9 Communes spanning four vulnerable agro-ecological zones, with direct benefits to some 2,200 people (one third of which were women), and indirect benefits to an additional 12, 155 community members.



# The power of peat

RESTORING ECOSYSTEM HEALTH TO PEATLANDS IN BELARUS

ABOVE Burning peatland

“**B**ELARUS USED TO BE DESCRIBED as the ‘land of mires’. My childhood was spent surrounded on all sides by mires (peatlands) and woods. As a young boy, I would go hunting with my father and older brother, and cranberry-picking with my mother and the women from the village. These formative years spent in the countryside determined my choice of path in life. After leaving school, I went to Minsk, where I enrolled at the biology faculty of the university. My first interest was in waterfowl and it was through this that I became interested in wetlands and peatlands.

In the 1990s, we observed a decline in the number of many waterfowl species. Our research showed that this was correlated with the degradation of mire ecosystems, resulting from various human-induced disturbances (such as draining, peat extraction, peat fires and infestation by



**DR ALEXANDER KOZULIN** grew up in the small village of Haradnaja (Gorodnaya) in the Belarusian Paliessie (Polessie), an area rich in peatlands. He is the Head of the International Cooperation Division of the National Centre for Bioresources, and a Senior Research Associate in the Institute of Zoology, at the Academy of Sciences of Belarus, where he has worked since 1978.

invasive alien plants). The deterioration in the ecological condition of these habitats was made worse by the increased frequency of hot, dry winds, which previously were unheard of in Belarus. In 1999 and 2002, major peat fires broke out, and a considerable part of the country was blanketed in smoke – which contained millions of tons of CO<sub>2</sub> that had been locked up in the peat deposits. We initiated a pilot study to investigate the causes of these catastrophic peat fires and submitted the data to Government to motivate for a full-scale assessment of the state of Belarusian peatlands. Our data confirmed that the fires were happening due to large-scale disturbance of the hydrological regime of these ecosystems – industrial-scale extraction of peat (for fuel) in the past had led to drainage of just over 50 percent of our peatlands, leaving a mere 34 percent of them in their natural state. There was also increasing pressure to allocate new land – even in protected areas – for peat extraction. Extensive areas of worked-out peat deposits lay abandoned, increasing the risk of peat fires. Our research demonstrated clearly the urgent need to take prompt action to restore the ecological integrity of these degraded mires – not only to conserve biodiversity, but to reduce carbon emissions and for the broader benefit of the people of our country.

Having a solid body of research behind us, and the commitment of government to take action to prevent peat fires, paved the way for the development of successive projects to deal with different aspects of peatland restoration. The first of these projects, which started in 2004, addressed the practical aspects of peatland restoration, and produced a strategy for the sustainable use of peatland resources, supported by an appropriate regulatory framework. We restored the hydrological regime of over 20 peatlands (covering up to some 40,000 ha), which put an end to the fires.

The impact of this was that the authorities, and people in general, realised that re-wetting is one of the most efficient ways to combat the peat fires, which had presented a great risk to people’s health and property, and cost the Government a lot of money. As a result, the national Council of Ministers adopted the Strategy for Sustainable Use and Categorisation of Peatlands, which was developed with detailed inputs from a team of technical experts, and representatives of various institutions responsible for protection or use of peatlands. This represented a significant change in government thinking, and different

sectors were working together to come up with solutions.

On a professional level, these projects enabled us as scientists to develop and put into practice innovative, cutting-edge, ecosystem-based approaches and methods for the conservation and sustainable use of peatlands – ideas which previously we could only plan in theory. We now share our experience and expertise at conferences and workshops, and influence peatland



Aquatic warbler

management in other countries, such as Russia, Ukraine, and Lithuania. We have improved the expertise of our professionals in nature conservation, and working as an environmental specialist is now viewed as a prestigious job.

At the most fundamental level, this work has drastically changed attitudes towards peatlands, at all levels: local communities are now proud that people from all over the world come to see their beautiful mires, and they have regained lands for cranberry-picking and fishing – with the added income-generating opportunities these activities bring; government agencies support the campaign for re-wetting peatlands and placing more mires under formal protection; and the peat-extraction sector has changed how it approaches its business. The fact that the Government has supported the proposal to draft a *law* on the sustainable use of peatlands, shows how much attitudes have shifted.

Bringing about this scale of change and finding



Cranberry pickers

sustainable solutions to an issue as complex as restoration of peatlands, cannot really take place within a short period of four years. Fortunately, GEF did not stop its support for work on Belarusian peatlands after the first pilot project was completed. Further investments as part of a second, larger-scale project, have made it possible to sustain and multiply the transformation that can be achieved

when there is a change in the knowledge, attitudes and approaches of the professionals in the sector, government, industry role players, and the public.

When I started this work, it was my dream that Belarus can again become the 'land of mires', with benefits for our people, our biodiversity and climate. It is extremely satisfying for me to see that dream becoming a reality. ■

#### ECOSYSTEM-BASED APPROACHES TO MANAGING PEATLANDS FOR ECOLOGICAL, SOCIAL AND CLIMATE BENEFITS

**P**eatlands cover some 2,560,000 ha (12.3 percent of the land surface) in Belarus and are of both national and global importance. The pristine mires preserved in Belarus (covering 863,000 ha) remove approximately 900,000 tons of carbon dioxide and release 630,000 tons of oxygen into the atmosphere every year. About 500 million tons of carbon are accumulated and kept in the mires of Belarus. These mires also provide habitats for rare and endangered wildlife species, such as aquatic warblers, greater spotted eagles, and great snipe, and perform critical ecosystem services relating to the hydrological cycle.

Peat fires and the unsustainable use of peatlands cause the release of 16.7 million tons of CO<sub>2</sub> into the

atmosphere (4.45 million tons of carbon) per year, making Belarus one of the leading hotspots of greenhouse gas emissions from drained peatlands. The re-wetting of degraded peatlands, as developed by Dr Kozulin and his team, can prevent these emissions.

Over the past 10 years, UNDP and the GEF have supported the Government of Belarus in the implementation of two projects focused on peatlands, supplemented by a number of Small Grants projects. The first full-size project dealt with re-wetting of degraded peatlands, and the development of a strategy and regulatory framework for sustainable management of these ecosystems. The second is implementing a landscape approach to managing peatlands for

multiple ecological, biodiversity, climate and social benefits. During the lifetime of the second project, a major achievement was the approval by the Council of Ministers of the Peatlands Strategy, preventing any future loss of peatlands, allowing peat extraction only where no biodiversity loss will be caused, and requiring mandatory rehabilitation where extraction does occur. Informed by the best available science, these projects have combined strategies and regulatory frameworks; technical guidelines for restoration; protection of critical habitats; working with the private sector to adopt more sustainable practices; and creating opportunities for nature-based activities to stimulate economic growth.

# Ridge-to-reef living landscapes

A MODEL FOR COMMUNITY-BASED CONSERVATION IN PAPUA NEW GUINEA

**“W**E ARE A COASTAL COMMUNITY and have always relied on the sea for food and income – we catch fish, and harvest sea cucumbers and trochus shells. When I was a young boy I can remember that there were plenty of sea cucumbers and we would always come home with a big catch of fish. But, as time passed, our community was taking too much, without thought for the future. The reefs were being damaged and we had to search further and further from the shore to find any fish.

A few years ago, the Tree Kangaroo project started working in the coastal areas around my village of Singorokai. I was interested, so I joined their community meetings and workshops to learn more about it. I learnt that this project had been started to protect the cloud forest home of the tree kangaroo, and that doing this meant that the whole landscape, from the high mountain peaks to the sea, had to be conserved. Also, the project was concerned not only about the tree kangaroo, but also other species like turtles and dugongs. An important way of protecting them, they said, was for communities like ours to be involved in conservation work and for us to find ways of making a living that do not harm the forests and reefs. This really inspired me – so we formed a community forum called the YUS Conservation Organisation through which we could be involved in activities to protect the marine species and habitats that we depend on. I was chosen to represent our village in the Organization.

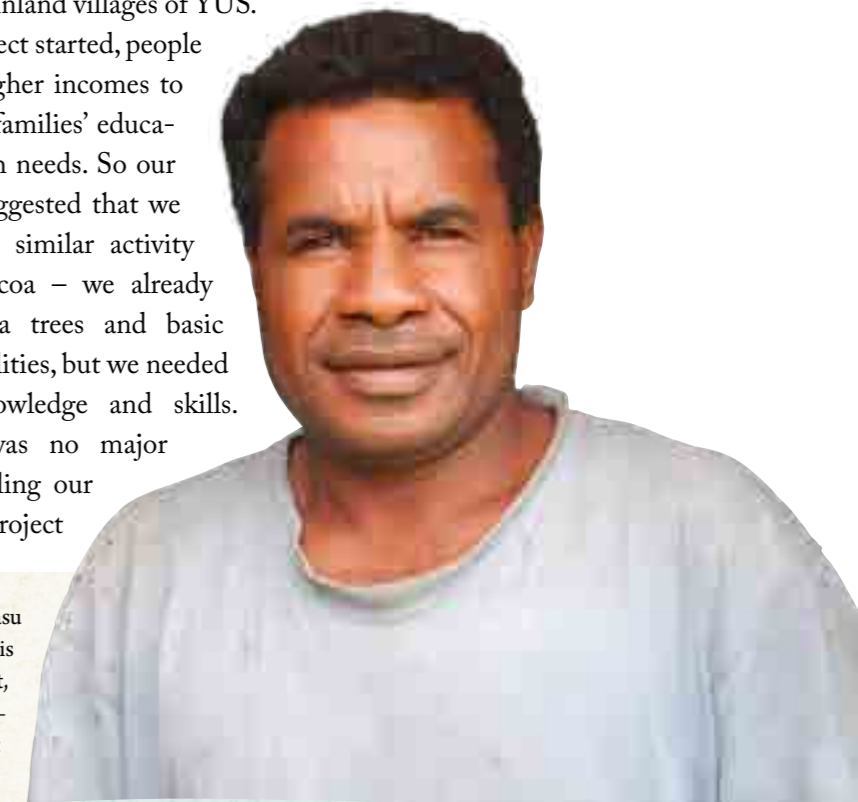
Through our involvement in this work we gained a much better understanding of our marine ecosystems and what we can do to look after them. Marine scientists

from the project trained volunteers from the village to patrol the reefs and coastal areas so that we can keep a watch on the situation and respond to problems that come up. We look for the species that we use or sell, the rare and endangered species that need protection, and we check on habitats like the seagrass beds and corals.

The people of Singorokai now see great value in protecting our environment and using our resources in a sustainable way. We have even set aside some of the reefs for conservation, to create a safe space for fish to breed – this balances out what we harvest in other areas. But people are still concerned about meeting the needs of their families. Our villages are very isolated, and the nearest towns are hours away by boat. If we limit the harvest of fish and sea cucumbers, what other options do we have to support ourselves?

We knew about the Conservation Coffee programme that the Tree Kangaroo project started with farmers in the inland villages of YUS.

Since that project started, people are earning higher incomes to support their families' education and health needs. So our community suggested that we should start a similar activity here using cocoa – we already had the cocoa trees and basic processing facilities, but we needed the right knowledge and skills. Also, there was no major market for selling our product. The project



**NOMIS SIMON** is a local landowner, cocoa farmer and former Peace Officer with the Wasu Local Level Government on the Huon Peninsula in the north of Papua New Guinea. He is a community champion for conservation, advocating for sustainable resource management, and serves as Vice President of the Yopno-Uruwa-Som (YUS) Conservation Organization – a community-based landowner association which advises on conservation and development efforts throughout the YUS landscape.



put farmers like me in contact with the local extension officer to improve our cultivation and processing methods – this increased both the amount and quality of the cocoa we could produce.

We hope that the quality of our cocoa will improve so that we can sell it to international buyers, and earn the above-market prices that the inland coffee farmers have realized. Our cocoa farmers are now forming a cooperative through which we share tools and labour. We can also work together to solve problems, manage our lands and connect with buyers. This is exciting as we can look forward to having much more financial security and providing better for our families.

I am proud of the commitment my community has made to caring for the environment and threatened species. People no longer hunt leatherback turtles or harvest corals and fish carelessly from the reefs. And we have stopped using damaging fishing methods like poison ivy. People’s opinions are changing – in the schools and churches I hear people having discussions about conservation and our responsibility to protect the environment for future generations to enjoy. I am a volunteer marine monitor and occasionally go out to observe the reefs. I see exciting signs of recovery – the corals look healthier, and fish are returning to areas where once they were nearly gone. Leatherback turtles nest and hatch freely on the beaches and dugongs are often seen in nearby seagrass beds. We are able to rely again on harvests from the sea to support ourselves, and I am really hopeful and excited for the new opportunity we have for cocoa farming.

Our clans have lived here for generations – we are a part of the landscape. I think that what we are doing here shows that we can play an important role in conservation.”



ABOVE Coast of YUS, Huon Peninsula



LEFT Trochus shells



20-year Sing-Sing celebration for the Tree Kangaroo project

#### STRENGTHENING THE RESILIENCE OF ECOSYSTEMS, COMMUNITIES AND CULTURE IN PAPUA NEW GUINEA

The Tree Kangaroo Conservation Program was launched in Papua New Guinea in 1996, primarily to conduct research on the endemic and endangered Matschie’s tree kangaroo, a conservation flagship species. Under Papua New Guinea’s customary land tenure system, local people own and control over 90 percent of the land – this means that long-term habitat protection relies on the commitment and participation of the local communities who depend on these ecosystems and their products for their livelihoods.

In 2009, the Tree Kangaroo Conservation Program, together with local landowners, the Government of Papua New Guinea and many other partners, helped to establish the country’s first nationally-protected Conservation Area in the Yopno, Uruwa, and Som (YUS) watershed areas on the Huon Peninsula. This was the first and still is the only protected area of its type in Papua New Guinea – it is wholly owned by local clans. To ensure the effectiveness of the

conservation area, the Tree Kangaroo Conservation Program partners with and builds the capacity of the YUS Conservation Organization – of which Nomis Simon is the Vice President – and a team of Community Rangers who patrol the area on a monthly basis. It also collaborates with communities to address local needs including sustainable resource management, livelihoods, education, and access to health information and services.

Since the creation of the YUS Conservation Area in 2009, the Tree Kangaroo Conservation Program has expanded from its mountainous roots to embrace a broad landscape approach, including marine and coastal reef ecosystems and associated coastal agricultural areas and settlements belonging to more than 50 villages within the YUS area. It has also shifted from a single-species focus to include a wide range of endemic and threatened species such as leatherback turtles, dugongs and long-beaked echidnas. Involving

coastal communities in conservation action, whilst providing sustainable economic opportunities, has been a critical step in ensuring the long-term sustainability of the YUS Conservation Area.

Commencing in 2013, the UNDP has supported various components of this work (financed through the GEF Small Grants Programme), including local capacity-building for community-based conservation of threatened marine species, enhancing sustainable livelihoods through responsible agro-forestry, undertaking reforestation activities, and conducting community-led awareness campaigns. Under a new GEF-funded project that started in 2015, the National Government of Papua New Guinea has selected the Tree Kangaroo Conservation Program and the YUS Conservation Area to serve as a model for community-based conservation providing ridge-to-reef protection for habitats and species in Papua New Guinea.

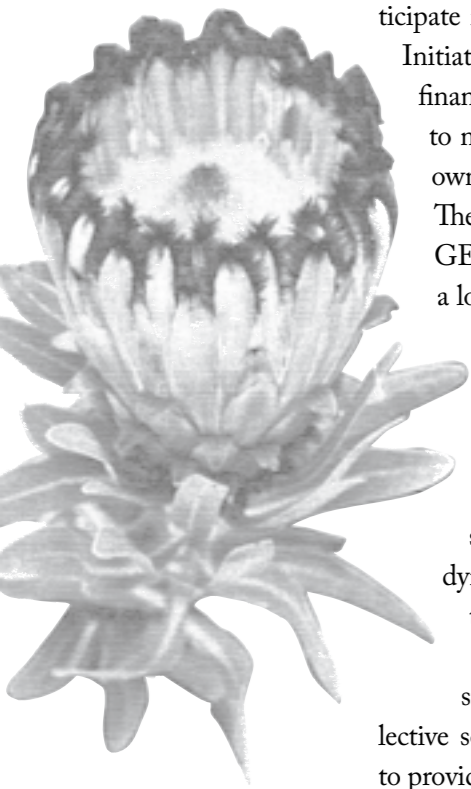
# Biodiversity for Development

WEAVING ENVIRONMENTAL BENEFITS INTO THE FABRIC OF SOCIETY

“**I**T WAS DURING MY CHILDHOOD years in Malawi that my interest in the natural world was first awakened. We did not live in a city, and I spent nearly all of my time outdoors. But it was when I was in the ninth grade at school, and I looked down a microscope for the first time at leaves and guard cells, that my mind was made up - I was going to become a botanist! I went on to study Botany at university before taking up my first job with the Botanical Society in South Africa.

I was given the opportunity through UNDP to participate in the development of the Agulhas Biodiversity Initiative (ABI) – this was one of the earliest GEF-financed interventions in the country that worked to minimise biodiversity loss by working with land-owners and communities outside of protected areas. These were the early days of our partnership with the GEF and UNDP, but they laid the foundation for a long-standing relationship that has revolutionised what we have been able to achieve.

The ABI process took place in parallel with the development of the CAPE biodiversity mainstreaming project, which was one of my first experiences of working through big, multi-stakeholder partnerships – CAPE grew into a dynamic community of practice that still operates today, providing an essential knowledge network that brings together stakeholders from different sectors to identify common issues and seek collective solutions. My initial involvement in CAPE was to provide technical inputs on various task teams, where I represented civil society, working as I did at the time for an NGO – little did I know that, a few years later, I would find myself responsible for overseeing the implementation of several key components of CAPE, and, ultimately



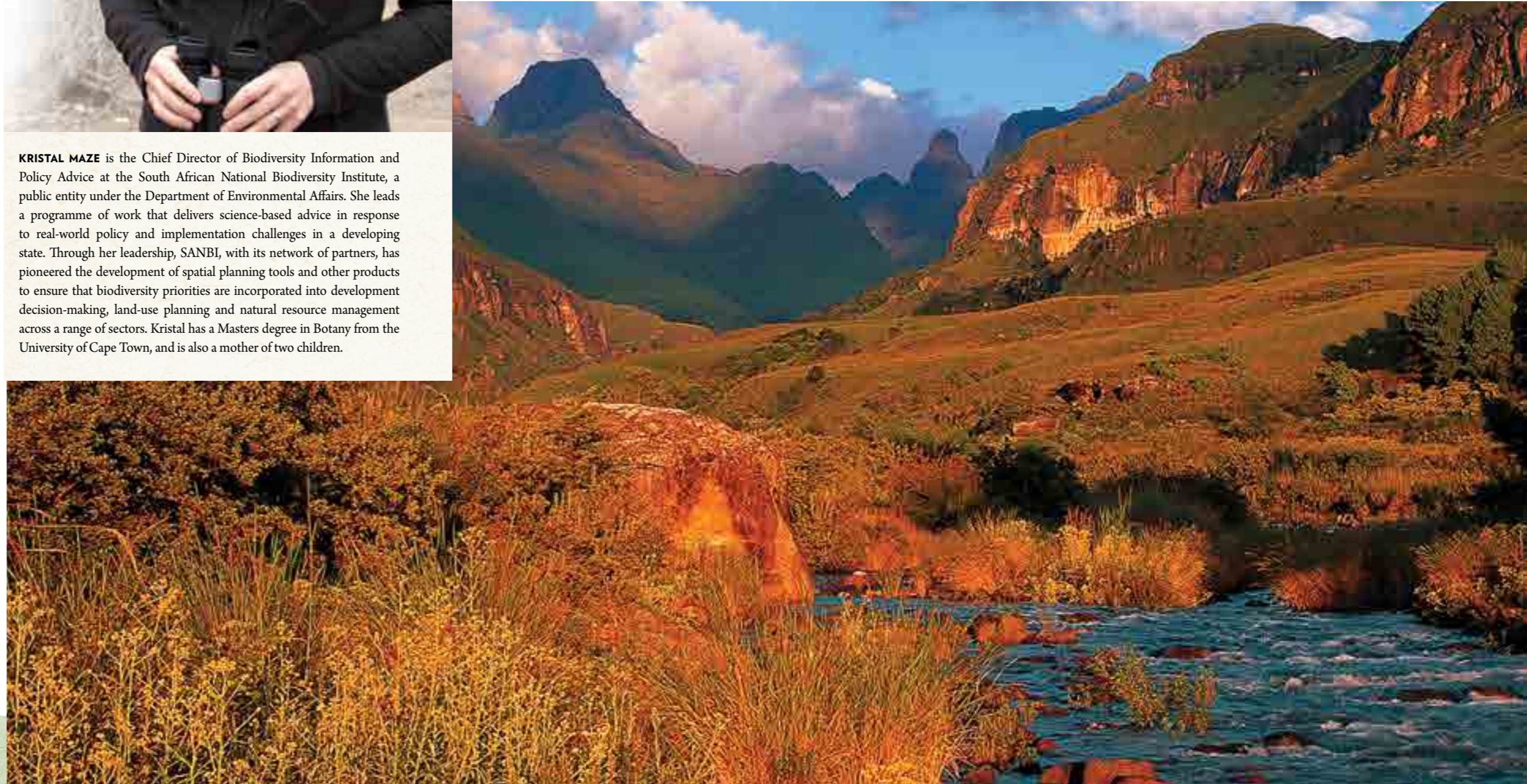
**KRISTAL MAZE** is the Chief Director of Biodiversity Information and Policy Advice at the South African National Biodiversity Institute, a public entity under the Department of Environmental Affairs. She leads a programme of work that delivers science-based advice in response to real-world policy and implementation challenges in a developing state. Through her leadership, SANBI, with its network of partners, has pioneered the development of spatial planning tools and other products to ensure that biodiversity priorities are incorporated into development decision-making, land-use planning and natural resource management across a range of sectors. Kristal has a Masters degree in Botany from the University of Cape Town, and is also a mother of two children.

responsible for the final phase of the project.

In 2003, I was appointed to lead a division within the newly-constituted South African National Biodiversity Institute. SANBI was born out of the former National Botanical Institute, but carried a much broader mandate – key amongst its new functions was the co-ordination of programmes of action involving civil society and other stakeholders to promote conservation and sustainable use of biodiversity. This broke new ground for SANBI, and also signalled the beginning of a remarkable transformational process, through which we – as SANBI, and the broader biodiversity community – were able to weave environmental investments into an integrated fabric of work, to mainstream biodiversity into the development agenda in South Africa.

After a few years, my division was given responsibility for co-ordination of various components of the CAPE programme, as well as other biome-based (bioregional) programmes supported by the GEF, UNDP, World Bank and Critical Ecosystem Partnership Fund in different parts of the country. But, it was in the GEF-funded Grasslands Programme that I was involved from the design phase to its closure in 2015. Drawing on our experience from other bioregional initiatives, and with technical support and mentorship from GEF and UNDP, we were able to lead both the development and implementation of an 8-million dollar programme to ensure that production and development activities in our country's grasslands were located and managed in ways that maintain the delivery of ecosystem processes essential for underpinning

Grassland landscape in the Ukahlamba Drakensberg World Heritage Site



the economy. Although the GEF-funded project has now closed, the results of this work are being sustained and scaled-up through other programmes of action led by NGOs, the private sector and government departments. I think this stands as testament to the tremendous impact the projects have had in developing institutional capacity and influencing the appetite for – and commitment to – this type of work in South Africa.

As support from the GEF grew, the programme I was responsible for leading also expanded – it morphed from being a small division with a handful of staff responsible for co-ordination of bioregional programmes, into a division for biodiversity planning and information management, and, ultimately, into a directorate for biodiversity information and policy advice, with a staff of more than 50 people – more than two thirds of whom I am proud to say are women! We co-operate with a managed network of partner institutions – universities, government and the private sector – many of whom were initially brought together through one or other of the GEF-funded projects.

The scope of our work – and that of the sector as a whole – has blossomed and matured. Areas such as land-use planning and environmental management – which had initially formed discrete components of funded projects – have now grown into fully-fledged programmes of their own. For example, through programmes such as ABI, CAPE and Grasslands, we pioneered biodiversity stewardship as the most efficient way of involving private landowners and communities in protecting important biodiversity on their own land. The impact of this has been enormous. We have

now developed a national business case for biodiversity stewardship, which is being rolled out across the country as a way of expanding the protected area estate, whilst respecting people’s land-use rights – some 550,500 hectares of land have been brought under formal protection using this model. The bioregional programmes gave us the space to explore new concepts such as ecological infrastructure, which is now the subject of a dedicated GEF-financed project on water security, development finance and infrastructure, working at the levels of both national policy and practical intervention at catchment level.

Through this process, we have defined more clearly *what* we need to do. GEF resources have catalysed three major streams of work: expansion of protected areas through biodiversity stewardship; avoiding loss of species and ecosystems by incorporating biodiversity priorities into spatial planning and land-use management in multiple sectors; and optimising efficiency around restoration of ecosystems.

We have also learnt a lot about *how* to work: three things are important – partnerships, processes and products. Process is a really important part of the journey – we have not always got it right, but we certainly have an increased appreciation for how much time and effort needs to go into the process. Without strong partnerships and investment in people, the resources we have to spend are impotent. And we need products to optimise return on investments – products that address real issues and are useful to the end-users, such as the Mining and Biodiversity Guidelines.

It is through partnerships that we have reached the government agencies central to biodiversity management and sustainable use of natural resources. This has altered the way people and institutions think and operate – in urban development, mining, forestry, and integrated environmental management. We have gained good traction in the water sector with engineers and municipal managers. But our engagement has not been as successful in all sectors – we certainly hope to strengthen our interaction with agriculture in future. One of the biggest transformational impacts I have seen is in the development of human capacity in our biodiversity sector. Programmatic support has enabled us to link with a global network in the mainstreaming area, showcase our work, and tap into global experience and technical expertise. We have been afforded

the opportunity to develop, trial and refine innovative approaches and tools to address environmental and sustainability issues in integrated ways, and train many new, young professionals. Consider the National Biodiversity Planning Forum as an example – this started in 2004, with a group of about 24 people, mostly scientists and SANBI staff. Since then, the Forum has convened every year and is now attended by over 250 people, drawn from all three spheres of government, industry, universities and civil society.

I would say that the overall impact of the GEF-funded portfolio of projects has been to give us the ability – the muscle – to operate and influence in a much bigger space than we ever could have dreamed of, to integrate the environmental and national development agendas. Having a dialogue with the author of the National Development Plan to discuss the role of ecosystems in national development would never have been possible without the programmes funded through the GEF!

We have learnt how to frame our biodiversity messages in a more tangible way, moving away from a ‘fear of loss’, towards a ‘hope of gain’ approach. I think it is because of this that people in South Africa have shifted from thinking about ‘biodiversity OR development’ to ‘biodiversity AND development’, and ultimately, ‘biodiversity FOR development.’ ■

Flower-picker at Flower Valley on the Agulhas Plain



*Romulea sabulosa*, a vulnerable species in threatened Renosterveld vegetation



SOUTH AFRICA'S LANDSCAPE APPROACH TO CONSERVING BIODIVERSITY AND PROMOTING ECOSYSTEM RESILIENCE TO MAXIMISE DEVELOPMENT BENEFITS

Following South Africa’s transition to democracy in 1994, the country ratified a number of international environmental agreements, including the Convention on Biological Diversity in 1997. The two decades since have seen this mega-diverse country access GEF funding for some 15 biodiversity projects and programmes, through both UNDP and the World Bank. These investments have helped fulfill South Africa’s post-apartheid vision that biodiversity conservation should be undertaken in a manner compatible with social justice, equitable access to resources and economic sustainability, whilst building on the country’s high levels of capacity in systematic biodiversity planning.

Between 2004 and 2014, UNDP supported the Department of Environmental Affairs and partners – including SANParks, SANBI, provincial conservation agencies, and other national departments responsible for water, agriculture, forestry, fisheries, rural development and land reform – on four projects aimed at mainstreaming biodiversity conservation into wider production land- and seascapes, to maximise developmental co-benefits: the Biodiversity Conservation and Sustainable Development Project (CAPE); implemented in partnership with the World Bank; the Agulhas Biodiversity Initiative (ABI); Conservation and Sustainable Use of Biodiversity on the

Wild Coast; and the National Grasslands Biodiversity Programme. These programmes helped shape South Africa’s ‘landscape approach’ to biodiversity conservation, that involves working both within and beyond the boundaries of protected areas, to manage a mosaic of land uses including protection, restoration, production and subsistence use, in order to deliver ecological, economic and social benefits.

A new GEF-financed project, the *Biodiversity and Land Use Programme*, was initiated in 2015 to support municipalities in effectively regulating land use to ensure that biodiversity continues to provide essential ecosystem services to citizens of South Africa.

*“I am especially happy to see our children turning into trained young professionals, who are organized and engaged, and who really believe in sustainable development. We are reaching more people than ever before, and building our future environmental leaders.”*

MINISTER DIDIER DOGLEY

*“I think that the single clearest thing I have learnt is that people matter, and the partnerships that they can build – ultimately, it is people who make policies and bring about change.”*

HELEN COLES DE NEGRET



# Adapting to the Himalayan Meltdown

REDUCING THE RISK OF GLACIAL LAKE OUTBURST FLOODS IN BHUTAN

Agay Dophu's story

“ON ANY GIVEN DAY, I am more than happy to walk visitors up to Samdingkha, to introduce them to our ever-vigilant village ‘watchperson’ – the siren that warns us of chhuri (Dzonghka for ‘glacial lake outburst floods’). Just being near it and seeing it overlook the valley makes me feel safe and reassured that today, I am better prepared to face a disaster – unlike what happened 22 years ago.

I still remember that October morning in 1994, when I saw about 40 of my community members being suddenly swallowed by giant, unforgiving river waves. I could do nothing but stand there and witness my friends and neighbors disappear with the water.

**AGAY DOPHU** is an 82-year-old farmer who lives in Samdingkha village in the Punakha Valley, in Bhutan. He is a survivor of the catastrophic glacial lake outburst flood (GLOF) that occurred in 1994. At the time, he was a Gup – a village headman.

Having seen the 1994 *chhuri* myself, it was easy to understand and encourage community members to participate in the planning for disaster preparedness that was introduced by the GLOF project.

I was a representative of a village land committee when the project started works here. The high flood-risk areas were mapped and escape routes for immediate evacuation to higher grounds were identified. People were also discouraged from building structures in high-risk areas along the river.

The project activities have served as a constant reminder to people of what *could* happen – otherwise, they tend to forget about it as time passes by and take things for granted. The project has helped us face up to and deal with our fear of possible *chhuri* – we now have a *plan*. We have also found that the local Government officials are now planning for disaster risk reduction during the development planning process – before, they focused only on planning for basic necessities, such as building roads and schools.

I wish that the current early warning system was in place back in 1994. Things would not have ended the way they did.”

Jai Ram Rai's story

“I first experienced the use of the early warning system built by the project, when *Lemthang tsho* burst upstream of the *Mochhu* river. Although the water did not rise to danger level, we did not want to take chances, as it happened at night when people are off-guard. So we manually triggered the siren to warn people to evacuate to safe grounds. Now that I reflect on it, it was a good opportunity

to check that the system actually works!

In July this year, a similar situation developed. We were regularly getting worrying news on floods from the southern districts, and we went beyond our usual schedule to monitor river levels. It haunted us for the entire month with sleepless nights.

The important thing is that we are now able to provide information on river levels to Punatshangchhu project authorities as well as officials downstream of us in India, on a daily basis – and sound the warning when there is danger. And we know that it works.”



Glacial lake



**MR. JAI RAM RAI** is a 28-year-old Junior Engineer who is in charge of the Early Warning System Control Room at Wangduephodrang, downstream of Samdingkha.





Monastery in the Punakha valley

### Captain Drukpa's story

"Being a climate-sensitive sector, we at Punatshangchhu Hydro Projects quickly recognized the importance to us of the activities implemented by the GLOF project – this is why we contributed co-finance from our security budget.

Through this project, we realized the importance of having a well thought-out disaster management plan, and now have our own GLOF disaster contingency plan. With this, if a flood were to occur today, we would be able to evacuate around 10,000 workers, and expensive machinery, to safe grounds within two and a half hours after the siren goes off. This would never have been possible before.

We have been made aware of the impending threats posed by GLOF due to climate change, and have the knowledge and equipment to be better prepared. This protects lives, personal property and infrastructure." ■



**CAPTAIN KELDEN DRUKPA** is a Deputy- Chief Security Officer at Punatshangchhu Hydropower Project Authority. He is responsible, around the clock, for the safety of thousands of workers and expensive equipment.

#### BUILDING ADAPTIVE CAPACITY TO CLIMATE-INDUCED DISASTERS IN THE HIMALAYAS

In 1994, a flood from a glacial lake named *Luggetsho* resulted in devastating loss of life, property and livelihoods for the communities living downstream in the Punakha-Wangdue valleys – this was the event described by Angay Dophu. As the climate of the Himalayan region grows warmer, there is increased risk of glacial lake outburst flooding (GLOF), a phenomenon in which the natural barriers that hold back the glacial meltwater break suddenly, resulting in catastrophic floods. In Bhutan, there are 677 glaciers and 2,674 glacial lakes, 25 of which pose a high risk of flooding. Amongst these, Lake *Thorthomi* has been identified as one of the most dangerous.

To assist Bhutan in their efforts to build adaptive capacity to climate-induced disasters, UNDP has supported the implementation of a project (known as 'NAPA 1') to reduce risks from glacial lake outburst floods in the Punakha, Wangdue and Chamkhar Valleys. The project physically lowered the level of Lake *Thorthomi* to reduce the risk of flooding, simultaneously contributing to local enterprise development and job creation. The project also strengthened disaster-preparedness by installing automated Early Warning Systems and building the capacity of the community to respond better to natural disasters. The work was funded jointly by the GEF

(through the Least Developed Countries Fund) and UNDP, with co-financing from the Royal Government of Bhutan, and other partners.

Since the project closed in 2013, the Government of Bhutan constantly monitors water levels in the glaciers and glacial lakes, and has installed an Early Warning System in another at-risk river system, where hydropower facilities are soon to be built. GEF support for a second GLOF project (known as 'NAPA II') will make it possible to set up additional automated hydro-meteorological stations across the country and to establish a National Weather and Flood Forecasting and Warning Centre.

# Cool tech...

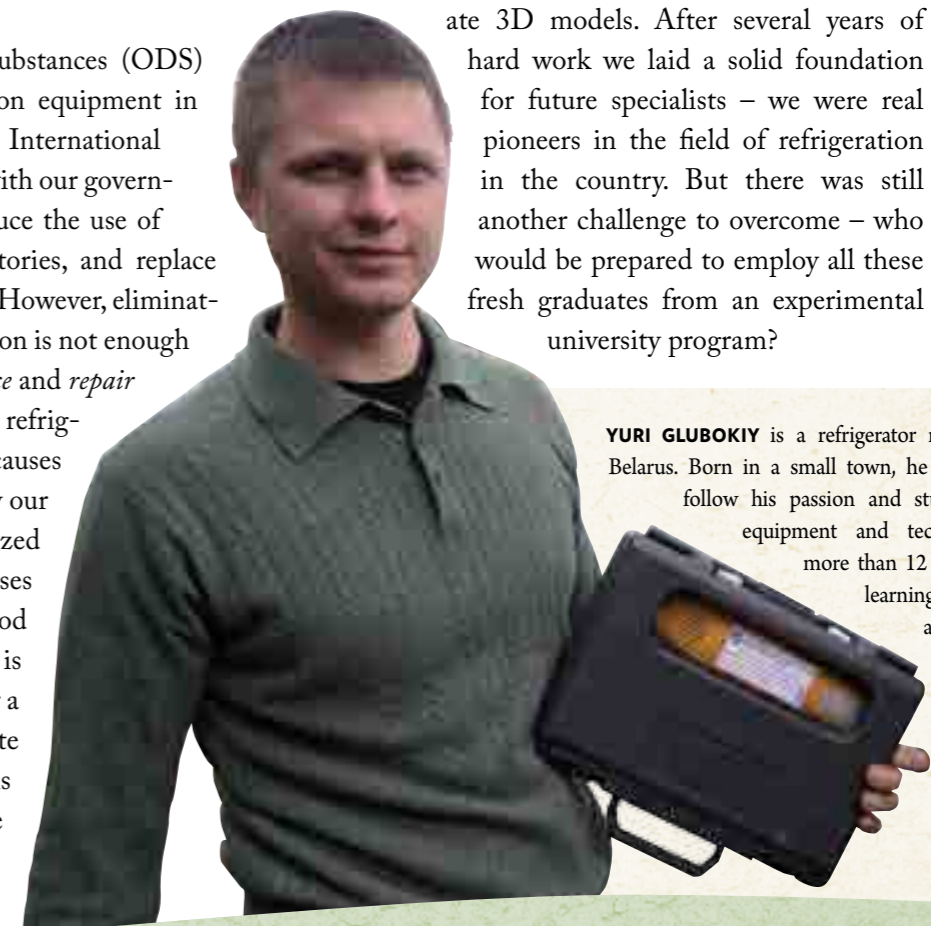
## BUILDING CAPACITY FOR REDUCING OZONE-DEPLETING SUBSTANCES

### Yuri Glubokiy's story

"WHEN I ACCEPTED an invitation from the Belarusian Refrigeration and Air Conditioning Association to participate in an advanced training course, it was a major turning point in my life. At the time, I was a young and ambitious Senior Refrigeration Engineer, leading a number of projects at a private company – I had been doing this for the past five years, and was looking for opportunities to grow as a professional. So, that is why I decided to take up the offer to learn about new approaches to the installation, operation, maintenance and repair of refrigeration and air conditioning systems. The focus of the course would be technologies for handling ozone-depleting substances, a relatively new field of study in Belarus.

The use of ozone-depleting substances (ODS) in the manufacture of refrigeration equipment in our country is an important issue. International organisations have been working with our government for the past 10 years to reduce the use of such chemicals at Belarusian factories, and replace them with non-ODS alternatives. However, eliminating these substances from production is not enough – what happens during *maintenance* and *repair* is also important. Low-quality refrigerator repair service frequently causes dangerous gas leaks – up until now our technicians simply have not realized how hazardous these ODS gases are for the environment. Also, good refrigeration repair equipment is expensive – around US\$ 15 000 for a full tool set – and most small, private enterprises and young technicians cannot afford it. The consequence is poor repair services.

For me, working in refrigerator repair service is more than a job. I look at it as an 'art' – everything should be done according to high aesthetic and technical standards. In 2004, I was afforded the opportunity to enroll at the *Faculty of Low-Temperature Equipment and Technology* at the Belarusian National Technical University. The creation of the Faculty had been recently enabled by an ODS Phase-out Project supported by the UNDP and GEF. The facility was at an early stage of development, and students and professors alike had to start from basics in this new field. Working side by side, we were challenged to translate schoolbooks and user's manuals from foreign languages, open academic archives, create a technical database and create 3D models. After several years of hard work we laid a solid foundation for future specialists – we were real pioneers in the field of refrigeration in the country. But there was still another challenge to overcome – who would be prepared to employ all these fresh graduates from an experimental university program?



**YURI GLUBOKIY** is a refrigerator repair serviceman in Belarus. Born in a small town, he moved to Minsk to follow his passion and study low-temperature equipment and technology. He spent more than 12 years experimenting, learning and mastering the art of low-temperature technology.

In order to prove my credentials I joined the Refrigeration and Air Conditioning Association (called APIMH). With support of the Phase-out project, APIMH offers advanced training courses for individuals and enterprises alike and provides certification. The course is an intense, free-of-charge, weekly experiential learning and knowledge-exchange opportunity, rather than a 'school-room' course. This gave me the opportunity to meet with international specialists, exchange ideas with university professors and receive a special set of repair tools to improve my services. This equipment is very expensive, and for someone like me with a young child to care for, I could never have afforded it without this support. This enabled me to start my own business, providing environmentally-friendly refrigerator repair services.

At first, it was difficult to enter the market independently, especially as I had to compete with big enterprises. But, with high motivation and my new skills and equipment, I earned a trustworthy reputation and can guarantee high quality service. Running my own business, I am making my dreams come true: combining personal development with business opportunities. I can provide better for my family, and it is really satisfying to know that I am contributing to efforts in Belarus to solve an important environmental problem.”



**ZHUK NIKOLAY** is a Senior Professor at the Low Temperature Technology and Refrigeration Faculty at the National Technical University in Belarus, where Yuri Glubokiy was trained in ozone-friendly refrigeration repair technologies.

#### Zhuk Nikolay 's story

“I have worked for more than 15 years in the field of refrigeration and air-conditioning, and understand the risk that ozone-depleting substances pose to our environment and health. Education is a key element in minimizing the use of ozone-depleting gases. To introduce ozone-friendly equipment and technologies into production and maintenance,

our specialists of low-temperature technology need to acquire new knowledge and skills. UNDP and the GEF provided support through the HCFC Phase-Out project for us to set up a new training facility here at the University – it is the only one of its kind in the country, where we can provide training in the use of hydrocarbon refrigerants. It is very gratifying to see how motivated the students become when they have the chance to work with this new machinery, and to see that we have the chance here in Belarus to ‘catch up with the times.’

We can only teach students if we can also raise the skills of our educators – including me! Again with support from the GEF-funded Phase-out project, I and my colleagues were given the opportunity to attend a 1-week training workshop at the Centro Studi Galileo in Italy. Here we were exposed to an extremely high standard of professionalism and engaged in vibrant debates. The live interaction with professionals from other countries enabled us to learn more than we could ever have obtained from the Internet or books – which are what we had to rely on before. We realized that our teaching materials at home were rather outdated, and attending this learning exchange prompted us to review our teaching methods, using new study materials we purchased at this event. Since then, we have become part of an international community of practice that is working to eliminate ozone-depleting substances; we regularly send

a delegation to Chillventa, which is one of the biggest platforms for promoting innovation in refrigeration and ventilation. We are able to obtain the latest updates on energy efficiency and sustainability from leading experts from all over the world. This energises us and boosts our confidence as educators, and equips us better to raise the skills base in Belarus for addressing the problem of ozone depletion. Our involvement in the Phase-out project has shifted our skills development opportunities into another level so that we can create a much better future.” ■

#### PHASING OUT OZONE-DEPLETING SUBSTANCES

UNDP partners with governments and the private sector to provide targeted policy advice and specialized technical assistance, training and technology transfer to adopt ozone and climate friendly technologies and best practices. In Europe, assistance is being provided to the governments of Belarus, Tajikistan, Ukraine and Uzbekistan, and relevant stakeholders, through a number of related projects to eliminate the use of ozone-depleting substances (ODS) through progressive reduction of HCFC import and consumption.

In Belarus, ozone-depleting substances are used in a wide range of industrial and consumer applications, mainly in refrigerators

and air conditioners, but also in installations for mobile telephone networks and other industrial processes. The GEF-financed and UNDP-supported HCFC Phase-Out Project worked to provide technical assistance, build capacity and strengthen institutions, improve regulatory and control measures for handling HCFCs, develop and introduce ozone-friendly alternative technologies, and assist Belarus in meeting its obligations under the Montreal Protocol. The project was implemented in partnership with government institutions, local NGOs, industry associations, educational institutions and small business operators as well as with other relevant projects in the region through enhanced networking.

Earth rising

# Threads of Life

WOMEN RESTORING WILD COTTON SPECIES AND INDIGENOUS PRACTICES IN PERU

“I WAS WORKING HARD on a poultry farm trying to make a living – it was a daily struggle to make enough money simply to put food on the table. I had begun noticing on my way to work, that a group of women were meeting every Tuesday, but I felt too shy to join them. One day, I worked up the courage and went with my smallest daughter, to see what these meetings were about. I didn’t know then that my life was about to change forever – when I heard what the women were talking about, I decided to quit my job at the farm and get involved in this new project.

The meeting was the beginning of a crusade to save a wild cotton variety that our grandparents used to grow to make items for daily use – dresses and fish nets.

At the time, our interest was to see if we could use this cotton to find a way out of poverty. When we started looking for wild cotton seeds, we realized there were almost none left – we looked in every house, on every plot of land, but, no one had any seeds. We eventually found some buried in pillows, and on a few plants that remained forgotten in the fields, or in hedges around the gardens.

Now that we had the seeds, we had to learn how to grow them. It was not easy, especially as we also had to ‘fight’ our husbands who did not look kindly on their wives getting together on their own to talk about work. We formed an association and started cultivating the

**YOLANDA CONTRERAS**, was raised by her grandmother in the district of Mórrope, Region of Lambayeque, in northern Peru. She is the mother of 3 children, a cotton farmer and an entrepreneur who markets cotton products as her main source of income. She is a member of the women’s group who have helped save a rare species of native cotton from extinction, and recover traditional Moche weaving practices.

cotton on land loaned to us by other women. Then we had another battle – the extension agency of the Ministry of Agriculture came to cut and burn our wild cotton; there was a law in place that banned its cultivation because – they said – it brings insects that infest commercial cotton.

Luckily for us, we were able to invite the Technical Coordinator from the Ministry to investigate this. It was found that the native cotton was not causing pest infestation, and we were allowed to carry on growing it. Slowly, the project showed how important the wild cotton is – not only for us to earn a living, but also because it brings back our old customs. The government changed its laws, and in 2006, the Regional Government declared wild cotton as a natural product of the region.

This cotton is special because the cotton bolls come in different colours. Growing up, we didn’t think of this as anything special – we thought that coloured cotton



Cotton bolls of wild cotton plants



Women from the Artesanas Association harvesting wild cotton

was normal. Now, we know its value and enjoy seeing the faces of people that come to visit us and can’t believe their eyes when they see our cotton plants and products – we learned not only to cultivate this type of cotton, but have brought back old weaving techniques that we use to make textiles and crafts that we sell for our livelihoods. I have been able to send one of my daughters to medical school

and support my family – and one of my other daughters also works in the project now.

We have been empowered as women. We are able to participate in fairs, receive visitors from around the world, and we even won the Equator Prize. These achievements would not have been possible without the support we have received.”

## SMALL GRANTS - BIG RESULTS: ENVIRONMENTAL AND SOCIO-ECONOMIC BENEFITS OF CULTIVATING NATIVE COTTON IN PERU

Cotton has played an important role in local livelihoods as both a high value and culturally important cash crop, since pre-Inca times. Since the 1930’s, however, native (wild) cotton, *Gossypium barbadense*, has been purposefully eliminated for fear that it carried pests that could spread to commercially valuable white cotton cultivars. Without this valuable cash crop, communities in the Mórrope District – who rely on small scale cultivation for income – were left with fewer opportunities for earning a living, resulting in social and economic stresses and rising poverty.

In 2003, local women formed an association (Artesanas Association of Arbolso and Huaca de Barro) to stimulate local livelihoods through environmentally

responsible cultivation of wild cotton, and by reviving traditional methods of cotton production. These women have succeeded in recovering five traditional colours of wild cotton, providing the basis for much-needed income-generating activities, including the sale of handcrafts and organic fertilizer. The Association has also been active in managing scarce water resources, resulting in improved local irrigation systems, increased agricultural productivity, and a better quality of potable water. The Association which began as a women’s group, now includes the whole community, and the project activities have been replicated in 20 other communities.

The recovery of wild cotton by women in Peru

was enabled by support from the GEF Small Grants Programme through six projects over an eleven-year period (2003 – 2014). Launched in 1992 as a GEF corporate programme with UNDP as the Implementing Agency, the Small Grants Programme operates on the principle of “thinking globally, acting locally” – the approach advocated by Agenda 21, the global action plan for sustainable development that emerged from the Rio Earth Summit. The SGP focuses on providing long-term support to poor and vulnerable communities and civil society, to build their capacity for addressing critical environmental and social issues. Over the last 25 years, the SGP has supported over 20,000 community-based projects in more than 125 countries.

# Learning to live together

COMMUNITY CONSERVATION IN  
THE ALTAI SAYAN ECOREGION

“I HAVE LIVED HERE in these mountains for my whole life. Like my father, and his father before him, I am a herdsman and I graze my animals here in the Toolaylyg and Barlyk River valleys. My brother Boris lives nearby and we help each other look after our sheep, goats, yaks and horses.

Herding is the only lifestyle we know. Our animals provide us with our food, clothes, yurts, and fuel for cold

winter nights. They are also our main source of income – without livestock, it would be impossible to survive here. So, when our flocks and herds are doing well, we are happy and confident. But when we lose many animals it is a tragedy for our families.

The life of a herder is difficult and sometimes dangerous work. All day, in any weather – hot sun, rain, heavy snow and wind – a herder watches his flock, following them up the steep, rocky slopes, keeping them together while they graze in the pastures, and protecting them from the livestock thieves we call *kaygal*, and predators. At night we keep our animals in corrals, but even then we need to be alert, because wolves and snow leopards come in the dark and can kill many animals at once.

Wolves and snow leopards (*irbish*) are strong predators that live very close to our camps – the mountains are their home as well. Wolves are more dangerous than snow leopards because they hunt in packs and can kill a lot of animals in a single attack out in the pastures. *Irbish* are different – these big cats move alone and, in the pastures, they normally kill only one or two sheep at a time. We have noticed that when snow leopards are around, the wolves go away, but when there are no snow leopards, there are more wolves. So normally we do not mind sharing our home, and even a few of our animals, with *irbish*. But in harsh, snowy winters, they



**SERGEY TUMEY-OOL BADY-OGHUR** has spent his entire life on Tsagaan-Shibetu Ridge, Southwestern Tyva, at the border of Russia and Mongolia. He was born and grew up in a remote herder camp in the high mountains. From his childhood he has lived among wildlife, including snow leopards (*irbish*), Siberian ibex, and Altai argali (wild sheep). Like other Tyvian herders, livestock is the only source of income for him, his family, and his neighbors.

can become as dangerous for our livestock as wolves.

One winter's night in January 2016, *irbish* came to my corral and murdered 65 sheep and goats – I began to understand why some herders hate snow leopards. Our conflict grew – snow leopards killed livestock in our corrals, so we killed snow leopards in retaliation. But it was a war that only benefitted the wolves: they came back to the area because the *irbish* were gone, and we lost even more of our livestock.

I went to the Department of Agriculture to ask for compensation, and they sent a special commission here. But it seemed like nothing could be done to solve the problem. That changed in the warm autumn of 2007. Rangers from the Ubsunuur Biosphere Reserve came to visit me. They were working for a special project to protect the wildlife of these mountains. They brought metal mesh and tools and worked with us to build a strong protective cover for the corral – not only mine, but in 25 other herder camps in this area. This was such a simple thing, but it saved our livestock, it saved our families from poverty and it saved *irbish*. It worked so well that the next year, protection was given to corrals in other parts of these mountains.

And that ended the war between *irbish* and herders – we no longer had to fear winter nights. Almost ten years have passed, but our corrals are still leopard-proof!

Snow leopards still live around my mountain camp – I hear them moving about at night, and some winter mornings I see their pawprints in the snow around the corral and even on its roof. But, they cannot get in. They go off and hunt ibex – and since we have been working with the rangers from Ubsunuur, there are more ibex here.

And I can laugh about it. Yes, *irbish* still take a few of my goats in the pastures, but I can afford to lose a few animals. Anyway, snow leopards save many more of our livestock by keeping wolves away. They are no longer my enemy, but my protector.”



Altai wildflower (*Aquilegia sibirica*) with pollinator

Altai herdsman with horses



Snow leopard



Altai Sayan mountain landscape

WORKING ACROSS BORDERS TO CONSERVE BIODIVERSITY IN THE ALTAI SAYAN MOUNTAIN ECO-REGION

The Altai Sayan Ecoregion is critically important for global conservation. This mountainous landscape spans the territories of Russia, Mongolia, Kazakhstan and China. It includes forests, steppes, deserts and semi-deserts; it is an important watershed, a global centre of plant diversity, and home to endangered and unusual species of animals such as the snow leopard and giant argali sheep. It is also home to diverse ethnic groups who are herders, hunters and horsemen and women, who practice largely traditional land uses.

In the last 25 years, changes in traditional lifestyles and the emergence of the market economy have led to increasing pressure on natural resources in this ecoregion. Wildlife numbers declined as a result of over-hunting and over-fishing, loss of habitat and conflict between people and predators; overgrazing resulted in extensive land degradation and all of these trends have been worsened by the effects of extreme weather events, fires and new pressures brought by mining and pollution of rivers.

The project described by Sergey Tumey-ool Bady-Oshur is one integral element of a tri-national initiative comprising three complementary GEF-

financed projects in Russia, Mongolia and Kazakhstan, implemented between 2006 and 2011. Collectively, these projects have taken a trans-boundary, landscape approach to conserve biodiversity through improved coverage, management and connectivity of protected areas; capacitating local herder communities to take custodianship of the landscapes in which they live; building partnerships among local herder communities, government and civil society organisations to resolve forest and grassland management problems; modifying negative trends in land and resource use, and stimulating diversification of livelihoods to address poverty and build sustainable communities.

In the Russian Federation, the project facilitated establishment of two new protected areas, with advanced management plans, adding almost 0.5 million hectares to the country's protected area network and improving representation of previously under-represented ecosystems. In Kazakhstan, the project worked with the government to bring new land under protection, expand an existing protected area and establish effective buffer zones, thus bringing over 370,000

hectares under improved protection. In Mongolia, the project worked with local communities to establish over 60 registered Community Groups to manage and use natural resources more sustainably over some 513,500 hectares in buffer zones, and to establish Community Trust Funds to stimulate sustainable livelihoods and improve quality of life.

Bilateral agreements between the neighbouring countries established the trans-boundary protected areas of 'Ubsunuur' and 'Altai' along the Russian-Mongolian and Russian-Kazakhstani borders, and two international agreements on collaborative management of these areas were revived. This has enabled joint activities critical for the conservation of transboundary populations of snow leopards and argali sheep.

With the support of organisations including the UNDP, GEF and WWF (amongst others), the governments of all three countries continue to invest in this work, through ongoing projects and new initiatives, such as the conservation of wetlands in China's Altai Mountains and ecosystem-based adaptation in Mongolia.

# Conserving the Cold Sea River

CIVIL SOCIETY AND GOVERNMENT WORKING TOGETHER IN PATAGONIA

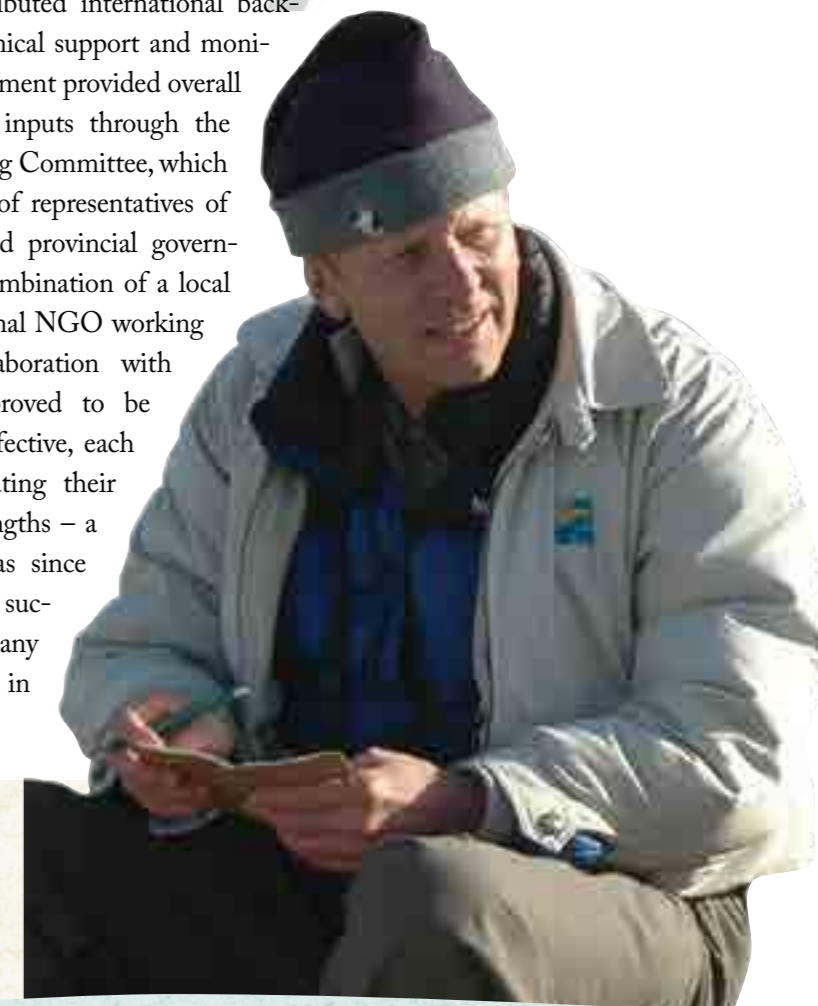
“IN 1988, WILLIAM CONWAY, then General Director of the Wildlife Conservation Society, wrote a chapter in a popular book under the title “A Cold Sea River”. In it, he described the spectacular concentrations of wildlife on the coast of Patagonia in Southern Argentina – including the Magellanic penguins, southern elephant seals, South American sea lions and southern right whales – and he wrote about the mighty Falklands-Malvinas marine current, the ‘cold sea river,’ that is the lifeblood of the Southwest Atlantic ecosystem that nourishes this rich biological diversity. He also discussed emerging threats from poorly controlled commercial fishing, oil pollution at sea, increased human disturbance of breeding colonies of wildlife on land, and the urgent need for improved coastal management.

This powerful vision gripped my imagination and found expression in the three projects that I directed for the Wildlife Conservation Society and Fundación Patagonia Natural, in partnership with the Government of Argentina, on the coast of Patagonia between 1993 and 2014.

When the first project began, fewer than 15,000 people visited the penguin reserve at Punta Tombo – today, it receives over 100,000 visitors. Fewer than 7,000 people went whale watching each season in Peninsula Valdes in the early 1990s, whereas more than 100,000 go whale watching today. In 1996, tourism generated an estimated fifty million dollars on the coast of Patagonia – twenty years later, tourism generates three times this much. Over 41,000 Magellanic penguins were becoming oiled at sea and dying each year in the 1980s and early 1990s, as tankers dumped their oily waste off the coast of Argentina. Today, oil tankers still sail this coast, but finding an oiled

penguin onshore is rare. In 1992, there were an estimated 4,000 southern right whales in the Peninsula Valdes population, but today this figure is greater than 10,000. We believe that these changes have resulted, in substantial measure, from the combined impacts of three projects implemented over 12 years in coastal Patagonia.

The first of these – the development of the *Patagonian Coastal Zone Management Plan*, which kicked off in 1993 – was one of the first projects funded by the GEF to be implemented by civil society organizations working in partnership with government. The local partner (Fundación Patagonia Natural), was responsible for providing personnel on-site, logistical support and infrastructure, while the international partner (the Wildlife Conservation Society) contributed international back-stopping, technical support and monitoring. Government provided overall direction and inputs through the Project Steering Committee, which was made up of representatives of the federal and provincial governments. This combination of a local and international NGO working in close collaboration with government proved to be enormously effective, each party contributing their particular strengths – a model that has since proved highly successful in many other projects in



DR GUILLERMO HARRIS was born in Neuquén, Patagonia. He served as President of *Fundación Patagonia Natural* (an implementing partner in UNDP-supported projects) between 1989 and 2014, has worked as a researcher of the Wildlife Conservation Society (WCS) since 1981, and has been the Director of their Argentina Programme since 2001. A qualified veterinarian, he is also a lecturer, wildlife writer and artist.



ABOVE Shoreline vegetation, Cape Horn, Tierra del Fuego



Arctic tern

both Argentina and elsewhere. All three projects were training power-houses, not only for thousands of fisheries observers, wardens, guides, reporters, school teachers, postgraduate students, government officials and the many community stakeholders that took part in the courses we organized, but also for the project consultants that led these courses – and many of them subsequently took up management positions in government. Examples of this include the Presidency of the National Parks Service, Under-secretary of the Environment of Argentina, Minister of the Environment of Chubut, Minister of Tourism of Chubut and the Director of Conservation of Chubut. This has meant that the project objectives, and the protection of coastal biodiversity in Patagonia, live on through their efforts.

One of the most valuable contributions

of the GEF-supported work on the coast of Patagonia was the emphasis on community participation. Stakeholder involvement in project design and implementation was instrumental in developing a culture of community contribution to biodiversity conservation, commitment to project objectives, transparency in project execution and shared responsibility of project outcomes. One activity stands out in my mind because of the scale of involvement of the community and the success it achieved for coastal biodiversity – this was the “Coastal Census”. Every few years, on the same carefully-chosen day early in Spring, more than four thousand volunteers walked a combined distance of over two thousand kilometers along the beaches – a distance equating to half the seaboard of Argentina – counting oiled penguins and gathering information on beach garbage. People in every town on the coast of Argentina took part in these walks, the events received nation-wide publicity and volunteers came from all over the country. This effort helped raise public awareness of pollution to an extraordinary level and, in turn, this helped improve waste management by ships at sea. Beach clean-ups on the coast of Argentina continue to the present day, and still engage thousands of volunteers.

Project activities were evenly shared between men and women, although women outnumbered men among the thousands of teachers that the projects reached out to, and men were more numerous than women onboard the many fishing vessels we worked with. The projects trained women as well as men to become fisheries observers and it became well-known that when women observers sailed on fishing vessels, the fishermen onboard were much better behaved! The fisheries observer programs developed by the project were adopted by the five coastal provinces of Argentina, and are now a requirement in the industry. Likewise, mechanisms introduced through the projects for involving communities in government decision-making, have become an established part of institutional culture: the use of public hearings on environmental matters, the right of public access to government information, and similar tools, are still in common use today throughout the region.

I believe it was community participation that produced the greatest changes in coastal management practices and that has kept project objectives alive even today, beyond the end of the projects themselves.”



Magellanic penguin with moulting chicks

#### STRENGTHENING COASTAL ZONE MANAGEMENT AND PROTECTION IN ARGENTINA

The Patagonian coastal zone of Argentina, which extends for 1,500 miles from Rio Negro to the Beagle Channel, looks out over one of the world’s richest and most productive marine ecosystems. As described by Guillermo Harris, this region supports globally important biodiversity, including an especially rich fauna. This stretch of coastline, and the associated marine environment, is also of great significance to the Argentinian economy, supporting both a growing tourism industry and important artisanal and commercial fisheries – fisheries being one of Argentina’s most dynamic economic sectors. However, intensive over-fishing caused degradation of the fisheries biomass, putting the main species harvested near biological collapse. This, and other negative environmental impacts of human activities, triggered numerous social and economic crises.

Over a period of 21 years, UNDP has facilitated the investment of GEF resources in three successive

projects led by the Argentinian government, working in partnership with local and international NGOs and members of the public, to secure the biodiversity of coastal Patagonia. Starting in 1993, the first project sought to provide the necessary tools for identifying important areas for conservation and achieving sustainable use of natural resources, paying particular attention to the needs and interests of local communities. The resulting Patagonian Coastal Zone Management Plan incorporated the establishment of coastal protected areas, sustainable fisheries, responsible tourism and prevention of pollution from shipping.

In 1999, a second project was initiated to consolidate and implement the coastal zone management program for the protection of biodiversity. This project worked to improve the quality of life of local communities who depend on coastal resources, while conserving biodiversity and maintaining the productivity of

Patagonia’s coastal ecosystems. Its objectives were achieved by ensuring that national, provincial and local stakeholders were able to effectively manage and plan resource use in the context of integrated coastal zone management. The project also worked to secure the establishment of new protected areas, with budget and personnel for their management. The further expansion and strengthening of the coastal protected area system was achieved through a third project which ran from 2010 to 2014, and which focused on coordination between protected areas under different institutions and jurisdictions (Municipal, State, Federal), increasing protection beyond breeding colonies on shore, and extending them out to sea to conserve foraging and migration routes beyond the high tide mark.

The combined effect of these projects has been to safeguard Patagonia’s coastal and marine ecosystems, in support of economic growth and building sustainable communities.

# A precious gift

DEVELOPING CAPACITY FOR RENEWABLE ENERGY IN TAJIKISTAN

“THE COMPANY THAT I RUN has over 50 years of experience in the energy sector. At Energoremont, we have a strong technical base and human resources, but we had never thought of extending our services beyond the repair of power stations, substations and electrical works – which had always been our core business. This all changed dramatically when we became partners in the GEF-funded project on technology transfer and market development for small-hydropower. The project opened new horizons of thinking and business possibilities for me personally, and my company.

Tajikistan is a mountainous country with abundant hydropower resources, but has suffered long years of electricity shortages. During Soviet times, hydropower facilities were being developed at a rapid rate – we have the tallest-ever rock-filled dam for the Nurek hydropower plant, and smaller hydropower plants were installed along the Vakhsh River. With the rapid industrial development and population growth that took place in the late 1990s, scarcity of electricity started to be felt – and the situation worsened when Tajikistan was cut off from the regional power grid connecting the Central Asian states. With time, the growing demand could not be met with existing capacity, especially in winter, and the stagnating economy meant that investment in large-scale hydropower was impossible.

Out of desperation, people resorted to cutting down trees for fuel wood, leading to significant deforestation, and many

social and environmental problems flowing from that. Anything that required a stable electricity supply suffered – school attendance by children dropped, proper medical services were largely unavailable, and sanitation and access to safe drinking water became serious issues.

At the national level, strategies and programmes to use small hydropower as an intermediate solution to the rising demand for electricity, were adopted by the government. But, implementation of the programmes has been hampered by the lack of technology and expertise, and the high costs of manufacturing, operation and maintenance. Of the 300-odd small and mini-hydropower plants built across the country, more than half are inoperable – this gives an indication of the seriousness of the situation.

I have witnessed the effects of this in the countryside. People, especially women and children, go out collecting wood for cooking and heating. In some villages, people have constructed self-made micro-hydropower plants using primitive electrical systems, but power supply from these is unstable – they can provide dim lighting for households, but use of electrical devices is impossible.

Through the skills-development process enabled by the project, we realized how weak we had been in the area of renewable energy, but, also realized the enormous potential renewables held for us – and the country. We now have the technical skills to plan, design, manufacture and commission small hydropower plants in Tajikistan. Previously, we couldn't even dream of penetrating the international market, but now such possibilities are opening up, and we will be providing services in Afghanistan. This has a massive impact on the job security and financial

**ROZA YUNUSOVNA KHOSHMUHAMEDOVA** is General Director of a Closed Joint Stock Company “Energoremont” in Tajikistan. She joined the company as engineer-in-chief in 1994, and, since then has been promoted up the ranks to the level of General Director. She holds a degree in electrical engineering from Tajik Polytechnic Institute. She has been repeatedly elected Deputy of the District and City Councils, and is fully familiar with the political and economic hardships Tajikistan has faced since gaining independence in 1991.



Shirkent River, Hissar Mountains, Tajikistan

stability of my staff. They are also more motivated – they have gained new knowledge and skills, and they can look forward to a better future for themselves and their families.

Personally, I have gained a lot through this experience – it has renewed my own energy! Tajikistan is traditionally conservative, and running a company as a woman – especially in the engineering field – is not an easy task! But, through the project, I have received training in planning and project management, which has made it easier to organize myself, and the company – and I am achieving a

better balance between work and family life.

We are now manufacturing two small hydropower plants which will be commissioned by year-end. This will be a precious gift to the villages where the plants will be installed – one of these, Safedob, on the Afghan border, is completely remote and off-the-grid, so you can imagine the dramatic impact the hydropower plant will have. At Energoremont we are proud that we have been able to shift from being ‘repair technicians’ to leaders in sustainable energy solutions.” ■

## TECHNOLOGY TRANSFER AND MARKET DEVELOPMENT FOR SMALL HYDROPOWER IN TAJIKISTAN

Tajikistan has amongst the highest hydropower potentials of any country in the world. At present, hydropower meets more than 90% of the country's energy demand, but, energy production fluctuates seasonally. The lowest energy outputs are evident in autumn and winter, when the country faces acute energy deficits – in rural areas, where 70% of the population lives, electricity may only available for up to

3 hours a day in winter. This has profoundly negative impacts on quality of life, food security and economic growth, dropping agricultural production by 30% and forcing the closure of around 850 small and medium enterprises annually.

The small hydropower project described by Ms Khoshmuhamedova, was initiated by UNDP in 2011, in partnership with Tajikistan's Ministry of Industry

and Energy, and financed through the GEF Trust Fund. The objective of the project was to accelerate the development of small-scale hydropower (SHP) by removing barriers through enabling legal and regulatory frameworks; building the capacity of local companies (such as Energoremont) to plan, design, manufacture and commission small hydropower plants; and developing sustainable delivery models.

# Healthy oceans, people and economies

PARTNERSHIPS FOR MANAGING THE SEAS OF EAST ASIA

“THIS STORY STARTED IN 1992, when UNDP invited me to lead a project team for a proposed GEF-financed project on marine pollution prevention in the seas of East Asia. This turned out to be the catalyst for a vibrant collaboration among governments, private institutions, researchers and citizens to safeguard the oceans and coasts of South East Asia.

Our work on the marine pollution pilot project quickly highlighted the enormous and complex issues facing governance of the East Asian Seas. This led us to recommend adoption of a programmatic approach,

including longer-term management interventions covering all eligible countries bordering the East Asian Seas. Thus the first GEF-funded International Waters project of the region was born – this was PEMSEA, Partnerships for Environmental Management of the Seas of East Asia.

Building from one lesson and success to another, with long-term support from UNDP, PEMSEA has become one of the longest-running GEF International Waters programmes. I have been associated with it since its inception in 1993, and have had the privilege to be part of – and witness to – the steady and unique evolution of PEMSEA, and the significant changes that it continues to make at local, national, regional, and even international level.

The most significant contribution during the first phase of PEMSEA (1993–1999), was the development and demonstration of Integrated Coastal Management (ICM) as an effective tool for local governments to address complex coastal governance and management challenges. This was piloted at two sites in China and the Philippines. Over time, we developed technical capacity for ICM in various countries and built up a pool of local and regional experts for coastal and marine management. A new financing mechanism involving public and private sector partnerships in environmental management was also explored.

**DR CHUA THIA-ENG** is Chair Emeritus of the East Asian Seas (EAS) Partnership Council. He served first as PEMSEA's Regional Programme Director from 1993 to 2007, was elected as Chair of the EAS Partnership Council from 2008 to 2013, and has served as Chair Emeritus since then. With a PhD in Zoology, he has held academic positions at several universities including the University of Singapore, the University of the Philippines and the University of Science, Malaysia. He has also served on numerous international and UN organizations, managing regional programmes and projects.

While PEMSEA began small, the outcomes it delivered were recognized as beneficial to both local and national governments in the region. This highlighted the need for the partnership to expand its geographical coverage and functional scope in succeeding years.

As we moved into the second phase of GEF funding, it was evident that the region needed a common vision and mission that would set a clear direction to achieve sustainable coastal and ocean development at a larger scale. Mutual exchange of knowledge and experience led to the formulation of the landmark Sustainable Development Strategy for the Seas of East Asia. Adopted as the roadmap for regional co-operation in 2003, the Strategy provided a framework of actions for achieving the goals of key international agreements and other instruments related to governance and management of coasts, islands and oceans. During the same period (2000–2007), implementation of integrated coastal management was extended to sites in six more countries.

The strength of PEMSEA lies in its partnerships and in 2003, the East Asian Seas Congress and Ministerial Forum were launched – they have convened every three years since. Country partnerships were formalised through the Haikou Agreement, signed by 11 countries in 2006. This established PEMSEA as the regional coordinating mechanism for the implementation of the Sustainable Development Strategy, and created the impetus for PEMSEA's establishment as a self-sustaining entity.

In a particularly exciting development, 2006 saw the launch of the first East Asian Seas Youth Forum, to engage youth leaders across the region, and empower them to take ownership of the health of coasts and oceans. The Youth Network has collaborated closely with local governments in the development and implementation of integrated coastal management, providing opportunities for involvement of young people in projects aimed at enhancing public awareness, restoring habitats and building the overall resilience of coastal communities.

At the local and regional level, capacity development was advanced through training programmes, awareness-raising, the establishment of ICM Learning Centres at several universities, and Regional Centres of Excellence. These Centres work collectively to build capacity and provide scientific input to Integrated Coastal Management policies and programmes at the national and local

OPPOSITE Young women planting mangroves as part of a rehabilitation programme, Patchaburi, Thailand







Sustainable mariculture

levels. Strong support networks for local governments were also institutionalized, including the PEMSEA Network of Local Governments for Sustainable Coastal Development (PNLG) and the PEMSEA Network of Learning Centres (PNLC). These knowledge-sharing and advocacy networks have grown over time, serving as incubators for innovation and co-operation – for example, membership of the PNLG has grown from 10 local governments in 2001, to 45 today.

Other important milestones at this time were various codes and agreements, which were scaled-up during subsequent funding cycles. This included adoption of a voluntary code of practice for safety, health and environmental management at ports and harbours, and

agreements at ministerial level for oil spill preparedness and response.

As PEMSEA shifted into the third cycle of support from the GEF and UNDP, the time came for me to retire, after completing 15 years of service with the Regional Programme. Although this was probably long overdue, I felt that I could leave with a great sense of satisfaction that PEMSEA was on the right path and in safe hands under its new leadership. But, full retirement was not on the cards for me. In 2008, I was elected to serve as Chair of the East Asian Seas Partnership Council, and so continued assisting PEMSEA's transformation in this capacity, with the support of the members.

With the formation of the Council, a much bolder PEMSEA partnership came to the fore. It brought together country members and non-country partners – the latter being national, regional and international organizations and institutions in the region which share our vision. One of our key tasks was to transform PEMSEA into an international organization with a legal identity – this was a formidable task! But in 2009, eight participating countries formally recognized PEMSEA's international legal personality and it became a fully-fledged international organization. Our priority was to prepare for national implementation of the Sustainable Development Strategy, and scaling-up of many of the partnerships, networks, mechanisms and practices that had been put in place in the earlier phases. The countries focused on formulating national coastal and ocean policies, legislation and implementing programs.

To further strengthen the capacity of local governments and to facilitate their efficient use of available resources, PEMSEA initiated the development of the Integrated Coastal Management Code. This was designed to help local governments in planning, developing, assessing and refining a structured management system for marine and coastal areas to enhance governance and achieve desired social, economic and environmental goals.

Immediately following the Rio+20 summit, the Ministerial Forum responded to the global call for stronger commitment towards achieving a sustainable future, and the Changwon Declaration Toward an Ocean-based Blue Economy was signed. Part of the Changwon commitment was the adoption of the 5-year Implementation

Plan for the Sustainable Development Strategy for the Seas of East Asia.

PEMSEA entered into its fourth phase of GEF support in 2014, as an implementing partner of UNDP. This ushered in a new stage in PEMSEA's evolution, with a new brand and services to better support the needs of partners and other stakeholders as they scaled-up implementation of the Strategy.

The Partnership has indeed come a long way – the Secretariat that was initially run by two people working in a single room, has grown into a 36-strong team in a 2-storey building provided by the Government of the Philippines. Ten of the 12 partner countries have adopted and initiated the implementation of national policies, strategies, and programs for coastal and ocean management; and 75 percent of the countries have established national inter-agency and inter-sectoral coordination mechanisms. Approximately 15 percent of the region's coastline is now covered by Integrated Coastal Management, from a baseline near zero in the early nineties, and several countries are starting to incorporate the objectives and targets of the Strategy into their medium-term development plans, and are promoting such investments to a wider group of development agencies, donors and local and national partners.

A deeper engagement with the youth sector – tomorrow's leaders – has also been pursued. In 2016, a small grants program was established for furthering the cause for sustainable coastal management by youth in their respective communities and universities. And we are seeing exciting developments such as students developing educational games to promote awareness and leading mangrove rehabilitation and beach clean-up operations.

Existing learning networks are being expanded and new ones are being created to improve interaction between governments and the business community in the planning, development and implementation of blue economy policy and investments.

What lies behind these remarkable achievements? The introduction of ICM shifted mindsets from site-based, compartmentalised and top-down approaches to holistic, integrative, and area-based coastal management led by local governments. The Sustainable Development Strategy has served as a useful regional framework, creating opportunities for collaboration and co-operation in a diverse and complex region. PEMSEA has gone to great lengths to build regional competency for integrated coastal management and ocean governance and this is key to its sustainability. The combination of science, precautionary approaches, intuitive knowledge and working experience has facilitated wise decision-making, and partnerships have been at the core of all of this.

The past 23 years have not been without hurdles. But, with strong support from the partners, PEMSEA has endured and remained focused on its vision. It has shown that creating significant change and promoting continuous growth require commitment and innovation to address the myriad issues in the East Asian Seas region. As a witness to PEMSEA's evolution over the past two decades, I am confident that it will continue as a leading international organization that places great emphasis on local, national and regional implementation of sustainable coastal and ocean development strategies.” ■

#### PEMSEA: A COMMITMENT TO SUSTAINABLE MANAGEMENT OF THE SEAS OF EAST ASIA

Over the past 20 years, PEMSEA has directed substantial efforts in empowering local governments, coastal communities and national governments to protect and preserve East Asia's oceans and coasts. Evolving from a demonstration project on marine pollution prevention and management, PEMSEA is now a fully-fledged international organization with a legal identity.

Working in partnership with local and national governments, international development

organizations, companies, scientific institutions and regional initiatives, PEMSEA has applied Integrated Coastal Management (ICM) solutions in dozens of sites across East Asia, impacting more than 31,000 km of coastline and over 146 million people living in coastal and watershed areas. Healthier habitats and fisheries resources have improved the quality of life for coastal communities, and PEMSEA-supported governance processes have provided coverage to all socio-economic

segments of society, including women, children, indigenous peoples and disadvantaged groups.

With the help of the Global Environment Facility (GEF), UNDP and other international organizations, PEMSEA has fostered a dynamic partnership among stakeholders from the local, national, sub-regional and regional levels working to address threats to the region's marine and coastal ecosystems and the communities these support.

# Saving the planet, one appliance at a time

TOWARDS SOUND MANAGEMENT OF E-WASTES IN CHINA

“I HAVE A DEGREE IN APPLIED CHEMISTRY, but I did not know much about Persistent Organic Pollutants (POPs) and their damaging nature until I started working on pesticide management in 2007 in Hubei Province. Through my job I learnt that improper dismantling and processing of e-waste releases organic pollutants that have a detrimental impact on human health and the environment. To give you an idea of the scale of the issue – it has been estimated that in 2015 alone, the number of e-waste items recycled in China amounted to 152.74 million pieces! So this is a challenging task for those of us who work on waste management, but, I think that we are now on the right track.

China set up a Waste Electrical and Electronic Equipment (WEEE) Treatment Fund to promote proper management of e-wastes – including recycling, dismantling and processing industries. This laid the foundation for the construction of a national Extended Producer Responsibility (EPR) system – a

**MR YANG LIQUN** is an Engineer at the Hubei Provincial Solid Waste and Chemical Management and Pollution Prevention and Treatment Center, which is a branch of the Hubei Provincial Environment Protection Bureau. He holds a degree in applied chemistry and has been working in his current capacity since 2007. He manages a programme of work related to e-waste management and pollution reduction in China, as well as related international projects.

strategy that promotes the integration of environmental costs associated with goods throughout their life cycles into the market price of the products. However, these systems could not be effectively implemented as we did not have regulatory measures or the technical guidance needed for e-waste processing factories and local governments to adopt appropriate practices.

This is where the e-waste project has come into play. With the right technical back-up, and new technologies and equipment, we have been able to ‘close the gaps’ and implement the Extended Producer Responsibility and e-waste management systems – at least at pilot sites.

Working with three companies in Hubei province, including the Green Eco-Manufacturing Co. Ltd (GEM), we are piloting environmentally friendly waste management and processing practices. We have upgraded production lines, introducing control techniques that prevent harmful chemicals from being released during the e-waste dismantling process – this is important for both the health of factory workers and the environment.

To give you an example, I spoke to Ms Wang Cuihua, a frontline worker at the GEM factory. She dismantles about 400 televisions manually *every* day. She told me that before, she would get covered in phosphorous dust every time she opened a television, even though she was wearing a protective masks and goggles. With the introduction of the new dust-extracting devices, most of the dust is now vacuumed away, and she is happy that she works in a much cleaner and safer environment.

We have also been able to improve our e-waste Management Information System at pilot companies with new technology involving video-monitoring devices and a standardized barcode system. I must tell you that introducing this has not all gone smoothly! Initially the companies thought that the new system



Worker dismantling e-waste manually

would mean extra labour and procedures for them. Now that the system has been in operation for a while, they have seen the benefits themselves. We at the provincial department are able to collect accurate data on processed e-wastes, and the workload of the companies has been *reduced* – a win-win solution!

The real breakthrough for us has been that the techniques learnt through the pilot projects have been incorporated into technical guidelines that are being prepared for adoption by the Ministry of Environment Protection as best practice for WEEE dismantling and processing in China.

What also inspires me is that other e-waste processing

companies, having seen the benefits at the pilot companies, are now upgrading their own production methods and changing how they operate. We are now seeing exciting innovations in the e-waste processing sector – mobile app-based solutions like Huishouge (Recycling Brother) and Baidu Recycle have meant that consumers can now access certified e-waste recycling and dismantling companies and dispose of their e-waste in an environmentally responsible way.

My real hope is that these new approaches for dealing with e-waste can spread throughout China, because then our people could enjoy a greener and healthier life with far less pollution.”

## TAKING A LIFE-CYCLE APPROACH TO THE MANAGEMENT OF PERSISTENT ORGANIC POLLUTANTS FROM E-WASTES IN CHINA

With the acceleration of economic and technological growth, China has become one of the world's largest producers and recipients of waste electrical and electronic equipment (WEEE). However, most e-waste in China has, historically, been dismantled and treated in environmentally destructive ways with heavy release of persistent organic pollutants.

To address this problem, UNDP, in partnership

with the Foreign Economic Cooperation Office of the Chinese Ministry of Environmental Protection is implementing a GEF-financed project entitled *Reduction of POPs and Persistent Toxic Substances (PTS) by Environmentally Sound Management throughout the Life Cycle of Electrical and Electronic Equipment and Associated Wastes in China* (2015 - 2018).

This 4-year project is an example of turning

an emerging challenge into a new opportunity for protecting the environment, safeguarding human health and generating income. Taking a life cycle approach to managing e-wastes makes a significant contribution to achieving targets for Sustainable Consumption and Production as well as other sustainable development goals, and helps China meet its commitments under the Stockholm Convention.

# Namibia: sequencing beautifully!

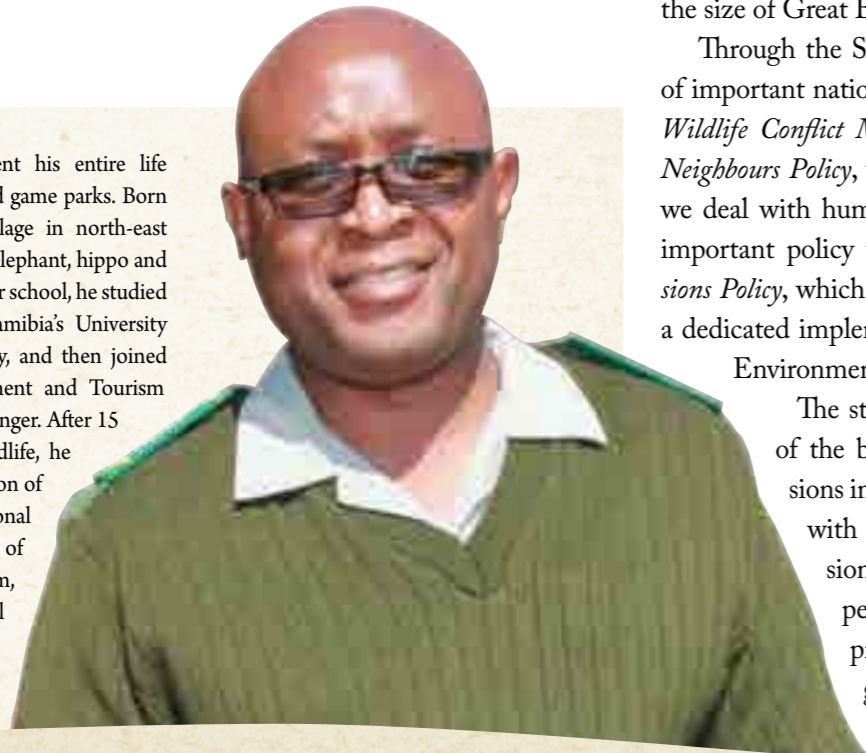
TAKING PROTECTED AREAS TO NEW LEVELS

“EVERY DAY, MY OFFICE PHONE RINGS almost non-stop. Calls from farmers, communities, NGOs, schools, journalists, businessmen, park visitors ... and so it goes on. Game parks and wildlife are *big* in this country. Why? Because they are such a dominant feature of our land – nearly 50 percent of our land surface in Namibia falls either within national protected areas or communal or private conservancies. When you visit my country, you will see wildlife roaming freely almost everywhere.

Namibia's progress with strengthening the national park system has gone hand-in hand with the 15-year history of our partnership with UNDP and GEF. Between 2004 and 2012, our first protected area project, *Strengthening the Protected Area Network* (fondly known as SPAN), laid many foundations for the country to establish a protected area system which can truly serve as a cornerstone for conserving the country's amazing



**COLGAR SIKOPO** has spent his entire life associated with wildlife and game parks. Born and raised in a small village in north-east Namibia, he grew up with elephant, hippo and lechwe in his backyard. After school, he studied nature conservation at Namibia's University of Science and Technology, and then joined the Ministry of Environment and Tourism (MET) in 1997 as a park ranger. After 15 years of working with wildlife, he was appointed to the position of Director, Wildlife and National Parks, in the Ministry of Environment and Tourism, with responsibility for all protected areas and wildlife in Namibia.



biodiversity – and also serve as the engine for our rural development. During those exciting eight years, we proclaimed five new protected areas to include previously under-represented ecosystems such as *Succulent Karoo* and *Acacia Tree and Shrub Savanna*. Overall, our protected area coverage now stands at over 17 percent of our total land area – this amounts to an area more than three times the size of Great Britain.

Through the SPAN project, we developed a number of important national policies. For example, the *Human-Wildlife Conflict Management Policy* and the *Parks and Neighbours Policy*, which provide clear guidance on how we deal with human-wildlife issues. Probably the most important policy was the *Tourism and Wildlife Concessions Policy*, which was followed by the establishment of a dedicated implementation unit within the Ministry of Environment and Tourism.

The strategy we have developed remains one of the best models for protected area concessions in the world, and is probably the only one with such a strong emphasis on, and provision for, supporting the livelihoods of rural people who are living inside and close to protected areas. The policy goes as far as granting direct concession rights within

protected areas, whether these are for a camp site or a lodge, and which may be a joint venture with the private sector. It is our strategy to ensure that protected areas deliver direct benefits to communities living within and around them, and in return communities become custodians of our protected landscapes. A very welcome bonus of this concession system is that it provides extra revenue which is reinvested in maintaining the protected area network.

The economic analyses we conducted as part of SPAN in 2004, showed that the protected area system already contributes up to 6 percent of the country's GDP in direct revenues from park-based tourism, with 24 percent economic return on government investment. These results enabled a decision to earmark 25 percent of park entrance revenues for reinvestment in the protected area system through a trust fund, providing up to US\$ 2 million additional financing per year. The second economic study, published in 2010, indicated that if we realize the potential for community benefits through the tourism and wildlife concession system, economic return on government investment in protected areas could be as high as 42 percent over 20 years. After our project's number-crunching, I can proudly and confidently tell our Ministry of Finance that nurturing our natural assets is going to yield win-win returns for both the people and wildlife of Namibia.

Our second project, called the *Protected Landscapes Conservation Areas Initiative* – or *NAMPLACE* for short, started in 2011. Given that the majority of wildlife in Namibia occurs outside national protected areas, the idea has been to establish Landscape Conservation Areas which bring together different conservation-oriented land-use units, including protected areas and privately-owned farms and conservancies. This takes our protected area management approach further, working at truly landscape levels for further improving the effectiveness of our conservation actions. We have already managed to establish five Landscape Conservation Areas covering some three-and-a-half million hectares.

ABOVE LEFT Waterhole, Etosha National Park

ABOVE Young lions at waterhole, Etosha National Park



Field Guide, Desare Ilnoobes,  
Twyfelfontein World Heritage  
Site, Uibasen Conservancy,  
Damaraland

OPPOSITE Gemsbok (oryx) on  
red sand dunes, Namib-Naukluft  
National Park

How did these successive projects change *my* life? A lot! Because of the outputs generated through the projects, I now have firm policy backing for dealing with parks and wildlife issues. Our budget for protected area management has increased four-fold and we have a stronger legal and institutional structure for protected area and wildlife management. Government as a whole, and people in towns and villages, are increasingly recognizing the value of protected areas and wildlife in the country – not only as an important cultural and natural resource and part of our heritage, but also as major assets for our sustainable development. And, of course, I now have more parks to look after, but I am much better equipped to do so.

However, this job is never free from new challenges. We currently face an upsurge in rhino poaching, fueled by

demands for rhino horn in Asia. Thankfully, with support from our third protected area project – *Strengthening the Capacity of the Protected Area System to Address New Management Challenges* – we are working to improve the monitoring and enforcement system to deal more effectively with wildlife crime.

One of the critical things I have learned is that in the ever-evolving circumstances surrounding our environment and society, a long term partnership is essential. The long-term nature of our partnership with UNDP and GEF, spanning over 13 years with a series of projects and financing in sequence, has been a tremendous asset for our country. The legacy of this partnership, including our beautiful protected area logo depicting the national animal, the oryx, is certainly part of our national history and our future.” ■



Goshawk

#### UNLOCKING THE POTENTIAL OF PROTECTED AREAS IN NAMIBIA - TAKING CONSERVATION BEYOND CONVENTIONAL BOUNDARIES

Namibia is a country of vast open spaces, spectacular and often other-worldly landscapes, and a rich diversity of largely rural peoples. Despite its aridity, Namibia is home to rich biodiversity and unique ecosystems. National parks and other protected areas serve as important reservoirs for biodiversity and environmental health, and form the centrepiece of Namibia’s tourism industry, which is a mainstay of the country’s economic development. Conventional

approaches to establishing and managing protected areas are insufficient to prevent biodiversity loss, land degradation, and consequent economic decline, and this is why Namibia is working to take conservation beyond its traditional boundaries.

With the support of the UNDP and GEF, Namibian Government agencies are working to lift conservation barriers and advocate for the establishment of a large-scale network of protected landscapes where

landowners and the conservation authorities come together to manage ecosystems at the landscape scale. As described by Colgar Sikopo, a series of three projects between 2004 and the present, amounting to a GEF investment of US\$ 17 million, have built on each other to unlock the potential of Namibia’s protected areas – including community-conserved areas – while contributing to human development in the country.

*“Women now have a voice! Before, a woman would not stand and address a gathering of men, but what we have done with the Field School has made it possible for women and youth to be involved in decision-making, both in households and in the community ... I can truly say now: ‘mambo si kama zamani’ – things are not like in the past. Our lives are better now.”*

ESTHER KULUO

*“We have learnt how to frame our biodiversity messages in a more tangible way, moving away from a ‘fear of loss’ towards a ‘hope of gain’ approach. I think that it is because of this that people in South Africa have shifted from thinking about ‘biodiversity OR development,’ to ‘biodiversity AND development’, and ultimately, ‘biodiversity FOR development.’”*

KRISTAL MAZE

# Coastal Calculations

CLIMATE-PROOFING COMMUNITIES IN THE COOK ISLANDS

Paul Maoate's story

“WHEN CYCLONE SALLY hit Rarotonga in 1987, I was 9 years old – I remember standing at the window watching the leaves and chunks of trees blowing past. The thing that really stands out in my memory, though, was the incredible unity amongst the community when cyclones came – although there was no written ‘plan’, people knew to come together and help prepare homes before the cyclone arrived, and then, afterward, everyone teamed up again to help with the clean-up and repair work. It was the same on all of the islands.

In 2005, I was working in New Zealand when five cyclones hit Manga'ia, destroying the main harbour – or Avarua Landing as we call it. Through my work I met people who experienced that cyclone. They described how the harbour was completely engulfed by waves – the storm surge extended about 20 m above the harbour walls, damaging the main quay and even floating the 20,000 litre concrete water tank away. It was hearing about this that prompted me to return home, to apply my skills and help build a better harbour.

**PAUL MAOATE** is a Civil Engineer in the Planning and Design Division of the Infrastructure Department in the Cook Islands government. He is responsible for the implementation of infrastructure projects such as upgrades to water-supply infrastructure, airports, roads and harbours. A Cook Island Maori, Paul was born on the island of Rarotonga, and has lived in the Islands for most of his life, barring 8 years spent studying and working in New Zealand. He took up his current position in 2006.



Avarua Landing is the lifeline of Manga'ia. The airport runway is only 1km long, limiting the size of the aircraft that can land there. So all major supplies such as food, building materials and fuel have to come in by ship. When the boats cannot come into the Landing safely, the islanders have to go without food supplies, basic provisions and diesel (which is needed for transport and electricity generation).

As an engineer working for the Cook Islands Government, I became involved in the GEF-funded project to rebuild Avarua Landing. Our objective was to rebuild the harbour so that it could withstand cyclones, high seas and storm surges with minimal damage, so that the harbour could remain operational following these extreme events. We also needed to provide a sheltered ramp that local fishermen could use safely during rough seas.

The real innovation of the project was the development of a tool called the Cook Island Coastal Calculator – basically, this takes information on wave and water levels, positions of reefs and other coastal formations, and other climate-related information, and translates it into something that engineers can use to inform the design of coastal

structures. It can also be used to forecast the probability of extreme events occurring, in 10, 20 or even 50 years.

Before we had the Calculator, our approaches to protecting the coast were ad hoc – we would take solutions that had worked elsewhere, such as gabions or rock walls, and apply them to protecting our coastline here. We also had to rely on external expertise to assist us with scoping and providing recommendations on how to improve our coastal protection. But with the Calculator, and support from the project, we were able to re-build the harbour on Manga'ia ourselves, with the confidence of knowing it would be far more resilient to tidal surges and other extreme weather.

We have been able to use the knowledge and tools from Manga'ia to upgrade another two harbours on the island of Manihiki, and build a removable jetty and coastal protection walls in Rarotonga. Right now we are constructing cyclone shelters for Palmerston, Nassau and Rakahanga.

Climate-proofing is not only about finding engineering solutions – it is about building the resilience of people. When we were designing the Calculator we wanted to

take traditional knowledge into account – so a workshop was held on Manga'ia with the specific purpose of gathering information from the older generation, especially those that could still remember cyclone events going back to the 1940's and 1950's.

Women also play an important role in building the strength of the community and in driving economic activities – many women run businesses that rely on the regular arrival of ships. Rebuilding the harbour has also opened new opportunities for them to send their craft products to Rarotonga to take advantage of the tourist trade there.

Tua'ine Tuara's story

“Our day normally starts at about 5 a.m. and we bake all day. We rely on boats coming in at Avarua Landing for our supply of flour. Before the harbour was rebuilt, the

**TUA'INE TUARA** is a small business owner on Manga'ia Island. She and her family bake bread, a staple in the diet of the local community.

Avarua Landing, Manga'ia Island, Cook Islands





Aerial view of coastline showing strong wave action, Manga'ia Island

arrival of the boats would be inconsistent because of the weather. Supplies would arrive every two or three months and we can't store flour for that long. I can recall many times when we had to go without bread for periods of a month or so – which also means that we had no income. We have had many times in the past when we ran out of diesel, and, of course, if there is no diesel we cannot bake. When the cyclones hit in 2005, it was a real disaster as the

harbour was filled up with rocks and no boats could come in. We had no supplies – no milk, rice, flour, or any of the basic foodstuffs you need in a household to keep people fed. The only way of bringing supplies in was by air and that was extremely expensive. Now that we have a much more regular supply of provisions by boat, we can provide bread to the community and our business is more stable and profitable.” ■

BUILDING RESILIENCE TO CLIMATE CHANGE IN SMALL ISLAND DEVELOPING STATES IN THE SOUTH PACIFIC

Small island developing states (SIDS), including the Cook Islands, are highly vulnerable to climate change and sea level rise due to their small land masses and vast ocean surroundings. Their socio-economic development is hindered by their isolation from foreign markets, limited natural resources, inadequate infrastructure and periodic devastation from natural disasters. Whilst tropical storms, tidal surges and cyclones have always been a feature of the climate in these South Pacific islands, data show an increased frequency of coastal inundation due to high seas and

storm surges; more frequent, intense rainfall events, and an increasing frequency and intensity of cyclones.

In 2005, Manga'ia, the second largest of the Cook Islands, was stripped of a vital source of trade and economic prosperity when a series of five tropical cyclones destroyed Manga'ia Harbour. The transfer of goods to the island was cut off by these natural disasters, leaving the community vulnerable and hindering the operation of the many small businesses that form the backbone of the economy in these island communities.

Supported by UNDP, and funded through the GEF Special Climate Change Fund (SCCF) and the Australian Government, a project was initiated to rebuild Manga'ia harbour, using state-of-the-art decision-support tools, and to strengthen climate resilience within the community through awareness-raising and capacity building. This initiative served as a catalyst for a much bigger programme of action – the Pacific Adaptation to Climate Change Project (PACC) – to climate-proof communities on other islands in the South Pacific.



Blue-footed booby

# Cleaning up our act

CONSERVING FRAGILE ECOSYSTEMS IN THE GALÁPAGOS ISLANDS

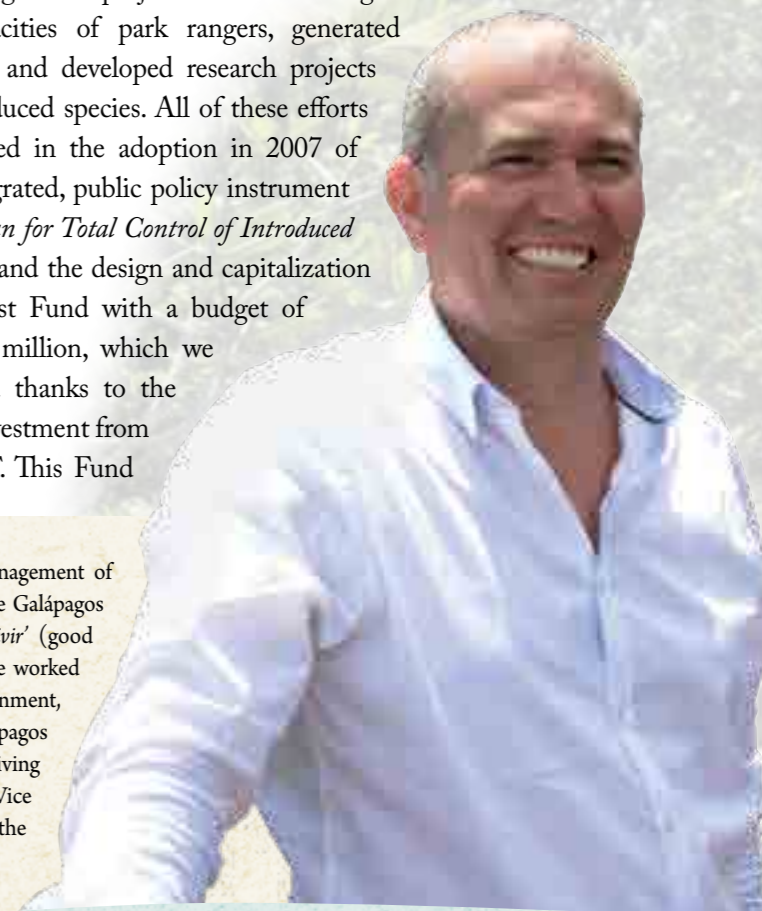
“THE GALÁPAGOS ISLANDS occupy a special place in the minds of people – what other place can claim to have had such an influence on the way we think about our natural world? Our island ecosystems are unique, not only because of emblematic species like the iguanas, tortoises and finches, but also because they are so isolated, unusual and fragile. At the same time, these islands are a premier tourist destination for wildlife viewing and diving, and this is an essential pillar of our economy – along with the farming and fishing that sustains our communities. This presents a complex set of challenges for those of us involved in biodiversity conservation here.

I was born on Floreana, the least populated island of the Galápagos, so the strong bond that I formed with the environment came naturally to me. My professional career began as a volunteer for the Charles Darwin Foundation, performing fieldwork for the study of ‘Petrel Pata Pegada’ (the Galápagos petrel). This involved spending long periods observing nesting birds on Santiago Island, to investigate the impacts of invasive animal species, especially goats and pigs. I quickly came to understand the seriousness

of the threat that invasive animals posed.

During my time as Director of the National Park, we – together with the Darwin Foundation, the UNDP and GEF – designed a landmark project for the management of introduced species. We mobilized some US\$ 18 million, and these resources facilitated a massive intervention to eradicate goats and pigs on Isabela, Santiago and some of the other small islands – literally thousands of alien animals were eradicated, allowing the natural habitat and species to recover.

Through the project we also strengthened the capacities of park rangers, generated manuals, and developed research projects on introduced species. All of these efforts culminated in the adoption in 2007 of one integrated, public policy instrument – the *Plan for Total Control of Introduced Species* – and the design and capitalization of a Trust Fund with a budget of US\$ 15 million, which we leveraged thanks to the initial investment from the GEF. This Fund



A marine biologist by training, **ELIECER CRUZ BEDÓN** is a specialist in the management of protected areas. Eliecer is the current President of the Government Council for the Galápagos Islands, and is responsible for promoting sustainable development and ‘*buen vivir*’ (good living) in the archipelago within the framework of national policies. Previously, he worked as Undersecretary of Marine and Coastal Management for the Ministry of Environment, coordinating the work on Marine Protected Areas. He was Director of the Galápagos National Park for a period of 8 years, during which time he played a key role in driving the establishment of the Galápagos Marine Reserve. Eliecer previously served as Vice President for the Charles Darwin Foundation during the period 2005-2007 and as the Eco-Regional Representative Director of the World Wildlife Fund for Galápagos.



Bartolomé Island, Galápagos



Giant tortoise

provides ongoing support for control and eradication of invasive species – work which continues to the present.

In 2001, we were forced to deal with another threat that these islands face – pollution. The oil spill from the shipwrecked tanker, *MV Jessica*, polluted Naufragio Bay on San Cristóbal, triggering one of the worst environmental disasters the islands had known, with devastating impacts on populations of iguanas, sea lions, shore birds and rare marine species.

Following this, we worked with UNDP to secure another GEF investment to develop oil spill contingency plans in case of future disasters. Although the *Jessica* oil spill itself was overwhelmingly damaging, it put the spotlight on our high dependency on fossil fuels. It became obvious that we should secure

investment for a new project to develop clean energy technologies, and that is how the ‘renewable energy for electricity’ initiative was born.

We now have a significant proportion of the energy requirements of San Cristóbal and Santa Cruz islands met through wind generation, a photovoltaic park on Floreana, and we are working on the creation of another photovoltaic park on Isabela. The individual and combined impacts of these projects have been profound. Beyond anything else, they have created a culture of care and respect for our natural heritage amongst the population, and also amongst decision makers – so much so, that a government agency for regulation and control of biosafety and quarantine has been established to provide controls at airports and maritime ports to ensure that our environment remains free from invasive alien species.

It is our responsibility to conserve the unique ecosystems of the Galápagos, but in ways that the population can benefit from ecosystem goods and



Marine iguana resting in shallow water

BELOW LEFT Eradication of invasive alien ants



services through sustainable, non-extractive use and integrated management of natural resources. We must create a healthy, environmentally sustainable economy that can be an example for the world. Our long term relationship with the GEF and UNDP has contributed *fundamentally* to the significant progress we have made, and it is my vision that this relationship should strengthen and grow as we work to reach even greater goals. With this, we can remain pioneers in conservation, whilst building our resilience to the increasing threats posed by climate change.” ■

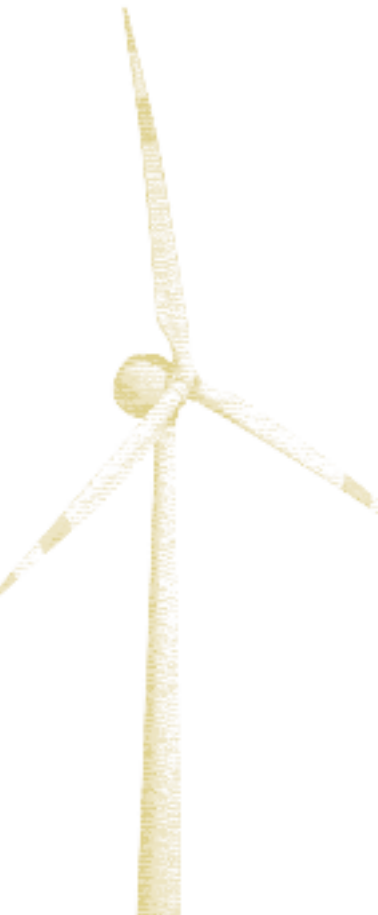
#### INTEGRATED ACTION TO ADDRESS THE DRIVERS OF ECOSYSTEM DEGRADATION IN THE GALAPAGOS ISLANDS

The Galápagos Islands are situated in the Pacific Ocean, some 1,000 km from the Ecuadorian coast. This collection of islands, islets and rocks, and the surrounding ocean, are known as a unique ‘living museum and showcase of evolution’. Situated at the confluence of three ocean currents, the Galápagos marine environment is one of the most diverse and spectacular in the world. 97% of the total land surface of the archipelago falls within a National Park, with human settlements restricted to specifically zoned areas on only four of the islands. The islands are surrounded by the Galápagos Marine Reserve, which is one of the largest in the world.

Invasive alien species pose the single greatest threat to the integrity of the Galápagos ecosystems, and the unique assemblage of species they support. Since people first arrived in the islands in the 1500s, they have – intentionally or by accident – introduced a host of alien plant and animal species. Through predation, competition, modification of habitats and introduction of diseases, these species have had a devastating effect on the natural biota of the islands.

Between 2001 and 2011, a series of three UNDP-supported, GEF-funded projects have provided multifocal and integrated support to the Galápagos

to build capacity for controlling invasive alien species; reduce the risk posed to wildlife by oil pollution and strengthen the capacity for dealing with oil spills if they occur; and to remove barriers to the development and utilization of low-emissions, renewable energy for electricity generation. The combined impacts of these investments has been to strengthen the protection of the unique natural heritage of the Galápagos, and reduce reliance on fossil fuels, thereby safeguarding the natural capital that is the lifeblood of the economy, and contributing to a better quality of life for the communities on these islands.





# Reducing the load

MANAGING TRANSBOUNDARY NUTRIENT POLLUTION IN THE DANUBE/BLACK SEA BASIN

“I REMEMBER CLEARLY that it all started in Sofia, Bulgaria, in the autumn of 1991. As an official of the Slovak Ministry of Environment, I had an opportunity to listen to a presentation by the first Chief Executive Officer of the GEF, Mohamed El-Ashry, in which he presented a vision for an environmental recovery programme for the Danube River Basin. Representatives of Danube countries, and the donor community, had all gathered to establish the foundation for this programme that would gradually transform, over two decades, into the GEF Strategic Partnership for Nutrient Reduction in the Danube/Black Sea basin.

Let me explain the problem: Between 1970 and 1980, the ecosystem of the western Black Sea collapsed, an ecological and socio-economic disaster driven mainly by the enormous volume of nitrogen pollution that the Danube River was delivering to the Black Sea. Vast numbers of dead algae and other aquatic life covered the beaches of Romania and western Ukraine. By 1990, losses of bottom-feeding animals were estimated at 60 million tons, including five million tons of fish, and about 40,000 km<sup>2</sup> of the north-western shelf of the Black Sea was effectively considered a ‘dead zone,’ with insufficient levels of dissolved oxygen to support any kind of life.

So it was that, in 1991, the governments of Danube and

Black Sea countries welcomed the introduction of a series of projects to be implemented by UNDP with financing from the GEF International Waters focal area. These projects would contribute over US\$ 50 million in GEF grants, with the long-term objective of restoring the highly degraded Danube/Black Sea transboundary aquatic ecosystems. We especially appreciated that through two of these projects, we would receive assistance in preparing an investment portfolio for nearly 500 projects, with private and public sector investment worth over US\$ 5 billion, to tackle pollution reduction from every possible angle – including everything from wastewater treatment to restoration of wetlands.

The impacts of this work have been remarkable. It would be hard to find any other place on Earth where such water quality and ecosystem improvements have been achieved, over only two decades, in a large river basin and its receiving sea. In the Danube Basin, nitrogen and phosphorous emissions have decreased by 20 percent and 50 percent respectively, and oxygen levels are now at or near saturation in most areas of the Black Sea. The downstream impact of this has been the effective elimination of the ‘dead zone’ in the northwest shelf of the Black Sea, a marked decrease in the frequency of algal blooms, and the return of many species that had become locally extinct. Associated with these changes, there has been a significant recovery in revenues from tourism and fisheries in the Black Sea region.

These projects played a catalytic role in helping countries to make full use of policy, legal and institutional

**IVAN ZAVADSKY** is the Executive Secretary in the Permanent Secretariat of the International Commission for Protection of the Danube River. He has occupied various senior management positions in the Bratislava Water Utility Company and the Slovak Government, and has served on the GEF Secretariat, with responsibility for complex regional programmes and projects under the International Waters thematic area. Between 2001 and 2007, he served as co-ordinator of two nutrient pollution reduction projects in the Danube/Black Sea basin. He has a Masters degree in water management and a post-graduate qualification in water management economics.

reforms to advance nutrient reduction, and to increase their capacities for the protection, management and sustainable use of shared water resources. They built partnerships with other donors, enhancing the enabling environment for public and private nutrient-reduction finance going forward, and paving the way for the EU accession of seven Danube countries.

Many best practices have emerged from these projects that can serve as models for adoption elsewhere. Personally, I am especially proud of one of these innovative practices, which has contributed to ongoing impacts from this work. Following consultative processes, the project developed an Exit Strategy to set in motion a phase-out of project support in preparation for the International Commission for the Protection of the Danube River (ICPDR) operating as a self-financing Commission and Secretariat. As a result, we now have a technically and institutionally strong Danube Commission and the Danube countries are now standing confidently, backed by solid environmental regulation and real investments, to meet their own environmental needs. The Commission is strongly committed to further efforts to reduce nutrient pollution, especially from the agricultural sector. Targeted measures will help farmers to decouple economic growth in the agricultural sector from pollution of ground and surface waters.

This success story has not ended. The Danube Ministerial Conference in 2016 acknowledged the impressive progress in ongoing reduction of organic emissions from point and diffuse sources. Hundreds of fish migration aids have been constructed, opening up migration routes

and improving the connectivity between habitats. In addition, more than 50,000 hectares of wetlands and floodplains have been partially or totally reconnected, restoring ecosystem functioning and flood attenuation services.

None of this would have been possible without the initial, well-targeted and strategically designed GEF-funded interventions. This unique experience has had a truly transformational effect and catalytic impact in the entire region and on the public and private sectors. It has built a solid foundation for transboundary co-operation in a region with many different role-players. Over the years that I have worked in the Danube, I have witnessed that if people can find ways to work together to achieve shared environmental goals, they can also start seeing the benefits of greater social and economic cooperation.” ■



## STRATEGIC PARTNERSHIPS FOR BASIN-WIDE APPROACHES TO NUTRIENT REDUCTION IN THE DANUBE/BLACK SEA REGION

The Danube is the second largest river in Europe, draining an area of 817,000 before discharging into the Black Sea. Its delta is the second largest natural wetland in Europe. Unsustainable use of water resources and the release of untreated wastewater (mainly from agricultural runoff and discharge of urban sewage) into the river, has resulted in reduced water quality and quantity, causing significant environmental damage, with associated threats to public health, economic activities and quality of life. Pollution in the Danube has also contributed to increased downstream environmental problems in the Black Sea such as eutrophication, algal blooms, and species loss. Impoundments and other

hydraulic structures have been built on the Danube, with negative impacts on wetlands and floodplains, threatening the region’s bird and fish habitats and compounding the risk of flood damage.

The overall goal of the Danube Regional Project described by Ivan Zavadsky, has been to restore the ecological condition of the river basin and manage its natural resources more sustainably, with particular attention paid to achieving sustainable ecological gains within the Danube River Basin and Black Sea area – including the reduction of nutrient and toxic loads to levels which will allow ecosystems to recover to 1960-conditions.

The *Danube Regional Project*, implemented by UNDP in partnership with the International Commission for the Protection of the Danube River (ICPDR), was one of three components of the basin-wide approach adopted by the US\$ 95 million GEF Strategic Partnership for Nutrient Reduction in the Danube/Black Sea Basin. Other components include the *Black Sea Ecosystem Recovery Project* (a joint UNDP, Black Sea Commission and UNEP initiative), and the *Partnership Investment Fund for Nutrient Reduction* (a GEF-financed, World Bank-supported fund), which provides single-country nutrient reduction investments.

# Science for sustainability

TURNING CHALLENGES INTO OPPORTUNITIES IN CUBA

“I HAVE HAD THE PERSONAL and professional experience of travelling, with many different companions, on a remarkable journey through the landscapes of Cuba, as we work to conserve our ecosystems and support sustainable livelihoods. Working together, our Government, the GEF and UNDP have provided the roadmap, directions, equipment and funds to make this possible. The departure point for the journey was the diverse and rich Sabana-Camagüey archipelago, on the north shore of Cuba – with its mosaic of sensitive marine environments, mangroves, coastal forests and agricultural lands that are critical for supporting the livelihoods of the varied communities there. From here, our route took us through diverse protected areas – where globally important habitats and species are conserved, and then inland to the mountains – our water factories. The journey started 25 years ago and still continues today. I have had the privilege of leading one leg of this journey for nearly 13 years, and I am proud to share some of what I have learnt along the way. Cuba is a Small Island Developing State and protection of coastal and marine ecosystems is a strategic issue. Tourism is one of the strongest components of our economy and depends on us maintaining the health of these coastal ecosystems. In

**DR DANIELA DE LAS MERCEDES ARELLANO ACOSTA** is an Advisor to the Environment Agency of the Ministry of Science, Technology and Environment of Cuba. She holds degrees in Engineering Geophysics and Geological Sciences, is a founder member of the National Union of Architects and Construction Engineers of Cuba, and an active participant in the Latin American Meeting of Women Engineers, Architects and Surveyors. She has held various academic positions, including that of Deputy-Professor in the Higher Institute of Applied Science and Technology, has served as President of the National Committee for UNESCO's International Hydrological Programme, and as National Co-ordinator of Regional Project 13 of the International Atomic Energy Agency. She served as the National Co-ordinator of the GEF-funded Sabana-Camagüey projects from 2002 to 2015. She is the recipient of several prestigious awards, including the Felipe Poey Award (2016) conferred by the “Friends of the Country Economic Society.”

the Sabana-Camagüey archipelago, tourism zones also coincide with areas that support important fisheries – this meant that we had to harmonize the management of resource use by these sectors to avoid conflicts, and this provided the basis for our project.

From its conception, the project envisaged ecosystem-based management as a way to promote sustainable development. Better understanding of the ecosystem was needed, so, early on, the work was characterized by detailed biodiversity research undertaken by scientific institutions. But the link with production sectors was missing – how could we translate our knowledge of biodiversity and ecosystems into programmes of action that would lead us towards sustainable use of ecosystem goods and services for the benefit of economic development, and improved quality life?

The critical step was to open paths for establishing partnerships among key economic sectors – tourism, agriculture, livestock, fisheries, and forestry – the scientists, regulatory authorities, communities and local government bodies. I was pleased to see the progression in the relationships among these role-players – this ‘coming together’ was greatly facilitated by our focus on training in sustainable production practices. At first you could almost read the thoughts of the producers saying: “What is this scientist coming to talk about now?” With time, they started speaking about sustainable production as if it was something they had always known and believed in! And, with time,

they have seen tangible evidence of job creation and the generation of environmental, economic and social benefits. These range from nature-based tourism – building on well-managed, intact ecosystems; to agro-forestry and sustainable land and livestock management on land previously under sugar cane; to biodiversity-compatible activities such as cultivation of natural sponges and sustainable cultivation of mangrove oysters. The net effect was that we restored ecosystem health at pilot sites, with benefits for food security – this provided best practices that are now being replicated elsewhere.

A great innovation was the creation of capacity building centres in municipalities. These provided classrooms for learning and providing advisory services to local governments. Rural people had the opportunity to go to international events to represent Cuba, and the project. I will not forget an event on integrated coastal management in Uruguay, where we sent five participants to explain the

experiences of their municipalities in integrated coastal management. All five delegates were women and this reflected the strong participation of women in the project – they numbered more than the men!

Along this journey, I learnt that change takes time, but it can happen – when people can see the benefits and when there are opportunities on which to build. By way of example: in the nineties, 25 sugar cane factories were closed in the coastal areas of Sabana-Camagüey, as part of the transformation of the Cuban economy. In these areas people had been devoted to the cultivation of sugar cane for many generations – the sugar cane plants were part of their life and suddenly this ended. For the project, this challenge presented an opportunity. We were able to help these communities develop sustainable approaches to rearing water buffalo for milk and meat, while protecting

View over the Sabana Camagüey archipelago





Tourist boat on the Redonda Lagoon

key wetland areas. In addition, the government interest in reforestation was an opportunity for us to introduce native tree species in key locations to increase connectivity to natural forest areas. The seeds that we started planting in 2004 became trees by 2015. Today, the people who planted only sugar cane now grow different crops, nurturing them with organic fertilizer and worm compost, and they use biogas for their energy needs. And it is so pleasing to hear local farmers saying: “The birds we have not seen for years have come back again!”

The overall impact of our work in the Sabana-Camagüey was that it opened the way to doing things differently – from production on the ground right up to policy level. Today we have a much broader vision of natural resources and the holistic nature of the environment, and how national decisions can be shaped by lessons learnt at the local level – so much so, that Cuba’s national coastal zone management legislation was informed largely by the approaches and practices developed through the Sabana-Camagüey projects.

Our ground-breaking work on building co-operation between land-use sectors provided a foundation on which

subsequent projects have been built – in particular those designed to strengthen our protected area system, and to connect mountain and coastal ecosystems through new biological corridors that link protected areas through production landscapes. This has meant that environmental and protected area planning had to be integrated with municipal land-use planning and decision-making. Achieving this was a first for Cuba, and an innovation that has now been replicated in other initiatives around the country. Municipal authorities have approved Coastal Management Programmes which integrate environmental management, government, community, and socio-economic sectors and science – a positive change from the old view of municipalities as being there only to implement national policy.

I believe that the long-standing relationship between our country, UNDP and GEF has yielded important impacts for a number of reasons. Firstly, the support has been developed in line with international objectives and national policies, each project building on the next, to provide an integrated programme of support to the country. Secondly, the sustainability of these impacts is quite certain, due to



Outdoor education

the existence of well-capacitated people, and genuine commitment and buy-in from Cuban institutions.

When we started this journey, I had a vision of the immense capabilities that this small country has to replicate experiences that promote synergies, linking national

and international initiatives to produce big results. I am confident that UNDP and the GEF will continue with us on our ongoing journey, which now takes us through the territory of climate change, as we work to safeguard our ecosystems and make Cuba a prosperous island.” ■

#### INTEGRATED ACTION TO SAFEGUARD CUBA’S LANDSCAPES AND SUPPORT SUSTAINABLE LIVELIHOODS

Over the past 25 years, UNDP and GEF have worked with the Government of Cuba and other partners, to build an impressive portfolio of interconnected and complementary projects that address multiple issues across the entire country. These projects were designed to ensure the sustainability of impacts at specific sites, whilst replicating and expanding them to larger areas, addressing an increasing range of threats and emerging challenges that Cuba faces as a small island state.

As described by Daniela de las Mercedes Arellano Acosta, the earliest projects, which were initiated in 1991, established the scientific and institutional foundations for biodiversity conservation in the Sabana-Camagüey archipelago. Key sites were identified for safeguarding biodiversity and ecosystem services, such as the supply of fisheries stocks. A series of subsequent projects provided support for establishing protected areas in the Sabana-Camagüey, and building capacities for their management. From this departure point, two parallel streams of activities developed – one through which the governance framework

for Cuba’s entire national protected area system was improved; and the other focused on mainstreaming biodiversity considerations into production sectors in the Sabana-Camagüey archipelago. The latter represented one of the first mainstreaming initiatives ever supported by the GEF.

These achievements paved the way for a second batch of UNDP-supported, GEF-financed projects which broadened the scope of interventions across the entire island. From 2005 and onwards, Cuba started to implement sustainable land-use practices and ecosystem conservation at a landscape scale through a ridge-to-reef approach. One of these initiatives was the Cuba’s Country Pilot Partnership on Sustainable Land Management (SLM), which is still running today. This has implemented sustainable land-use practices in multiple ecosystems by addressing key issues such as cattle ranching in dryland forest ecosystems, water resource management and sustainable financing mechanisms for SLM across productive landscapes. The lessons learnt from the first interventions on protected

areas and from the Sabana-Camagüey projects also served to develop and establish a whole new set of marine and coastal protected areas along the entire southern coast of Cuba. In parallel, new programs were established to address restoration of degraded coastal areas; the prevention, control and management of invasive alien species in vulnerable ecosystems; and the conservation of threatened mountain ecosystems. Detailed studies on the impacts of climate change and adaptation measures have provided valuable information for the design and implementation of projects and national policies.

Cuba is now working with the UNDP and GEF on the development of a new ground-breaking project that will incorporate multiple environmental considerations, and their economic implications, into the management of landscapes, forests and production sectors. The new project will take all of the lessons learnt over the past 25 years to scale, and work to integrate environmental sustainability into implementation of the 2016-2030 National Development Plan, in the context of the country’s economic transition.

# Fishing for the future

TRANSFORMING MANAGEMENT OF TUNA FISHERIES IN THE PACIFIC

“I HAVE BEEN INVOLVED in the fisheries sector in one capacity or another all my working life. So I have had a long period over which to observe and experience, from different perspectives, the issues that affect the fisheries sector in the Western and Central Pacific. The story I have to tell is one of ‘David and Goliath’ in the fisheries world – it is a story of transformational change in fisheries management, involving Pacific Small Island Developing States (SIDS), and the wider powers of global fisheries operators.

The waters of the Western and Central Pacific hold the most important tuna fishing grounds in the world, providing about 60 percent of global supply. But fishing is also the foundation of livelihoods and employment for the majority of people living on islands in this region. Tuna represents a critical source of revenue and is one of the few commercially viable natural resources these

**HUGH WALTON** is employed by the Pacific Islands Forum Fisheries Agency (FFA) as Chief Technical Advisor and Project Coordinator of the Pacific Islands Oceanic Fisheries Management Project (supported jointly by the GEF, UNDP and FAO). Since 1978, he has worked in the fisheries sector in the West and Central Pacific in many capacities, with first-hand experience working on different kinds of fishing vessels. He has held numerous positions as a fisheries researcher, trainer and technical adviser and for four years was head of the New Zealand School of Fisheries. He worked as a Fisheries Development Adviser and as a Fisheries Policy Specialist, before taking up his current position in 2015.

Pacific island states can use to buoy up their economies and create jobs. In the mid-nineties, with no legally-binding framework to govern co-operation on tuna fishing between countries, or local and global operators, there were serious management deficiencies across the range of the fish stock, including in the high seas beyond national jurisdictions. Over-exploitation of the fishery resource was threatening the ecological integrity of the large marine ecosystem that supports these fish stocks, with serious implications for the well-being of the region's people and the global community.

In 1997, the Pacific SIDS Strategic Action Program (prepared with support of UNDP and the GEF), identified key challenges facing the tuna fishery. These included weaknesses in national and regional level fisheries management and governance, and a lack of information available to senior decision-makers to help them understand the root causes of unsustainable actions, and respond to them appropriately. There was also a critical need to cement a role for Pacific SIDS in tuna management and to empower them in their negotiations with larger nations, many of whom were politically far more influential.

This gave rise to a series of GEF-funded Pacific Oceanic Fisheries Management projects that were supported by UNDP and implemented by the Forum Fisheries Agency (FFA) and the Pacific Community (SPC). These projects worked to facilitate negotiations for, and signing of, the Western and Central Pacific Fisheries (WCPF) Convention and the subsequent establishment and operation of the WCPF Commission. This provided the legal and institutional foundation for improving fisheries management. The projects provided advice and support to these processes, almost certainly bringing the Convention into operation far sooner and faster than would otherwise have been possible. At the same time, the projects worked to strengthen fisheries governance at national and regional levels, building the confidence and capacity of the Pacific SIDS to contribute to the

negotiations and implement the Convention. Stakeholder participation was really high, and existing institutions, such as the Forum Fisheries Agency, were fully integrated into the process, enhancing their capacity to contribute to improved management and decision-making into the future.

As a result of the projects, conservation and management of transboundary oceanic fishery resources has been profoundly improved. Through the Parties to the ‘Nauru Agreement’ (PNA), a purse-seine vessel day-scheme has been implemented, which sets limits on numbers of vessels and fishing days. This has resulted in more sustainable catch volumes and – through an auction mechanism for vessel days – has generated as much as US\$ 400 million (in 2015) for the eight PNA member countries. The Project supported the introduction of the world's largest on-board Observer programme (including 100 percent coverage on tropical purse-seine vessels), which has contributed to achieving more responsible and sustainable harvesting, and has generated significant employment. The introduction of a satellite-based vessel-tracking program has helped strengthen enforcement and compliance, and improved scientific understanding assists with monitoring tuna (and other) stocks, and supports more informed decision-making.

The Food and Agriculture Organization has partnered with the GEF and UNDP in supporting a third phase of this work, which is implemented by FFA. We are building on earlier successes and supporting Pacific SIDS with implementation and enforcement of regional and sub-regional arrangements for the conservation and management of transboundary oceanic fisheries. We have come a long way, but there is still much to do.



Having started my fisheries journey on a lobster boat, I find it tremendously exciting to be working with highly efficient technical processes and dynamic agencies to conserve an economic resource of global value and contribute to global food security and a more sustainable future for Pacific Islanders.”

Line-fishing for tuna in the Pacific

■ BELOW Blue fin tuna

## SMALL ISLAND DEVELOPING STATES AND FISHERIES MANAGEMENT IN THE CENTRAL AND WESTERN PACIFIC

The waters of the Western and Central Pacific provide the majority of the world's tuna harvest, as well as other important fish stocks. These highly migratory fish are capable of swimming large distances across national maritime boundaries. Persistent over-fishing, resulting from weak regional governance and management of fish stocks, places this globally significant fishery at risk, with serious negative impacts on Pacific Small Island Developing States.

Between 1998 and the present, UNDP has provided

support to Pacific Island states, the Forum Fisheries Agency and the Pacific Community, through a series of GEF-funded projects to address weaknesses in national and regional level fisheries management, promote co-operation and empower small islands to engage on a more equal footing with larger states and distant water fishing nations. These projects have set in motion processes and strategies for

bringing into force and implementing the Western and Central Pacific Fisheries Convention. With additional support from the Food and Agriculture Organisation, the work continues, with emphasis shifting to implementation of conservation and management measures, giving specific protection to threatened species and key habitats.





# Welcome to my forest

WORKING TO SAVE TIGERS FROM EXTINCTION

**PAK BELANG** (also known as 'harimau', or *Pantheri tigris*, subsp. *jacksonii*), is a Malayan tiger. Pak Belang is an apex predator and keystone species living only in closed-canopy rainforests in the southern and central parts of the Malay Peninsula. One of six surviving subspecies of tiger, Pak Belang is classified as critically endangered by the International Union for the Conservation of Nature.

“**I**N THE RAINFOREST WHERE I LIVE, there has been little to celebrate in recent years. My home has grown smaller, my horizons likewise. My larder has grown emptier, and my neighbours more scarce. The noise of new things has smothered the birdsong, and I wonder if more change is coming? I am living in what they call the Anthropocene, the age of humans – and my future is in the balance.

Like every living thing, I need food. I prefer Sambar deer, but I have not seen one for months. Wild boar are dangerous to hunt, but must suffice – although they too have become fewer. A shiver runs down my spine when I see the near-emptiness of my surroundings. Sometimes, I leave the shelter of my home to find food where people keep animals in large numbers. What else can I do?

Humans call me the 'king of the jungle', but, they shoot and trap my kin, sell their skins for decoration, and use their body parts for medicine. I am a king in danger – my throne is coveted, my kingdom is threatened. Others who lived here in the time of my forebears have already disappeared – the Sumatran rhinoceros has gone from this peninsula, and the Javan rhinoceros was hunted to extinction when this land was ruled by people from a far-off kingdom. Much of our forest home has been chopped down.

As I think of those who disappeared before, the fate of my own kind comes to my mind. This morning, I roamed the forest for some time and did not encounter one other tiger, although I did see some pawprints – the first I have seen in a long time. Will I get to meet my kin again? My wise grandmother told me that only four decades back, there were three thousand of us roaming this peninsula. Now, only three hundred are left. If the forces that are destroying our home and killing us are not brought under control, there will be none of us left.

The Malaysian people's lives have blended with ours for centuries – they have even given me my name – *Pak Belang* – out of respect. Surely they will not let us fade from this land? None of our cousins can replace us. We have no other home – if we cannot survive here, then an entire branch of the tiger family tree will be lost. And with it will go many others that depend on our presence for their own survival. And if our home is changed so much that we cannot survive here, then the food, and timber and fibres that people need from it will also grow scarce. The water that flows from this earth will dry up, and the soil

that once was held by the roots of the forest trees will be blown and washed away. This is all connected.

The forest spirits have urged me to be hopeful. They speak of a brighter future for our clan – of people from the surrounding villages who come here to patrol the forest, with special clothes and equipment. These are forest guards who are well trained and have a plan – they watch and wait for people who come here to hunt us or destroy our home. Those that are caught are made to pay high sums of money and are imprisoned. Now, when I see these guards I have peace of mind, knowing they are here to care for this forest and its inhabitants.

People who study the forest are coming more often now too, and they have many new words on their lips: 'connectivity', 'corridors' and 'landscape approach.' I overhead a learned man explaining that these words mean that the people of Malaysia are trying to reconnect our fragmented forest areas so that we can regain the vast home we used to have – we call it the Central Forest Spine. They understand that this forest is not only here for us, but for all the people of Peninsular Malaysia and even in Singapore, across the sea – even there, the people are using water that flows from our forested lands.

These activities give me hope that I will start noticing new trees growing where once the forest was chopped down. Perhaps soon I will be able to roam far enough to find deer, and meet others of my own kind. I have renewed hope that the clan of *Pak Belang* will roam this land forever.”



Community rangers setting up a camera trap to monitor tiger movements



ABOVE Historic photograph of a tiger crossing a river in rainforest in Malaysia

BELOW *Rafflesia* flower in Royal Belum, Galong River

## CONSERVING THREATENED SPECIES: SYSTEMATIC CONTRIBUTIONS TO TIGER CONSERVATION

**T**igers and their habitat face complex and interlinked threats, due to increased exploitation of natural resources and increasing poaching and hunting. These threats have been driven, in part, by a growing human population and increased poverty, particularly over the last century. Loss or fragmentation of intact tiger habitat has led to a decline in food and reproductive opportunities for tigers, as well as increased conflict with humans. This has resulted in the decimation of tiger populations – across Asia, numbers have decreased from an estimated 100,000 in 1900 to approximately 3,200 – 3,800 wild individuals remaining today. During the same time-frame three sub-species have already been driven to extinction, with the Malaysian sub-species under increasing risk.

Since 2010, the GEF has initiated 17 projects in 11 tiger-range countries in support of the Global Tiger Recovery Program – 10 of these are being implemented in partnership with the UNDP, in six tiger-range countries including Malaysia. These projects adopt a comprehensive approach based on clear identification of threats and barriers and community involvement in the governance of natural resources, not only to conserve a critically endangered species, but also to maintain vital ecosystem services that are essential for improved livelihoods and sustainable development.

In Peninsular Malaysia the UNDP supports 2 GEF-financed, Government-led projects. These work to strengthen the protected area system and re-establish connectivity between fragmented forests in the Central Forest Spine, the only habitat for Malayan tigers. Efforts to combat poaching and illegal trade in tiger parts feature prominently, including establishment of regional wildlife crime units and intelligence-led law enforcement capacity development involving local communities.





## AFTERWORD

# Reflections on 25 years

IMPLEMENTING ENVIRONMENTAL INNOVATIONS FOR SUSTAINABLE DEVELOPMENT



*Helen Negret, Senior Technical Advisor*

Helen Coles de Negret, on mission at Maliau Basin, Sabah, Malaysia, 2012

“I AM A BRITISH-BORN ECOLOGIST, married to a Colombian who is also an ecologist – we met in the Amazon forest in Brazil; he was looking for insectivorous birds and I was looking for insects so our paths crossed! My interest in Latin America was sparked by the book ‘*A Zoo in my Luggage*,’ which I got in a Christmas stocking at the age of 10. The description of the armadillos in the pampas of Argentina, inspired me to visit there. Later, when I got the chance to apply for a scholarship to do post-graduate research in Brazil, I jumped at it and luckily was successful. I came for a year, and 40 years later I am still here – I have travelled a lot around the region with a suitcase and have armadillos in my garden in Panama where I now live!

I started working for UNDP in Brazil in 1989, to help build the first environmental unit in a UNDP Country

Office. This was quite a feat in itself, but, the first major project I worked on was even more of a challenge! It was a fully UNDP-funded project working with the Ministry of the Environment in Brazil, to develop environmental guidelines for line ministries, including those of transport, agriculture and mining – among others! This was taking place in the run-up to the 1992 UN Conference on Environment and Development in Rio, but, despite being at the heart of it all in the host country, bringing these sector stakeholders to the table was a hard task. The project and its proponents were initially regarded as zealous environmentalists, and the odd-ones-out in the broader development programme in the country.

Now, just over 25 years later, and in the very same country, things have changed dramatically. UNDP is supporting a GEF-funded project led by one of the biggest

agricultural research institutes in the world, to conserve high value forests by setting sustainable harvesting limits, and implementing public policies for non-timber forest products that improve livelihoods of rural farmers. Through other projects, we are supporting the Brazilian Rural Society in forested areas to strengthen supply chains for deforestation-free soya; entire States are addressing land degradation as part of their development plans; and national policies are being developed for environmental management in the indigenous lands that cover 12 percent of this massive country. It has been a long journey, with many twists and turns, and one in which I have seen many changes and learnt many lessons.

I clearly remember being in a meeting in Belem, in Brazil, chaired by an elderly British aristocrat. He was handed a fax announcing that the Global Environment Facility had just been formed. He looked around the table and his eyes rested on me – the only woman in the room. Assuming I was a secretary, he asked me to make copies of the fax for everyone so that we could discuss its content – which was the idea of incrementality, the central principle defining GEF’s role to cover the costs of global benefits, rather than national and local ones. Now, as I leave UNDP, all of my senior management team are women, and we have a different way of thinking about the relationship between global environmental benefits and national development impacts – our GEF-funded projects now not only measure local and national-scale benefits, but actively seek to optimise these, and build policies to sustain these impacts over time.

Bringing about this change of mind-set has been a slow process. It is true that UNDP has, from its beginnings, supported environmental conservation and natural resource management programmes. But, when we first started implementing GEF-funded projects in the Latin American and Caribbean countries, this work was not generally seen as *central* to the development agenda – many viewed the projects simply as environmental interventions. The other thing was that many of our earlier projects were site-specific, and this was not enough to sustain benefits over time, especially where there were gaps in national-level policies. The contrast now is that GEF investments are used to address problems more holistically and systematically – either through successive projects, each focusing on discrete parts of a problem, but building on each other



Brown-throated, 3-toed sloth with young, Panama

to complete a bigger picture; or through larger, multifocal projects that address several inter-linked issues at multiple levels. Long-term benefits to people are now recognised as being at the centre of sustainable development, and it is this that generates long-lasting environmental benefits at the local and global scale. Making these transitions has shifted our work to the centre of the development agenda, with our projects serving as triggers for transformational change.

This is demonstrated most clearly in interventions taking place in countries where we have built long-standing partnerships, over a series of successive projects. I have seen this in countries such as Chile, Uruguay, and Ecuador – where projects have moved beyond a site-specific vision, to a systematic approach, in which we have strengthened governance of entire protected areas systems, and secured long-term support from Ministries of Finance, based on a common understanding of the role protected areas play in

RIGHT Nine-banded armadillo at sunset



providing ecosystem services for national development. In other countries such as Argentina, Cuba and Paraguay, we started with safeguarding ecosystems through protected area approaches, and then moved beyond the boundaries of protected areas to work with production sectors – addressing risks and threats in the landscape, and working with global markets to increase demand for sustainably-produced products. This has taken time, but has brought about the transformation that is needed.

At the centre of it all – whether projects are local, national or regional; or whether they are site-specific, systemic or aimed at mainstreaming – the success of this work has been determined largely by the people involved. The most successful projects have been those with clear leaders or champions of the cause – people who are passionate about what they are trying to achieve, and persistent in doing so; those who have the tenacity to get a project approved and to implement it, against all odds. My role has been to help these people shape their vision into something that also fits with the visions of the GEF and UNDP, and to structure it in a way that is achievable, helping them channel their passion and energy into specific actions and results that can be measured. Many times, I have worked with champions who have gone the extra mile – dodging

protests and burning tires to get to meetings, or making late-night calls and working on weekends to deal with emergencies or simply get things done. Many times, we have seized

an opportunity – be it a new law, a partnership or just good political timing – to make a project happen. I think that the single clearest thing I have learnt is that people matter, and the partnerships that they can be build – ultimately, it is people who make policies and bring about change.

This also applies at the community level, where champions lead the way. I have seen how communities have learnt new, more sustainable ways of deriving income; have recognized the need to manage their resources, and have received recognition for their role in protecting resources important to the broader community. A prime example can be seen in the crab collectors in the muddy swamps of remote mangrove forests in the north-east of Brazil. Once, they were too ashamed to admit their trade and ‘invented’ different jobs when asked by girls at dances what they did for a living. The very same crab collectors today are proud to say that this is what they do; they have developed management plans to protect their livelihoods, putting aside no-take areas and setting minimum sizes for capture. They are using new transport techniques that reduce crab mortality by 60 percent and increase their incomes; and, they have opened restaurants in the nearby towns that serve a growing tourism industry. It is



Crab collector

these people who are increasingly being recognized as key guardians of an ecosystem that provides so many services to coastal and national development. And it is these people whom the project continues to support, by taking pilot-level lessons to national scale, with new policies and plans for sustainable use of mangroves along Brazil’s entire coastline.

It has been a privilege to be in the position to translate the vision and power of so many people into so many projects, and to see the impacts unfolding over the years. It has been a privilege to be part of a wider team – learning from colleagues and projects across the world, and taking their lessons to the countries I have supported. It has been wonderful to have the opportunity to create networks and see ideas on combatting desertification in the north-east of Brazil being shared with Lusophone countries in Africa; to see lessons on managing invasive species taken from Galápagos to Juan Fernandez, to conserve world heritage sites and the livelihoods of the people there; and to see a network of coastal and marine areas being built through GEF-financed, UNDP-supported projects spanning the entire coastline of South America.

I know there is a whole network of people fighting to make a difference and to sustain impacts at the scale needed to make life on this planet sustainable. Project proponents and beneficiaries are the ones who stay the course; they are the ones who can help provide continuity and change. I have been blessed to see project co-ordinators who go on to be Directors of Biodiversity in their governments; and those who developed biodiversity strategies in their countries go on to lead international conventions. I have even seen the children of past project coordinators taking on the formulation of new projects!

It is with this knowledge and rich experience that I enter the next phase of my life. I have seen that change can happen, and that individuals do make a difference. I have recognised the power of individual will; and how it can be harnessed for the benefit of others. It has had the honour of meeting so many dedicated people who work against all odds – in cold harsh mountain climates, in semi-deserts under the burning sun, and in agricultural landscapes stricken by drought. It has been a privilege to help translate these people’s vision and power into projects. Projects are about much more than numbers – they are about people. It is people’s voices we need to hear and support. These are the people who matter, and it is their future that we should support. These are the voices that should be heard, and that we celebrate.”

Helen Coles de Negret, at a meeting in Costa Rica



**DR HELEN COLES DE NEGRET** is the Senior Technical Adviser and Regional Team Leader for UNDP’s Global Environmental Finance Unit in the Latin America and the Caribbean (LAC) region. She has 33 years of professional experience working in the environmental and sustainable development arenas, just over 25 of these in the employ of the United Nations Development Programme.

Between 1989 and 1993, she served as Technical Advisor in the Brazil Country Office, setting up the environment unit and supporting a growing portfolio of environmental projects, including the first GEF-funded projects for Brazil. During this time she was also part of the UNDP team for the Rio Earth Summit (1992). This was followed by a seven-year period in which she developed GEF-funded projects in at least 17 LAC countries, and provided training in guidelines for incorporating environment into UNDP-supported projects. After a three-year period working as Technical Advisor in the UNDP-GEF Regional Unit based in Mexico, she moved to Panama to take up her current position.

Prior to working for UNDP, Helen occupied various other positions as a university lecturer, an environmental impact assessment practitioner and a researcher/writer for an NGO. She holds a BSc degree in applied biology and a PhD in applied ecology.



## PROJECT INFORMATION

This table includes a list of the main projects of relevance to each story, indicating the years of implementation, GEF investment and co-finance (US\$) and alignment with the Sustainable Development Goals.

PAGE	PROJECT(S)	YEARS	GEF INVESTMENT	CO-FINANCE	ALIGNMENT WITH SDGS
12-13	Mainstreaming Sustainable Land Management (SLM) In Agro-Pastoral Production Systems of Kenya	2010-2016	3,030,734	4,660,000	
14-15	Solar Water Heating Market Transformation and Strengthening Initiative	2009-2013	1,000,000	2,160,500	
16-17	Technology Transfer for Climate Resilient Flood Management in the Vrbas River Basin	2015-2020	5,150.00	77,260,000	
18-20	Globallast Partnerships (short title) - 2 projects	2000-2017	13,999,840	20,953,599	
21-23	Sustainable Land and Ecosystem Management in Shifting Cultivation Areas of Nagaland for Livelihood and Ecological Security	2009-2013	3,600,000	25,000,000	
24-27	Mainstreaming Biodiversity Management into Production Sector Activities	2007-2015	2,590,000	76,428	
	Strengthening Seychelles Protected Area Systems through NGO Management Modalities	2011-2016	2,154,145	2,590,000	
	Expansion and Strengthening of the Protected Area Subsystem of the Outer Islands of Seychelles and its Integration into the Broader Land- and Seascape	2014-2018	1,872,546	8,483,841	
	Technology Transfer for Grid-Connected Rooftop Photovoltaic Systems	2012-2016	1,227,000	4,885,000	
28-29	Integrated and Environmentally Sound PCBs Management	2014-2017	2,050,000	9,393,949	
30-31	Combating adverse effects of Climate Change on Agricultural Production and Food Security in Benin	2010-2014	3,100,000	6,920,000	
32-34	Re-naturalisation and Sustainable Management of Peatlands to Combat Land Degradation, ensure Conservation of Globally Valuable Biodiversity and Mitigate Climate Change	2004-2011	975,854	2,305,501	
	Landscape Approaches to Management of Peatlands aiming at Multiple Ecological Benefits	2014-2017	2,700,900	10,484,400	
35-37	Strengthening the sustainability of, and positive linkages between, ecosystems and coastal livelihoods on the Huon Peninsula, Morobe Province	2013-2016	49,953	n/a	
	YUS Conservation Organisation: Community Management (short title)	2014-2017	34,878	n/a	
	Strengthening the Management Effectiveness of the National System of Protected Areas: YUS Conservation Area Management and Sustainable Community Livelihoods	2015-2020	2,681,145	3,515,000	
38-41	Agulhas Biodiversity Initiative (ABI)	2003-2010	3,147,675	8,558,556	
	Biodiversity Conservation and Sustainable Development Project (or CAPE: Cape Action for People and the Environment); co-implemented by the World Bank	2003-2007	11,100,000	81,066,000	
	National Grasslands Programme	2007-2013	8,300,000	37,261,764	
	The Biodiversity and Land-Use project	2015-2010	8,177,730	41,957,000	
44-46	Reducing climate change-induced risks and vulnerabilities from glacial lake outburst floods in the Punakha-Wangdue and Chamkhar Valleys (GLOF)	2008-2013	3,445,050	3,906,224	
47-49	Initial implementation of accelerated HCFC Phase-Out project in the CEIT Region (Belarus, Tajikistan, Uzbekistan and Ukraine)	2012-2015	9,000,000	12,300,000	
50-51	Conservation of Native Cotton Varieties in Peru By Indigenous Women (6 Projects)	2003-2014	155,066	n/a	

PAGE	PROJECT(S)	YEARS	GEF INVESTMENT	CO-FINANCE	ALIGNMENT WITH SDGS
52-54	Community-based Conservation of Biological Diversity in the Mountain Landscape of Mongolia's Altai-Sayan Ecoregion	2006-2010	5,304,545	15,300,000	
	Conservation and Sustainable Use of biodiversity in the Kazakhstani section of the Altai-Sayan ecoregion	2006-2010	2,395,700	16,338,700	
	Biodiversity conservation in the Russian Portion of the Altai-Sayan Ecoregion	2006-2010	3,515,000	12,160,000	
55-57	Patagonian Coastal Zone Management Plan	1991-2004	2,800,000	n/a	
	Implementation and Consolidation of the Patagonian Coastal Zone Management Programme for the Protection of Biodiversity	1999-2010	5,200,000	12,910,000	
	Inter-jurisdictional System of Coastal and Marine Protected Areas of Argentina	2010-2014	2,177,727	10,730,000	
58-59	Technology Transfer and Market Development for Small Hydropower In Tajikistan	2011-2016	2,000,000	6,200,000	
60-63	Prevention and Management of Marine Pollution in the East Asian Seas	1993-1997	8,025,000	3,400,000	
	Building Partnerships for Environmental Protection and Management of the East Asian Seas	1999-2004	16,224,000	12,321,000	
	Development of Implementation of Public-Private Partnerships in Environmental Investments	2003-2006	1,000,000	808,500	
	Implementation of the Sustainable Development Strategy for the Seas of East Asia	2007-2010	11,576,336	33,374,400	
	Scaling up the Implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA)	2014-2018	10,643,992	144,981,000	
64-65	Reduction of Persistent Organic Pollutants (POPs) and persistent toxic substances (PTS) release by environmentally sound management throughout the lifecycle of electrical and electronic equipment and associated waste in China	2014-2018	11,870,000	47,000,000	
66-69	Strengthening the Protected Area Network (SPAN)	2004-2012	8,200,000	33,677,000	
	Protected Landscapes Conservation Areas Initiatives (NAMPLACE)	2011-2015	4,500,000	13,100,000	
	Strengthening the capacity of the protected areas systems to address new management challenges	2014-2017	4,100,000	14,500,000	
72-74	Pacific Adaptation to Climate Change Project (Climate Proofing Manga'ia Harbour)	2009-2015	920,000	20,000,000	
75-77	Control of Invasive Species in the Galapagos	2001-2011	18,300,000	23,240,000	
	Galapagos oil spill: Environmental Rehabilitation and Conservation	2001-2006	530,000	470,000	
	Renewable Energy for Electricity Generation - Renewable Electrification of the Galapagos Islands	2006-2009	3,800,000	21,310,000	
78-79	The Danube Regional Project (short title)	1991-2011	5,000,000	6,600,000	
	The Danube/Back Sea Ecosystem Recovery project	1991-1996	8,500,000	35,000,000	
80-83	Protecting biodiversity and establishing sustainable development of the Sabana Camagüey Ecosystem	1999-2004	2,000,000	3,477,375	
	Priority actions to consolidate biodiversity protection in the Sabana Camagüey ecosystem	1999-2003	3,889,000	16,019,000	
	Mainstreaming and Sustainability of biodiversity conservation in 3 productive sectors of the Sabana Camagüey ecosystem	2008-2014	4,119,498	23,353,178	
84-85	Implementation of the Strategic Action Program (SAP) of the Pacific Small Island Developing States	1998-2005	12,296,800	8,995,6333	
	Pacific Islands Oceanic Fisheries Management Project	2005-2011	11,644,285	79,091,933	
	Implementation of Global and Regional Oceanic Fisheries Conventions and Related Instruments in the Pacific Small Island Developing States	2014-2019	5,000,000	84,934,375	
86-87	Enhancing Effectiveness and Financial Sustainability of Protected Areas in Malaysia	2012-2019	5,600,000	13,400,000	
	Improving Connectivity in the Central Forest Spine Landscape	2014-2020	10,860,000	36,500,000	

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