Newsletter

A Watershed Moment

Anjouan Beach, The Comoros archipelago, Credit: Blue Ventures | Matthew Judge

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Funded by the UK Government, the Darwin Initiative provides grants to support developing countries to conserve biodiversity and reduce poverty, with Darwin Plus focusing its grants on the natural environment and climate change in the UK Overseas Territories (UKOTs).

Projects support:

- the Convention on Biological Diversity (CBD)
- the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- the Nagoya Protocol on Access and Benefit-Sharing (ABS)
- the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)
- the Ramsar Convention on Wetlands
- the Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- the United Nations Framework Convention on Climate Change (UNFCCC)

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St Helena Black Cabbage Tree, Credit: RSPB | Cloud Forest Project

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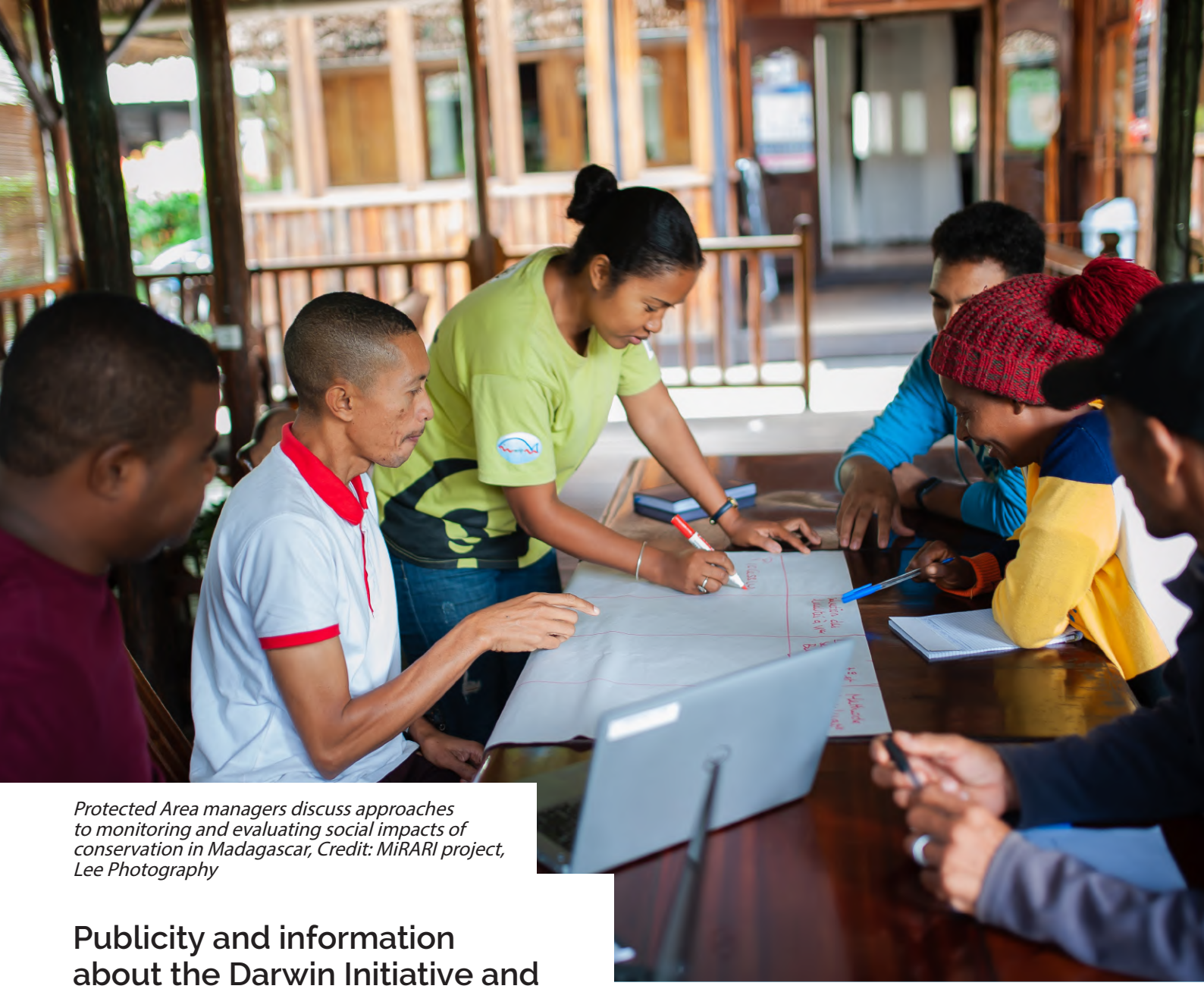

Protected Area managers discuss approaches to monitoring and evaluating social impacts of conservation in Madagascar, Credit: MiRARI project, Lee Photography

Publicity and information about the Darwin Initiative and Darwin Plus

For more information on the Biodiversity Challenge Funds including details about current and completed projects, and their final application forms, please visit Darwin Initiative, darwininitiative.org.uk, or Darwin Plus, darwinplus.org.uk.

We also have Biodiversity Challenge Funds channels on Instagram, Twitter, Facebook and LinkedIn. Please feel free to follow the accounts for Darwin Initiative and Darwin Plus news.

We're also keen to share other Biodiversity Challenge Funds project news. If you have news you'd like to share on our website, please get in touch at BCF-Comms@niras.com

Publicity and referencing Darwin Initiative or Darwin Plus

We kindly remind project leaders that if they are publicising their work then it is important that they make every effort to mention Darwin Initiative or Darwin Plus funding. This is important as it helps us to ensure the Darwin Initiative and Darwin Plus retains a high profile and secures continued Government funding.

Lac Alaotra, Madagascar, Credit: Mike Hudson

A word from the Biodiversity Challenge Funds

Water is a vital resource that sustains life on Earth, and its importance to biodiversity conservation cannot be overstated. Water covers approximately 71% of the Earth's surface, the vast majority of which (97%) is found in oceans. According to the United Nations, 10% of the world's species are harboured in freshwater ecosystems, which cover less than 1% of the Earth's surface. Biodiversity is closely linked to water sources, as water plays a crucial role in supporting ecosystems and sustaining life.

Water conservation and sustainable water management practices can help protect both water resources and biodiversity, but freshwater ecosystems are under threat. SDG 6, Clean Water and Sanitation highlights that in the last 300 years, over 85% of the planet's wetlands have been lost. In addition, since 1970, species dependent on inland wetlands have declined at a faster rate than those depending on other habitats, with an increasing number of these species now at risk of extinction. With nearly half of the world's population depending on water resources for their livelihoods, and an estimated three out of four jobs globally dependent on water (UN Water), biodiversity loss, pollution and degradation also has a huge impact on livelihoods. Balancing the needs of different water users, including biodiversity and human livelihoods, is therefore a complex but indispensable challenge that requires collaboration and cooperation.

We are therefore pleased to present the latest edition of our newsletter, focused on the interdependence of water, biodiversity, and livelihoods. In this issue, we aim to shed light on the critical role that water plays in supporting and maintaining healthy ecosystems, the benefits this provides for local communities, and the innovative solutions that are being developed to mitigate the challenges of a rapidly changing climate. From Malagasy wetlands to Kenyan cloud forests to coral reefs in the Philippines, our projects have identified the role that water plays in providing ecosystem services and improving livelihoods, particularly in areas already facing challenges from habitat degradation, over-exploitation, and climate change.

We hope you enjoy this edition of the newsletter!

Comorian women gleaning for octopus on reef flat, Credit: Blue Ventures | Effy Vessaz

Where livelihoods meet the ocean

The Comoros archipelago sits at the centre of the northern Mozambique Channel, an ecoregion with the second-highest marine biodiversity globally. 20% of Comorians are fishers, and over 70% of the rural population relies on fish for their main food source. The young, rapidly increasing population depends on dwindling fish stocks and farming for food security and income.

Comorians practise both reef gleaning (fishing the intertidal zone on foot during low tides) and open water boat fishing. Reef gleaning is practised mainly by women who are entirely dependent on accessible, shallow coral reef flats which are extremely vulnerable to climate change and human impact. Destructive fishing techniques, such as poison or metal spears, are sometimes used in these areas to fish for octopus. Boat fishing is practised by men, who often use unsustainable fishing techniques such as small-gauge nets. Both fisheries primarily provide subsistence food for families, selling any excess landings on the roadside. There are currently little to no value-addition activities being carried out to improve fishers' catch quality, access to market and price.

Funded by the UK Government through the Darwin Initiative, Blue Ventures is working with partner Dahari to protect the environment and improve the livelihoods of 1,500 small-scale fishers. This is achieved by reinforcing the community-led management of marine areas and taking practical actions to rebuild fish populations and protect key habitats.

Some of the actions encouraged are temporary reef fishery closures (which involve closing off an area to allow target species to recover), permanent no take zones, the enforcement of only sustainable fishing methods and gear, and the implementation of community-led data-based marine management plans. The benefits of these management interventions are reinforced through catch value additions, including supporting fishers' associations with infrastructure to reduce post-harvest losses, and drying or smoking fish to reduce spoilage, which allows for food security in times when fishing is not possible due to rough seas or bad weather.

> "We have heard directly from fishers that they've already seen rare species coming back into the area because of the areas where fishing and other extractive activities are not allowed"

Comorian women in a training session on data analysis, Credit: Blue Ventures | Effy Vessaz

"*So far, a major achievement has been the implementation of the first community-led permanent no-take zone in Comoros in 2021. We have heard directly from fishers that they've already seen rare species coming back into the area because of the areas where fishing and other extractive activities are not allowed,*" says Effy Vessaz, a Blue Ventures Partner Support Coordinator in the Comoros.

Blue Ventures and Dahari are dedicated to empowering women by ensuring they are included in decision making about the management of their marine resources. Fisheries management interventions, including temporary octopus fisheries closures and using more sustainable fishing methods, focus on the reef flat where women work.
Blue Ventures and Dahari raise awareness in their target communities about women's contribution to fishing pressure, and provide solutions that benefit entire households.

"Blue Ventures and Dahari are dedicated to empowering women by ensuring they are included in decision making about the management of their marine resources"

The legacy of the Darwin Initiative's support for this project is an incentive-driven model for community-led marine conservation, promoting human rights and gender equity that can be replicated across the Comoros.

Written by Effy Vessaz, Comoros Project Manager, and Fanny Wright, Dahari Programme Manager. For more information on project 27-006, led by Blue Ventures, please click here.

Community clearing of invasive plants in Lac Alaotra, Credit: Luhanaud Andriamiarivola

Converting conservation into compost

Lac Alaotra is Madagascar's largest lake and most important rice-producing region and inland fishery. It is also an important habitat for wildlife including the Critically Endangered, single-site native Alaotran gentle lemur and Endangered Meller's duck. The hills surrounding the lake used to be forested but have mostly been cleared for farmland, causing severe erosion and lake degradation. Migrating communities who come to Alaotra seeking fertile croplands are putting further pressure on the watershed by burning reed beds (the gentle lemur's only habitat) for conversion to rice-paddies. Inconsistent fishery management and overfishing are also a considerable threat and have led to a sharp decrease in income from fishing. These effects are compounded by climate change which is bringing severe weather events with increasing frequency and unpredictability, undermining the financial resilience of local people.

The rapid spread of invasive plants such as water hyacinth has further reduced both water quality and accessibility for fishing on Lac Alaotra. If channels become overrun with water hyacinth, fishing access is blocked and new areas of the marsh are burnt to make way for fishing, destroying Alaotran gentle lemur habitat. Access is also important for patrols to monitor Alaotran gentle lemurs and to identify and deter illegal activity, such as fishing with non-regulation apparatus or in the closed season. These thick mats of water hyacinth have been found to be ideal breeding grounds for disease-transmitting parasites. Lac Alaotra is a prime example of the interdependence of water, biodiversity, health, and livelihoods.

> “Lac Alaotra is a prime example of the interdependence of water, biodiversity, health, and livelihoods”

As part of the Darwin Initiative project *'Restoring the Alaotra Ramsar Watershed - The Breadbasket of Madagascar'*, and with co-funding from Jersey Overseas Aid, the Durrell Wildlife Conservation Trust is supporting local communities in Alaotra to clear priority water channels annually of invasive water hyacinth *(Eichhornia crassipes)* and water ferns *(Salvinia molesta)* using hand tools. Removing invasive species in the marsh not only improves access for fishing and patrols, but it also maximises opportunity for young reeds such as 'Phragmites' and 'Cyperus' to regenerate naturally. Community teams are also planting reed Phragmites in priority areas to connect existing priority habitat blocks for the Alaotran gentle lemur. These activities help to improve the financial resilience of local people by providing alternative employment in the closed fishing season.

> Community teams are planting reeds in priority areas to connect existing priority habitat blocks for the Alaotran gentle lemur, helping to improve the financial resilience of local people by providing alternative employment in the closed fishing seasons

In a pilot study supported by Jersey Overseas Aid, compost made from invasive water plants has proven to be particularly effective. Where crops were treated with this organic compost as part of a suite of Climate Smart Agriculture activities, people's yields increased an average 60-80%. Following such a successful pilot, this composting initiative is now ready to be scaled up to secure even greater benefits for people and wildlife.

Fishers and farmers will be recruited and trained to participate in the clearance of invasive plants. After some training and consultation, and providing the necessary equipment, the water hyacinths will be given free of charge to farmers' groups for processing into valuable organic compost. This process involves combining the mulched invasive plants with other organic matter like vegetable cuttings and worms are introduced to speed up the process. The finished compost will then belong to the group, which they can then sell to local, regional, and national markets where appropriate. The profits from compost sales can be reinvested in the group's joint activities or shared equally among members.

Darwin Initiative funding has been instrumental in upscaling our efforts to restore the Alaotra watershed.

Written by Gemma Charles and Harriet Croome. For more information on project 28-008, led by Durrell Wildlife Conservation Trust, please click here.

Alaotran gentle lemur, Credit: Durrell Wildlife Conservation Trust

Women using shovels to collect marine resources during low tide, Credit: Acer Aranha (IIRR)

Gender segregated perspectives on fishing, food security and conservation

Sitting at the heart of the coral triangle, the Philippines is known for its marine biodiversity. The country relies heavily on its fishing industry with both small- and large-scale operations. As of 2015, the fisheries sector employed over 1.6 million people, 85% of whom were with municipal fisheries, 14% in the aquaculture industry, and 1% from commercial fisheries. However, a practice that is seldom analysed is "gleaning" or "coastal food foraging". This is a fishing method used in coastal, inlet freshwater areas or in habitats exposed during low tide (Gleaning- GAF, 2019; Nessa and Ambo-Rappe, 2019). This involves minimal use of tools, often limited to hands, buckets, or tongs for retrieval of marine life. This artisanal fishing method is known to contribute to food security and supplemental income of coastal communities (Salvador, 2017). The role that gleaning plays in the lives of rural women and low-income communities, especially in the wake of COVID-19 and the climate crisis, has not been sufficiently explored.

The coastal municipality of Guinayangan, Quezon is known as a "seafood paradise" to many. The agricultural and fishing community relies heavily on its marine resources for daily nourishment. Alongside their livelihoods, many residents engage in gleaning for subsistence and additional income. The pandemic crippled communities across the globe, prompting an interest in gleaning from economic, social, environmental, and health perspectives. As a part of the Darwin Initiative-funded project, *'Improving coastal resilience and ecosystem services through biodiversity restoration,'* the International Institute of Rural Reconstruction (IIRR) conducted a study in Guinayangan across five barangays (villages), in order to develop an assessment on the role of gleaning in coastal communities. The study involving structured interviews critically assessed gleaning within the intersecting frameworks of gender, biodiversity conservation, and food security by highlighting coastal voices.

> "The nexus of food, climate, and gender must be recognised in building resilience in the face of climate change"

Historically, women carry the responsibility for maintaining food security for their families in addition to providing agricultural labour. Goh (2021) highlights the added challenges that the climate crisis poses and how it disproportionately impacts women. The nexus of food, climate, and gender must be recognised in building resilience in the face of climate change.

The IIRR research team conducted structured interviews with 29 participants from five barangays, to assess the role of gleaning in coastal communities in Guinayangan. The participant gender breakdown consisted of 15 women and 14 men. The survey asked community members about their gleaning activity, seasonality of catch and preferred species as well as their thoughts on climate change and its impact on species and marine resources.

Seashells caught during a gleaning session in Guinayangan, Credit: Acer Aranha (IIRR)

The analysis revealed that 55% of participants gleaned for both food and income, while the remaining participants were involved in gleaning solely for food and/or for donating the excess catch to neighbours. Of the participants who used gleaning for additional income, an average of 190 Philippine peso (roughly £2.90) was reported from the sale of their catch after a single gleaning session. The nine women who reported selling their catch earned an average of 135 peso (roughly £2.00) per session. In addition, 82% of participants considered gleaning as "very important" or "important" for household food security.

Interestingly, 82% of participants reported an increase in their activity during pandemic-prompted lockdowns. However, increases in gleaning during the pandemic are aggravated by the perceived decreases in the catch of target species in low tide events. These dwindling species include octopus, crab, and shrimps - species that are high in protein and key nutrients. Other target species, including sea cucumber and various snails, slugs and bivalves (two-shelled animals like oysters and mussels), were reported to remain stable. Overall, 86% of participants reported a decline in their entire catch or collection compared to when they started gleaning in previous years. Furthermore, when asked about the role of coastal resources such as seagrass beds, all participants with seagrass beds in barangays agree they play a vital role in healthy habitats for target species. Another discovery revealed that participants are aware of illegal fishing and link this to the destruction of habitats and reductions in target species.

Gleaning in Guinayangan proves to play a crucial role in community food security. Participants emphasised the destruction of seagrass beds and other habitats as something of high concern, revealing the overarching theme of habitat conservation. Participants also linked extreme weather and climate change to the degradation of the marine ecosystem. Therefore, these target species and their habitats must be afforded means of protection.

Other initiatives to combat illegal fishing and irresponsible resource extraction must be addressed on the barangay level, to ensure localised action. The study pointed to a high level of engagement of women in gleaning, a high relevance of gleaning for household food and nutrition security, and to the livelihoods of the coastal poor. Gleaning in the mudflats and mangrove areas by those living in poverty, especially women, needs to be studied across seasons spanning at least a year. The nature and quantities of the catch also differs across subsystems (e.g., mud flats and mangroves) requiring further inquiry.

The biodiversity associated with these coastal ecosystems needs to be further studied in an effort to conserve resources that are of special value to the poor and women in coastal areas.

Written by Miranda Salters, Darwin Raymundo, Julian Gonsalves, Acer Arana, and Jonalyn Laco. For more information on project 28-021, led by the International Institute of Rural Reconstruction, please click here.

Kenya Taita Hills Panorama, Credit: Jake Zarins | RSPB

Distant clouds - same silver lining

Separated by 3,500 miles of ocean, forest, and savannah, and clinging to mist covered mountain tops on both the UK Overseas Territory of St Helena and the Taita hills in Southern Kenya, are ancient fragments of cloud forest. Both are vitally important refuges of biodiversity and sources of water for the surrounding landscapes and communities.

The remaining 16 hectares of globally significant cloud forest within the St Helena Peaks National Park represent the last of the UK's natural cloud forest. Today, 250 unique species, existing nowhere else on the planet, can be found here. The Taita hills, although less remote than St Helena, are (or were) an isolated island of moist, forested habitat in a region of arid acacia scrub. As a result, they also have very high number of indigenous species, with at least 28 unique to this area, and a further 22 found only in the wider region.

As well as being of vital importance for some special species of flora and fauna, these high altitude forests have a unique skill that until these recent times of increasingly unpredictable weather patterns, has been woefully underappreciated – they collect, store and release precious water. Local partners, with support from RSPB, and funded by the Darwin Initiative and Darwin Plus, are on a mission to protect, conserve, and expand these vitally important habitats, not just for the wildlife of St Helena and Taita, but also for the long-term water security of the communities that live there.

Climate change predictions indicate a warmer, drier world which puts these already drought-prone areas' water security at further risk. The endemic cloud forest habitats play a critical role in capturing water from the clouds that cloak the steep slopes and are the principal sources of fresh water through rainfall and mist recharge. Research from St Helena suggests that an incredible 60% of this fresh water comes from mist capture.

These native cloud forest species have evolved over millions of years to effectively intercept the mist, unlike the invasive species which threaten these rare habitats. The cloud forest also helps the formation of peaty soils which act like a sponge, absorbing water and releasing it slowly instead of rapid runoff associated with invasive habitat.

“As well as being of vital importance for some special species of flora and fauna, these high altitude forests have a unique skill that until these recent times has been woefully underappreciated – they collect, store and release precious water”

> The project is building on previous data gathered under two earlier Darwin Plus projects, DPLUS103 and DPLUS051, to improve understanding of the water cycle on St Helena

Led by the St Helena Government, working with the local water utility company Connect Saint Helena, and core partners Arctium and the local Meteorological Station, the *'St Helena Cloud Forest Project'* utilises a nature-based solution where conservation of the island's natural resources will help to recover and enhance the island's long-term water supply and improve resilience to climate change.

The project is building on previous data gathered under two earlier Darwin Plus projects, DPLUS103 and DPLUS051, to improve understanding of the water cycle on St Helena. New weather stations and equipment to measure water levels and stream flow have been set up as part of a climate change and drought warning monitoring network for the island. The Cloud Forest Project will provide ongoing monitoring of the catchments fed by the Peaks National Park. This will help ecologists identify and target cloud forest restoration to re-vegetate in key areas for mist capture. Increasing the area of cloud forest habitat is expected to enhance the island's water supply and reduce the risk of that supply being depleted during times of drought.

> Although geographically distant, both projects demonstrate the benefits of healthy native cloud forests for both nature and people

Using learning from the St Helena work as inspiration, the *'Restoring the water tower cloud forests of Kenya's Taita Hills'* project, led by Nature Kenya, is likewise working to restore native forest to areas of the hills cleared and planted with non-native species during the colonial era. Plantations of Eucalyptus, Pine, and Camphor have negligible value ecologically and in their ability to both capture and store moisture from the clouds. Eucalyptus in particular sucks up any available water, drying the hills and making them increasingly prone to fires as droughts in the region become more frequent and severe.

In both Taita and St Helena, nurseries are propagating thousands of seedlings of native plant species that are then planted in areas cleared of non-native and invasive species. With time and dedicated maintenance to remove persistent and faster growing non-native species, the seedlings gradually establish on the steep and exposed slopes, connecting the few remaining pockets of natural native forest, and giving hope for the survival of the forest's remaining Critically Endangered species.

But these projects aren't just focused on the forest. To help improve the quality of life for local communities, the Taita project is providing infrastructure to improve access to water. 100,000 litres of storage capacity will ensure that water captured from rainfall or tapped from protected springs can be accessed more easily by local communities. This in turn will free up valuable time – especially for women – which can be refocused on other activities such as income generation; something also supported by the project through the promotion of agroforestry. On St Helena the project is also supporting sustainable development by creating opportunities through ecotourism, education, sustainable land use, and conservation training.

Although geographically distant, both projects demonstrate the benefits of healthy native cloud forests for both nature and people. With the support of the Darwin Initiative and Darwin Plus, the RSPB are supporting the hard work of local partners to perfect and share the techniques and approaches that will hopefully one day mean these vital ecosystems can provide the services and habitats that have helped make them such special and unique places.

Written by Shayla Ellick, Kirstie Ellis and Jake Zarins. Cloud forest restoration in Kenya and St Helena is currently being undertaken by the RSPB and their network of partners. The Kenya work is part of an ongoing Darwin Initiative project (28-022) whilst the St Helena work is currently funded by FCDO but building upon vital work delivered with Darwin Plus support (DPLUS051 and DPLUS103). The St Helena project has greatly influenced the work in the Taita Hills and the project is trying hard to transfer and contextualise learning across the two projects.

For more from the projects themselves, see:

- *St Helena Peaks National Park Facebook and Twitter*
- *Nature Kenya Facebook*

Co-Galápagos supports residents of the islands to run their own projects related to the UN SDGs, Credit: Daniel Proaño

Galápagos collective action for the 2030 SDG Agenda

The archipelago of Galápagos, situated 1,000km off the coast of Ecuador, is a National Park, a Natural World Heritage Site and a UNESCO Biosphere Reserve. It was also a vital source of inspiration for Darwin's Theory of Natural Selection, and its uniqueness and importance in terms of global conservation today is undeniable. Yet, the 30,000 residents of Galápagos suffer from inadequate access to basic services, including fresh water, proper sanitation, and integrated solid waste management. The islands' towns are overcrowded, education services are of low-quality, and disparities are evident between communities, with high levels of gender violence.

The Sustainable Development Goals (SDG) Agenda has been declared public policy in Ecuador and in 2018 Galápagos was chosen as a pioneer province for its implementation. In 2021, our team, in collaboration with the Governing Council for Galápagos (CGREG), ran a participatory process to prioritise and contextualise 40 of the 169 SDG targets for Galápagos (see more at www.co-galapagos.org/sdgs). In the same year, the Galápagos 2030 plan was launched (www.unidosporgalapagos.com), designed to address challenges in the Galápagos socio-ecosystem and envisioning an "archipelago to be happy in".

In collaboration with Galápagos-based NGO, Fundación un Cambio Por La Vida (FUNCAVID), we established our initiative, Co-Galápagos, to facilitate collaboration, cooperation and coordination towards the 40 priority SDG targets and the Galápagos 2030 Plan. Its focus spans three main areas - promotion of community-led efforts toward sustainable development, capacity-building of local change-makers and youth, and the creation of tools to increase the transparency, understanding and efficiency of the various efforts being undertaken toward sustainable development across the archipelago. Overall, Co-Galápagos seeks to improve social well-being in harmony with biodiversity conservation in Galápagos, using a model that prioritises empowerment of the local community.

One aspect of our work, supported by the Darwin Initiative's Capability & Capacity funding, is to support community members in implementing and leading projects related to the 40 targets. We support project leaders in initial project planning, budgeting, and fundraising, and connect them with potential collaborators. We then continue to provide training throughout each project and beyond, and run regular networking events between all project leaders to facilitate knowledge-exchange. Projects with the potential for policy relevance or influence are given particular guidance on how to produce results suitable for input into policy processes. We also run a highly popular internship training scheme to provide paid opportunities for early-career Galapagueños in areas of their interest that are related to sustainable development.

Supported projects have already covered a breadth of topics including education, conservation, gender equality, Circular Economy and water. The latter is of particular interest, with the archipelago's continued struggle to develop sustainable water and wastewater management practices meaning that all four of the targets under SDG 6 *"Ensure access to water and sanitation for all"* are featured in the 40 priorities for Galápagos.

Delivery of a sustainable water supply in Galápagos is hampered by natural water scarcity, with highland springs offering limited flow rates and coastal sources being fed by brackish groundwater. Municipal supply systems suffer from contamination, creating health issues for local communities and a reliance on bottled water bought from private desalination companies. Similarly, improved sanitation provision is hampered by the absence and ineffectiveness of centralised facilities, as well as the prevalence of poorly regulated domestic septic tanks built into the fractured and highly permeable basaltic rock.

One way in which Co-Galápagos is facilitating progress towards sustainable water management is by running a series of internships to support the archipelago's largest ever trial of fog-harvesting technology (funded by the Co-op Foundation; more information at www.galapagosconservation.org.uk/projects/rain-and-fog-harvesting). This project focuses on the agricultural zone of Santa Cruz, which covers over 100 km^2 and suffers from severe water scarcity. Nearly all irrigation water for this area is transported from a single coastal source, which is often brackish and contaminated. By installing and monitoring a series of specially-designed fog nets, this project is investigating the viability of harvesting the semi-permanent fog across the area to collect water within farms, with the overall aim of increasing the productivity and resilience of agricultural livelihoods in Galápagos. Engagement with farmers has been a critical component in the successful design and installation of the nets, and early water yields are already being stored and used effectively.

Three Co-Galápagos interns are receiving training in 2023 as part of this fog-harvesting project. Their work involves assisting with the co-ordination, design, and construction of the nets, as well as the management of quantitative and qualitative data collection. In this, they are developing valuable practical skills relating to installation of sustainable water infrastructure, as well as more transferable skills relating to community engagement, principles for robust data collection and dissemination of knowledge.

Co-Galápagos is the first initiative in the islands to be actively focused on engaging the community in conservation and

"By installing and monitoring a series of specially-designed fog nets, this project is investigating the viability of harvesting the semi-permanent fog across the area to collect water within farms, with the overall aim of increasing the productivity and resilience of agricultural livelihoods in Galápagos"

Co-Galápagos interns working to support the largest ever trial of fog-harvesting technology in Galápagos, Credit: Charlie Ferguson

sustainability, strengthening local capacity and building links between the community, researchers, and policy-makers. We are grateful to have the Darwin Initiative's support in growing this initiative, providing valuable opportunities for local residents to help drive projects supporting priority sustainable development topics. Co-Galápagos is intended to be a platform for change and, from just the short time we have been active, we believe we are fulfilling that intention.

Written by Dr Sophia Cooke and Dr Charlie Ferguson. For more information on project DARCC005, led by Galapagos Conservation Trust, please click here.

Co-Galápagos is driven by a core team from FUNCAVID, King's College (University of Cambridge) and Galapagos Conservation Trust.

Course participants learning Contingent Valuation methods, with local residents providing feedback, Credit: MiRARI project, Lee Photography

Socialising conservation

Conservation needs the support and consent of local communities to succeed, and managers need to understand the way their protected areas (PA) affect the people who live around them, both positively and negatively. Furthermore, international norms demand that conservation be achieved equitably, respecting local people's rights, and Malagasy law requires PAs to compensate local people for many of the restrictions they impose on resource use. Although these requirements are widely accepted in principle, they pose major challenges to PA managers in terms of their practical implementation, and conservation staff often lack the training and tools to tackle these complex issues. That's why in January 2023 our MiRARI project organised a training course for 15 managers of Malagasy protected areas, asking local people to contribute.

The MiRARI project is led by the University of Antananarivo, Madagascar, and aims to help conservation organisations, local residents, government, and donors tackle social aspects of conservation. The aim of the training course was to present PA managers with a summary of research in this area, highlight key national and international laws and guidelines, and train them in some of the techniques they might use to evaluate their social impacts. We also wanted to facilitate an exchange of knowledge between PA managers so they could learn from each other. Critically important was ensuring the voices of local people were heard, so we involved residents of two protected areas in the training course. In two communities around Torotorofotsy Ramsar Site (wetland of international importance), we showed our film "Voices of the Forest" (made during a previous FCDO-funded project) to initiate various thematic discussions between the course participants and the local communities.

We also used role playing games that allowed PA managers and local residents to swap roles and tackle difficult scenarios from the other's point of view. The enthusiasm of the participants made for both lively and hilarious debates, and facilitated local communities to share their perspectives with PA managers. Next, local people from Maromizaha New Protected Area helped train course participants in evaluation methods, including discrete choice experiments and contingent valuation. The local residents switched from 'mock respondents' to giving feedback on the methods used and interview techniques.

> "The enthusiasm of the participants made for both lively and hilarious debates, and facilitated local communities to share their perspectives with PA managers"

Overall, the training course was very successful, with rich and lively discussion that ensured everyone involved learned something from the course. We will apply some of the lessons we learned from this training to the next three courses we will run for local communities and PA managers, on how to negotiate their "Community Management Agreements". These will be conducted in partnership with Impact Madagascar, Kew Botanical Gardens, Madagascar National Parks, and Natural Justice.

Written by Sarobidy Rakotonarivo, Manoa Rajaonarivelo, Sanda Rakotomalala, Mirindra Rakotoarisoa, Veloson Manankery and Neal Hockley. For more information on project DARCC016, led by ESSA-Forets Madagascar, please click here.

Field team attaching a pinger to a net during trials in Sindh province, Pakistan, Credit: WWF Pakistan

How technology innovations are helping dolphins and communities

The interdependence of freshwater, biodiversity conservation, and human livelihoods is clear. As outlined in the WWF Living Planet Report 2022, freshwater hosts rich biodiversity, including one-third of vertebrate species (animals with a backbone), and is also crucial to our survival and well-being, playing an essential role in food security, energy production, domestic use, and industry. However, according to IUCN, one-third of freshwater species are threatened with extinction, while globally, over a third of inland wetlands have experienced declines from 1970 to 2015. A recent paper by Lynch acknowledges that international policy agreements have often overlooked the significance of freshwater biodiversity and its threats, but with a greater understanding and recognition of the benefits provided to people from these freshwater ecosystems, we can protect and restore freshwater biodiversity for human well-being and our collective sustainable futures.

"Nature protection must not come at the expense of people, their livelihoods, and rights, that is clear. But how do you balance the needs of nature and communities?" asks Daphne Willems, Lead of the River Dolphin Rivers Initiative at World Wildlife Fund (WWF). *"That is a question that a conservationist like me regularly encounters. Some of the best solutions I've encountered over the years are the ones that recognise that local residents are the best conservationists. The people who have a personal stake in the landscapes, resources, and species that need to be conserved, are the ones who will stay committed. My quest is to find solutions that work with local communities and are good for people and nature, so that both have a bright future. I am therefore proud that we have found such an innovative solution."*

> "As a protected species, it is a criminal offence to kill a river dolphin, and in some countries it can be punished with years of imprisonment. The solution to this problem is called a 'pinger'"

Most river dolphins around the world die from human fishing activities. They swim after fish, even if that fish has already been caught in a net - which can be difficult to detect with echolocation - meaning the dolphins become entangled and drown. The fishermen are also disappointed; river dolphins 'steal' their fish, damage their nets, and in many cultures fishermen believe that a dead dolphin is bad luck. As a protected species, it is a criminal offence to kill a river dolphin, even if it happens accidentally, and in some countries it can be punished with years of imprisonment. The innovative solution to this problem is called a 'pinger:' an electronic underwater device, around the same size as a banana, that you hang on a net so that its electronic 'pings' can keep the river dolphins at bay. In 2021, a local NGO partner in Indonesia, Yayasan Konservasi RASI, demonstrated that pingers are effective for the Irrawaddy river dolphins on Kalimantan. However, the response varies by dolphin species, meaning the pitch, strength, and frequency must be tested for specific species and river conditions.

Stakeholders participate in inception workshop for SoS Pingers in West Bengal, India, Credit: WWF India

This year, with support and funding from the Darwin Initiative Innovation scheme, we are trialling pingers in our project *'Sound of Safety: Testing Pingers for River Dolphins and Fishers'* to see if this innovative solution will work for the Indus river dolphin in Pakistan and the Ganges river dolphin in India. "*The really exciting part of SoS Pingers is the engagement with local riparian communities*," says Leanne Quille, Senior Programme Advisor at WWF-UK. Building on 'Mitras-' or 'Friends of the River' in India, and adapted to the cultural context in Pakistan, a diverse group of motivated volunteers will be trained in citizen-science methods to help record the fish catch (weight), species composition, fish size, and any net damage caused by dolphins. *"These structured records will be extremely valuable to base sustainable fisheries regulations on, and our hope is to demonstrate an increase in catch for fishers, while reducing dolphin bycatch."*

The first pinger trials have been conducted in Pakistan with encouraging initial results: good news coming off the back of a highly successful workshop in Islamabad in October 2022 which saw five Asian range countries sign a set of agreed recommendations to better protect river dolphins against the effect of fisheries. "*Dolphins and people cannot be isolated, we need to build co-existence and that's where pingers have been very helpful"* says Dr Uzma Khan, SoS Pingers Lead from WWF Pakistan. "*We are experimenting with pingers at two sites… and our initial results so far have been very encouraging; dolphins are staying away from the fishing nets when the pingers are 'on' and fishermen are happier because they are catching bigger and prized species. While we are carefully piloting pingers, the demand for pingers amongst fishermen is increasing!*"

> "Dolphins and people cannot be isolated, we need to build co-existence and that's where pingers have been very helpful"

Meanwhile in India, the SoS Pingers inception workshop was held in the Nadia district of West Bengal, in February 2023. Chaired by the District Magistrate, there was active participation from several state departments, institutes, universities, and foundations. *"The forest department is cooperating with WWF India in their efforts to conserve dolphins. The success of the intervention is expected to conserve the species and greater availability of fish catch,"* said the Divisional Forest Officer of Nadia Murshidabad.

As the SoS Pinger trials continue, and more results start to come in, the more we look forward to sharing the journey of whether pingers can help us safeguard aquatic biodiversity while improving benefits to local people.

Written by Leanne Quille and Daphne Willems. For more information on project DARNV008, led by World Wildlife Fund, please click here.

VOI transfer agreement signing ceremony at Lake Tseny in October 2022, Credit: Mark Grindley | WWT (2023)

A watershed moment for Malagasy wetlands

It is widely known that the conservation of wetlands is essential to addressing the biodiversity and climate crises, but it can also simultaneously address many human development needs. In Madagascar, the Wildfowl & Wetlands Trust (WWT) in partnership with Madagasikara Voakajy (Mavoa) are proving how this can work in practice with the support of the Darwin Initiative.

Madagascar – the 'Big Island' – is a global biodiversity hotspot due to its high level of endemism (species native to and found only in one place), and the high number of endangered species recorded in the island. Sadly, it is also one of the poorest countries in the world, with 75% of the population living on less than US$1.90 per day, which puts huge pressure on natural resources to supply food, materials, water, and so on.

One potential solution to this lies with the nation's wetlands: its lakes, marshes, rivers, mangroves, estuaries, and coastal areas. It is well known that wetlands play an important role in providing resilience to both the biodiversity and climate change crises. However, more than many other ecosystems, wetlands are able to provide for biodiversity while also sustaining human needs through the provision of food, reliable and clean water, materials, and other ecosystems services. Various pressures mean that around 60% of Madagascar's wetlands have been lost since 1960, but with Darwin Initiative support we are trying to change that.

Local people are partners in the 'wise use' of wetlands that Ramsar (wetlands of international importance) was established to promote, and WWT and Mavoa have therefore been working to expand the existing legal framework of devolved resource governance – originally established to manage forests – into these new frontiers. With funding from the Darwin Initiative, the success is now evident at one remote lake.

Lake Tseny is probably the most intact wetland within the Port Berge Key Biodiversity Areas, in the western uplands of Madagascar, and supports at least eight Threatened species, including the Critically Endangered pinstripe Damba, a cichlid fish. But the lake and its basin are also home to around 5,000 people across eight villages, the majority of whom are dependent upon natural systems for drinking water, sanitation, timber and fuel, fishing and other livelihoods, and general wellbeing. Working in partnership with the local authorities and communities, Mavoa and WWT have sought to address the main threats to biodiversity and sustainable livelihoods at the site, including lack of coordinated management, inappropriate fishing practices, habitat loss and degradation, over-use on agrochemicals, and the impacts of climate change.

The approach has been to create local institutions with the interest, mandate, skills and resources to engage in tackling the sustainability challenges facing the lake and its residents.

VOI chairpersons signing management transfer documents, Credit: Mark Grindley | WWT (2023)

In Madagascar, government legislation has allowed the establishment of what are known as 'VOIs' (Vondron'Olona Ifotony): granted rights to manage natural resources via formal 'transfer agreements'.

Originally intended for forests, the approach has increasingly been applied to wetlands and is a powerful tool in formalising what 'wise use' looks like. Mavoa has helped five of these bodies form at Lake Tseny, providing institutional development and training, and helping them through the formal application process. In October 2022, this led to the signing of the first three years of management transfer agreements, with local authorities at a colourful and livelily ceremony that the applicants hosted on site.

The next stage of the project involves participatory biodiversity surveys with the VOIs within their newly-defined areas, so that they can document and monitor what they are protecting. Mavoa is also helping the VOIs to show the authorities that they can implement the transfer agreements, including by implementing agreed fishing restrictions in the lake to protect nurseries; breeding periods; and avoid removal of undersized fish. We are also helping the VOIs to diversify livelihoods with drought-resistant crops, agro-fertiliser (which will remove agrochemicals from the soil and lake), and market chain development for local produce.

WWT is simultaneously supporting the VOIs to restore natural habitat in and around the lake, which will improve the quality and extent of fish nurseries as well as protect the watersheds against the widespread scourge of erosion and soil loss. We are also exploring with the VOIs the options for semi-wild rearing of the Damba, the cichlid fish, to recover a sustainable wild population at the lake.

"WWT is simultaneously supporting restoration of natural habitat in and around the lake, which will improve the quality and extent of fish nurseries as well as protect the watersheds against the widespread scourge of erosion and soil loss"

Lastly, in 2023 we also aim to conduct a climate change vulnerability assessment, using a modified version of the approach first developed by IUCN in Southeast Asia in 2019. This will empower local communities to better understand and plan for the impacts of climate change, and to develop solutions to the possible impacts on species, habitats, and livelihoods. The results of those discussions will feed into a management plan which will support the VOIs' application for an extension to the transfer agreement and potentially an application for the lake to be registered as a Ramsar site. That will provide international recognition for their management efforts, and should help catalyse further funding assistance to realise their plans for the sustainable management of this unique lake.

Written by Mark Grindley (WWT Senior Project Manager, International) and Harison Andriambelo (WWT Country Coordinator, Madagascar). For more information on project 28-001, led by Wildfowl & Wetlands Trust, please click here.

Coral reef in a Tagbanua community in the Calamianes, Credit: C3 Philippines

Indigenous management of marine resources

Marine Protected Areas (MPAs) are widely intended for biodiversity conservation, increased fisheries productivity, and protection of cultural diversity. However, the establishment of MPAs can affect local communities, particularly those who rely heavily on marine ecosystems. This is especially important in areas where conservation areas coincide with indigenous territories. In fact, 80% of the world's biodiversity areas overlap with ancestral lands and waters of indigenous communities.

In the Philippines, the island of Palawan is home to several marine protected areas and ancestral domains, including the Calamian group of islands. These islands have diverse and rich ecosystems, including coral reefs, seagrass, and mangrove forests, serving as habitats for endangered marine species such as sea turtles, dugongs, and marine crocodiles. However, some of these protected areas coincide with ancestral domains such as those of Tagbanwa tribe; one of the oldest ethnic groups in the Philippines, they have a long history of living closely with and relying on marine resources.

To address the challenges of managing MPAs alongside indigenous communities, the Darwin Initiative Project: *'Replicating a successful model to develop a network of Indigenous Marine Managed Areas'* is being implemented by C3 Philippines and Edinburgh University School of History, Classics and Archaeology. The project focuses on biocultural heritage approaches to marine management, working with local communities to map marine cultural heritage with a particular emphasis on traditional ecological knowledge cultural uses of space, traditional skills and practices, and gender roles.

The primary aim of this work is to aid in the development of community-managed MPAs. However, the project has revealed several hurdles that must be overcome, including interference from commercial fishing, nominal representation of indigenous peoples in management authorities, and barriers between traditional and scientific knowledge. To address these challenges, discussions on marine cultural heritage livelihoods, advocacy, and representation will be held alongside communities. By understanding how traditional and scientific knowledge intersects, the project hopes to build sustainable conservation and management plans for the ethical and inclusive management of the biocultural heritage within the ancestral waters of Busuanga.

Written by Reynante Ramilo and Georgia Holly. For more information on project 29-026, led by C3-Philippines, please click here.

Discussions on indigenous heritage, Credit: C3 Philippines

Discussion of key themes raised by the film "Voices from the Forest," Madagscar, Credit: MiRARI project | Lee Photography

Newsletter Contacts

The Biodiversity Challenge Funds Secretariat (Defra)

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To include an article on your project in an upcoming newsletter, please contact us at BCF-Comms@niras.com

Funded by the UK Government, the Darwin Initiative provides grants to support developing countries to conserve biodiversity and reduce poverty, with Darwin Plus focusing its grants on the natural environment and climate change in the UK Overseas Territories. Since 1992, the Darwin Initiative and Darwin Plus have committed over £241 million to 1,421 projects in 159 countries.