

# 97



## Making Money Local: Can Protected Areas Deliver Both Economic Benefits and Conservation Objectives?





CBD Technical Series No. 97

---

# MAKING MONEY LOCAL: CAN PROTECTED AREAS DELIVER BOTH ECONOMIC BENEFITS AND CONSERVATION OBJECTIVES?

---

April 2021



Published by the Secretariat of the Convention on Biological Diversity.  
CBD Technical Series No. 97  
ISBN: 9789292257149 (Print version)  
ISBN: 9789292257156 (Web version)

Copyright © 2021, Secretariat of the Convention on Biological Diversity

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the Convention on Biological Diversity concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views reported in this publication do not necessarily represent those of the Convention on Biological Diversity.

This publication may be reproduced for educational or non-profit purposes without special permission from the copyright holders, provided acknowledgement of the source is made. The Secretariat of the Convention would appreciate receiving a copy of any publications that use this document as a source.

#### Citation

Stolton, S., Timmins, H. and Dudley, N. (2021). *Making Money Local: Can Protected Areas Deliver Both Economic Benefits and Conservation Objectives?*, Technical Series 97, Secretariat of the Convention on Biological Diversity, Montreal. 108 Pages .

For further information, please contact:

Secretariat of the Convention on Biological  
Diversity 413 St. Jacques Street, Suite 800  
Montreal, Quebec, Canada H2Y 1N9  
Phone: 1(514) 288 2220  
Fax: 1(514) 288 6588  
E-mail: [secretariat@cbd.int](mailto:secretariat@cbd.int)  
Website: <http://www.cbd.int>

#### Cover photos:

Cover image 1. Octopus catch, Velondriake Paysage Harmonieux Protégé, Madagascar © Garth Cripps, Blue Ventures  
Cover image 2. Cacao breaking, Maya Mountain North Forest Reserve, Belize © Maximiliano Caal, Ya'axche Conservation Trust  
Cover image 3. Researchers at Reserva Particular Do Patrimônio Natural Reserva Ecológica De Guapiaçu, Brazil © Guapiaçu Ecological Reserve (REGUA)  
Cover image 4. Wildlife Friendly wool, Península Valdés Protected Area and World Heritage Site, Argentina © Ricardo Baldi, Cenpat-conicet

Layout and design: Em Dash Design [www.emdashdesign.ca](http://www.emdashdesign.ca)

## CBD foreword



The impacts of biodiversity loss, land degradation and desertification, and climate change are now recognized as the greatest global environmental challenges and a huge threat to life in harmony with nature on this Earth. They exacerbate each other, and unless the vicious circle they create is broken, they will keep undermining efforts towards sustainable development.

Carbon and water cycles depend on biodiversity that helps combat land degradation and facilitate poverty alleviation to which it is closely linked. Healthy ecosystems not only buffer the impacts of climate change (land slides, extreme weather, drought, etc.), but also contribute to climate change adaptation and mitigation, and multiple other benefits to livelihoods and health. Protected and conserved areas maintain biodiversity and support resilience to changing socio-economic and environmental conditions, but most importantly, the survival of life on Earth and the well-being of society.

Parties to the Convention on Biological Diversity have long recognized that protected and conserved areas are cornerstones of biodiversity conservation. They constitute important stocks of natural, cultural and social capital, yielding flows of economically valuable goods and services that benefit human populations. Similarly, it is recognized that these areas deliver various benefits when they are effectively managed and governed with inclusiveness, transparency and equity measures, participation of indigenous peoples and local communities, and youth, among others. However, the values are poorly understood and greatly undervalued by markets.

The present report is prepared pursuant to various paragraphs of COP decision XIII/2 on protected areas, in particular paragraph 5(a-e), and paragraph 10 of decision XI/24. It is an attempt to illustrate the ecological, economic and social benefits of protected and conserved areas, in order to generate a stronger call for action by policy makers and others.

Decision XIII/2, in particular, requested for continued support to the implementation of national action plans for the programme of work and

progress towards achieving Aichi Biodiversity Target 11 and other related targets at the national, sub-regional and regional levels.

The report, therefore, provides information on how protected areas deliver economic benefits and conservation objectives. It does so by presenting case studies from around the world to showcase some of the tangible benefits to local communities. The valuation and benefits at local and national levels are useful for decision-making. Likewise, they enhance willingness and engagement to concerted efforts to implement various commitments to facilitate the achievement of Aichi Biodiversity Target 11. Equally, they contribute to the post-2020 global biodiversity framework and the Sustainable Development Goals for the benefits of current and future generations.

As indeed, the benefits of protected and conserved areas extend spatially far beyond their boundaries, these areas need to be incorporated into wider sustainable development and economic strategies in order to support and augment these benefits.

I am grateful to Equilibrium Research and the researchers who contributed to the development of this report. Also, sincere thanks to all those who helped develop the case studies as well as those who provided feedback and comments to the document. Importantly, I am delighted and thankful for the European Union support through the European Commission Fund, and the Government of Japan through the Japan Biodiversity Fund.

I believe that this report will make an important contribution to encourage area-based conservation measures, as well as further design of creative, innovative and sustainable approaches to reap various benefits from protected and conserved areas. I hope that it will be used by a wide range of actors and stakeholders.

A handwritten signature in black ink, appearing to read 'Elizabeth Maruma Mrema'.

**Elizabeth Maruma Mrema**

Executive Secretary  
Secretariat of the Convention on Biological  
Diversity

## Foreword from IUCN WCPA Specialist Group of Natural Solutions



© Marianne Kettunen

The Convention on Biological Diversity has played a key role in advancing area-based conservation: the 2004 *Programme of Work on Protected Areas*; technical guidance on gap analysis, Free Prior and Informed Consent, and other aspects of management; the *Strategic Plan for Biodiversity 2011-2020* with its 20 Aichi Biodiversity Targets; and the definition of ‘other effective area-based conservation measures.’ Evidence suggests that the world still needs more land and water under dedicated conservation management. However, justifying this on the grounds of biodiversity conservation is challenging; however strong the arguments there are countervailing perspectives for greater development and economic growth. But the stark split between ‘conservation’ and ‘development’ is misleading.

This report, which focuses on the direct economic benefits of protected areas, is part of a programme, starting in 2003,<sup>1</sup> on wider benefits of area-based conservation to human society, including contributions to food and water security, disaster risk reduction, human health, recreational, cultural and spiritual concerns. The work has latterly taken place through the Natural Solutions specialist group of the IUCN World Commission on Protected Areas.<sup>2</sup> WWF and the World Bank supported the ‘Arguments for Protection’ series,<sup>3</sup> seven reports and a book.<sup>4</sup> Results were reported in the CBD Secretariat’s technical series<sup>5</sup> and reflected in several critical decisions by Parties. WWF helped develop the Protected Area Benefits Assessment Tool.<sup>6</sup> Organizations such as the UN Development Programme, The Nature Conservancy, Wildlife Conservation Society,<sup>7</sup> Global Environmental Facility<sup>8</sup> and Institute for European Environmental Policy have been involved, and the work formed a major stream of the 2014 World Parks Congress in Sydney.<sup>9</sup>

In all this effort, the focus on ‘values’ has remained broad, embracing subsistence values, contributions to human wellbeing, economic values including poverty reduction,<sup>10</sup> and cultural or spiritual values.<sup>11</sup> In the current report, something different is being tried, and the focus is deliberately narrowed to immediate economic values generated by protected areas. This is by no means a new idea and we made an initial investigation as part of The Economics

of Ecosystems and Biodiversity (TEEB),<sup>12</sup> and produced a manual on economic valuation in protected areas,<sup>13</sup> but this is as far as we know the most detailed attempt to date to identify direct economic benefits through a set of case studies.

Even within economic valuation we are looking at a narrow subset. We are not assessing total economic value, with more theoretical values such as the potential value of wild species as sources of food and medicines. Instead, we look at a subset of cases which link real money ‘in your hands’ to protected areas; in our experience these are the values that attract support locally, carry political weight with governments and help influence policies. The most commonly discussed value here is associated with tourism, in part perhaps because the economic values are more straightforward to assess. We include tourism case studies and could have filled the volume with examples. But one important theme is that there are a wider range of direct economic benefits from protected areas than generally assumed or recognized.

We know some people find the whole concept of putting a value on nature to be offensive<sup>14</sup> and are well aware that there are dangers in so doing. Decisions about land and water are seldom made solely on economic grounds, economic valuation can backfire if counterarguments emerge showing that development creates more income than conservation, and many economic values are inherently unstable. We are finishing this during the COVID pandemic when a collapse in tourist income has left many protected areas desperately short of funds.<sup>15</sup> We respect and acknowledge critical views.

At the same time, people need to live, and demonstrating economic benefits from protected areas often makes the difference between local communities supporting or opposing conservation. More broadly, showing understandable economic benefits can be the incentive to maintain government support, even from parties that are not natural supporters of conservation. It can attract funding from non-traditional sources. And it provides support to communities living in and around protected areas. So, whilst recognizing the caveats and uncertainties, this study has deliberately looked at the issue through a narrow economic lens.

**Marianne Kettunen**, Natural Solutions Specialist Group, IUCN World Commission on Protected Areas

# Table of contents

|   |           |
|---|-----------|
| CBD foreword .....  | 3         |
| IUCN WCPA foreword .....  | 4         |
| Acknowledgements .....  | 7         |
| Preface .....   | 9         |
| <b>SECTION 1: UNDERSTANDING THE ECONOMIC RETURN FROM PROTECTED AREAS .....</b>            | <b>11</b> |
| 1.1 Summary: Primer for policymakers: Key findings .....                                  | 12        |
| 1.2 Multiple benefits from natural ecosystems in protected and conserved areas .....      | 14        |
| 1.3 The value of biodiversity .....   | 16        |
| 1.4 Some background: The places and the benefits being assessed .....                     | 21        |
| 1.5 Conservation and economic development: Can we have both? .....                        | 22        |
| 1.6 Why this study: Aims and challenges .....   | 24        |
| 1.7 Overview of case studies .....  | 27        |
| 1.8 Livelihoods and conservation: A developing field .....                                | 31        |
| 1.9 Drivers of conservation and development: A starting point or retrofitting? .....      | 32        |
| 1.10 What causes projects to fail? .....  | 37        |
| 1.11 Conclusions: What do the case studies tell us about the nature of success? .....     | 39        |
| 1.12 Recommendations: Making conservation work and pay .....                              | 42        |
| 1.13 References .....   | 49        |
| <b>SECTION 2: THE CASE STUDIES .....</b>  | <b>55</b> |
| 2.1 Argentina: Península Valdés World Heritage Site .....                                 | 56        |
| 2.2 Australia: Warddeken Indigenous Protected Area .....                                  | 58        |
| 2.3 Australia: Fish River Station .....   | 59        |
| 2.4 Australia: Djelk Indigenous Protected Area .....                                      | 61        |
| 2.5 Bangladesh: Lawachara National Park .....   | 63        |
| 2.6 Belize: Maya Mountain North Forest Reserve .....                                      | 64        |
| 2.7 Bhutan: Wangchuck Centennial National Park .....                                      | 66        |
| 2.8 Bolivia: Manuripi National Wildlife Reserve .....                                     | 68        |
| 2.9 Brazil: Fernando de Noronha MPA .....   | 69        |
| 2.10 Brazil: Reserva Particular do Patrimônio Natural Reserva Ecológica de Guapiaçu ..... | 70        |
| 2.11 China: Sichuan Giant Panda Sanctuaries .....   | 72        |
| 2.12 Costa Rica: Ostional National Wildlife Refuge .....                                  | 74        |
| 2.13 Costa Rica: Monte Alto Protected Zone .....  | 75        |
| 2.14 Fiji: Vueti Navakavu Locally Managed Marine Area .....                               | 76        |
| 2.15 Finland: Pallas-Yllästunturi National Park .....                                     | 77        |
| 2.16 Germany: Schaalsee Biosphere Reserve .....   | 78        |
| 2.17 India: Ranthambore Tiger Reserve .....   | 79        |
| 2.18 Jordan: Ajloun Forest Reserve .....  | 81        |
| 2.19 Kenya: Biliqo-Bulesa Community Conservancy .....                                     | 83        |
| 2.20 Lebanon: Shouf Biosphere Reserve .....   | 85        |
| 2.21 Madagascar: Makira Natural Park .....  | 87        |
| 2.22 Madagascar: Velondriake Paysage Harmonieux Protégé .....                             | 88        |
| 2.23 Malawi: Majete Wildlife Reserve .....  | 90        |
| 2.24 Malaysia: Greater Ulu Muda Forest .....  | 91        |
| 2.25 Montenegro: Skadarsko Jezero National Park .....                                     | 92        |
| 2.26 Morocco: Al-Hoceima National Park .....  | 94        |
| 2.27 Namibia: Bwabwata National Park .....  | 95        |

|      |   |     |
|------|---|-----|
| 2.28 | Rwanda: Parc National des Volcans.....                                | 96  |
| 2.29 | Seychelles: Vallée de Mai Nature Reserve.....                         | 97  |
| 2.30 | Sierra Leone: Gola Rainforest National Park .....                     | 99  |
| 2.31 | Switzerland: Entlebuch UNESCO Biosphere Reserve .....                 | 101 |
| 2.32 | The Philippines: Puerto-Princesa Subterranean River Natural Park..... | 102 |
| 2.33 | Uganda: Bwindi Impenetrable National Park.....                        | 103 |
| 2.34 | Scotland, UK: Abernethy National Nature Reserve.....                  | 105 |
| 2.35 | USA: Great Smoky Mountains National Park.....                         | 107 |
| 2.36 | USA: Yellowstone National Park.....                                   | 108 |

## List of Figures, Tables and Boxes

### Figures

|           |  |    |
|-----------|--|----|
| Figure 1: | Ecosystem services adapted from the Millennium Ecosystem Assessment.....   | 15 |
| Figure 2: | Location and biome of each case study.....   | 25 |
| Figure 3: | Percentage of case studies presented falling into IUCN categories<br>(II, III, IV, V and VI) .....                                   | 27 |
| Figure 4: | The six main categories of values identified in the case studies.....  | 28 |
| Figure 5: | Linking benefits from protected areas, businesses and local communities .....  | 34 |
| Figure 6: | Analysis of the types of relationship between protected areas, business and local<br>communities in the case studies presented ..... | 35 |

### Tables

|          |   |    |
|----------|---|----|
| Table 1: | IUCN and the CBD recognize several different protected area management categories ..... | 21 |
| Table 2: | Protected area governance types.....  | 21 |

### Boxes

|        |                           |    |
|--------|---------------------------|----|
| Box 1: | COVID-19.....             | 26 |
| Box 2: | Understanding costs ..... | 46 |

# Acknowledgements

The Secretariat of the Convention on Biological Diversity (SCBD) would like to acknowledge the financial assistance from the European Union, through the EC Fund and Japan Biodiversity Fund that provided support to this work.

Equilibrium Research would like to thank the SCBD, and in particular Sarat Babu Gidda, for mentoring this study. Thanks are also due to other staff of SCBD, in particular Edjigayehu Seyoum-Edjigu, and to our proof-reader, Caroline Snow. We would also like to thank all Parties to the CBD, other Governments and relevant organizations who commented on the CDB's request for comments and feedback on the final draft of the report.

A very large number of people have provided support in terms of accessing and checking case studies and the overview write-up. We would like to thank the following (and apologize to anyone omitted from this lengthy list): John Adendorff, African Parks; Hussam Alawaidat, Royal Society for the Conservation of Nature, Jordan; Zouhair Amhaouch, Parks and Natural Reserves Division, Department of Water and Forests of the Kingdom of Morocco; Shaun Ansell, Warddeken IPA, Australia; Jose Argandoña, WWF Bolivia; Elmer Badilla, Puerto Princesa Subterranean River National Park, The Philippines; Ricardo Baldi, Wildlife Conservation Society, Argentina; Victor Bonito, Reef Explorer (Fiji) Ltd; Willie Boonzaaier, Integrated Rural Development and Nature Conservation, Namibia; Natalia Boulad, IUCN, Jordan; Andrew Brock-Doyle, Royal Society for the Protection of Birds, Sierra Leone; Neil Burgess, UNEP World Conservation Monitoring Centre, UK; Sandra Charity, UK and Brazil; Tina Chigo, Change A Life Bwindi, Uganda; José Courrau, IUCN Mesoamerica Regional Office, Costa Rica; Richard Dixon, Royal Society for the Protection of Birds, UK; Joanna Durbin, Conservation International, USA; Alex Earl, Bawinanga Aboriginal Corporation,

Australia; Hany El Shaer, IUCN Jordan; Mariana Napolitano Ferreira, WWF Brazil; Sumaiya Firoze, USAID, Bangladesh; James Fitzsimons, TNC Australia; Frauke Fleischer-Dogley, Seychelles Islands Foundation, Republic of Seychelles; Jelena Marojević Galić, Montenegro; Christina Garcia, Ya'axché Conservation Trust, China; Miguel Méndez García, Monte Alto Protected Zone, Costa Rica; Victor García, WWF Bolivia; Vinicius J. Giglio, Universidade Federal de São Paulo, Brazil; Rachel Golden Kroner, Conservation International, USA; Dmitry Gorshkov, WWF-Russia; Hugh Govan, The University of the South Pacific; Craig Groves, USA; Nizar Hani, Shouf Biosphere Reserve, Lebanon; Alasdair Harris, Blue Ventures, Madagascar; Dieter Hoffmann, Royal Society for the Protection of Birds, UK; Björn Horváth, Royal Society for the Protection of Birds, Sierra Leone; Asinu Janneh, Gola Rainforest Conservation, Sierra Leone; Paul Jenkins, Indigenous Land and Sea Corporation, Australia; Hubert Job, Julius-Maximilians-Universität Würzburg, Germany; Liisa Kajala, Metsähallitus, Natural Heritage Services, Finland; Florian Knaus, ETH Zürich Dept. of Environmental Systems Science, Switzerland; Genti Kromidha, Institute for Nature Conservation in Albania; Marisa Raphaela Kunze, Institute for Technology and Resources Management in the Tropics and Subtropics (ITT), Germany; Stephanie Kyriazis, NPS, USA; Atef Limam, UNEP/MAP/SPA/RAC, Tunisia; Harvey Locke, Canada; Nicholas John Locke, Reserva Ecológica de Guapiaçu, Brazil; Barney Long, Global Wildlife Conservation, USA; Elizabeth Maclang, Puerto Princesa Subterranean River National Park, The Philippines; Maher Mahjoub, IUCN Mediterranean Cooperation Center, Malaga, Spain; Anna Behm Masozera, International Gorilla Conservation Programme, Rwanda; Janet Matota, Integrated Rural Development and Nature Conservation (IRDNC), Namibia; Mary Melnyk, USAID, Bangladesh; Martin Mendez,

Wildlife Conservation Society, Argentina; Patrick Meyer, USAID, Bangladesh; Brent A. Mitchell, QLF Atlantic Center for the Environment, USA; Ruhul Mohaimman, USAID, Bangladesh; Antony Mukim, USAID, Bangladesh; Dan Mulrooney, Social Science Branch, Parks Canada; Enrique Nunez, Conservation International, Palawan; Jenny Oates, Blue Ventures, Madagascar; Tanya O'Garra, Middlesex University London, UK; Harisoa Hasina Rakotondrazafy, WWF, Madagascar; Ray Rasker, Headwaters Economics, USA; Lovy Rasolofomanana, Wildlife Conservation Society, Madagascar; Rufo Roba, Northern Rangelands Trust, Kenya; Dilys Roe, IIED, UK; Christel Scheske, Peru; Vishal Shah, Northern Rangelands Trust, Kenya; Maen Smadi, Royal Society for Conservation of Nature, Jordan; Doug Smith, Yellowstone National Park, USA; Andrea Solić, WWF, Croatia; Yeimy Cedeño Solís, Ostional Wildlife Refuge, Costa Rica; Candice Stevens, Wilderness Foundation Africa, South Africa; Ingrid Stonhill, Bawinanga Aboriginal Corporation, Australia; Surin Suksuwan, Proforest, Malaysia; Jordi Surkin, WWF Bolivia; Jeanne Tabangay, Conservation International, Philippines; Tandin Tandin, Nature Conservation Division, Department of Forests and Park Services, Bhutan; Othman Tawalbeh, Royal Society for Conservation of Nature, Jordan; Paul Thompson, Bangladesh Bird Club, Bangladesh; Jess Tomes, Royal Society for the Protection of Birds Abernethy National Nature Reserve, Scotland, UK; Nicolas Tubbs, Fauna and Flora International, Sierra Leone; Medard Twinamatsiko, Mbarara University of Science and Technology, Uganda; Pascale Salah van der Leest, Parks Canada; Sophie Vossenaar, African Parks; Zoe Walker, Wildtracks Belize; Tenzin Wangda, Wangchuck Centennial National Park, Bhutan; Xu Weihua, Chinese Academy of Sciences, China; David Wilkie, Wildlife Conservation Society, USA; Manuel Woltering, Julius-Maximilians-Universität Würzburg, Germany; Alison Woodley, Canada; S.P. Yadav, National Tiger Conservation Authority, India; Yan Zhang, IUCN China; and

Edvin Zhllima, Agricultural University of Tirana, Albania.

Additionally, we are grateful to the many people who sent in reviews, including: Marissa Altmann, Wildlife Friendly Enterprise Network; Charlotte Amos and colleagues at DEFRA, UK; Norbert Baerlocher, Federal Office for the Environment, Switzerland; Ricardo Baldi, Instituto Patagónico para el Estudio de los Ecosistemas Continentales Argentina; Garo Batmanian and colleagues, The World Bank, Washington DC; Crispin S. Bilombele, Aube Nouvelle pour la Femme et le Développement, DRC; Kristina Bowers and colleagues, German Ministry for Economic Cooperation and Development (BMZ); Lena Dempewolf, Trinidad; Barbara Engels and colleagues, Bundesamt für Naturschutz, Germany; Marci Gompers-Small, Ministry of Spatial Planning and Environment, South Africa; Birrin Hooper, Kat Miller, Tia Stevens and colleagues, Department of Agriculture, Water and the Environment, Australia; Elias Huland, Valerie Issumo, WasteWater ExchangeMasha Kalinina, The Pew Charitable Trusts, Washington DC; Stephen Kashinde, Macedonia Development Group, Tanzania; Akula Kishan, Forestry advisor, Andhra Pradesh, India; Johannes Kruze and colleagues, GIZ, Germany; Gary Litman, US Chamber of Commerce; Eugenia Arguedas Montezuma, Maiko Nishi, United Nations University; Anna Spenceley, IUCN World Commission on Protected Areas, Tourism Specialist Group; Surin Suksuwan, ProForest, Malaysia; Joseph Vogel, University of Puerto Rico-Río Piedras; and Dirección de Ambiente y Desarrollo, Ecuador.

This report has therefore received a great deal of assistance from around the world. We apologize to anyone who may have been inadvertently missed from these lists. Remaining errors of fact or opinion are our own responsibility.

# Preface

This publication has been developed as a contribution to Phase II of the Two-phase Strategy on Protected Areas of the Secretariat of the Convention on Biological Diversity (CBD). The aims are to:

1. Develop a technical report (technical series document for the Convention on Biological Diversity) for launching at the fifteenth meeting of the CBD Conference of Parties, by compiling and analyzing case studies of economic valuation<sup>1</sup> and benefits from protected areas. These studies need to be readily relatable to governments, decision-makers, companies and communities, to help build the case for long-term, sustainable protected and conserved areas.
2. Demonstrate some of the ways in which protected areas can support a range of the UN Sustainable Development Goals.
3. Respond to various paragraphs of decision XIII/2 on protected areas, in particular paragraph 5(a-e), as well as paragraph 10 of decision XI/24 which “*Requests the Executive Secretary, in partnership with relevant organizations, subject to available funding, to continue supporting implementation of national action plans for the programme of work and progress towards achieving Aichi Biodiversity Target 11 and other related targets at the national, sub-regional and regional levels*”, by making a case for Parties to speed up implementation of their national priority actions and commitments and donors to explore opportunities to align their ongoing and future bilateral projects with the various national commitments and help facilitate the implementation of these actions to achieve Aichi Biodiversity Target 11, and thereby contribute to the Post 2020 Global Biodiversity Targets, and the Sustainable Development Goals.
4. Make the case for a strong post-2020 commitment to targets that retain existing natural ecosystems as vital contributors to aspirations

of a just and sustainable human society, such as the calls for 30% of the world’s ecosystems to be included within networks of protected and conserved areas.

Protected and conserved areas are acknowledged to be critical elements in any national-level biodiversity conservation strategy.<sup>16</sup> Yet governments have struggled to meet global commitments in allocating land and water for conservation and cost is one of the major areas of concern. Here we aim to fill a knowledge gap by looking specifically at economic benefits from protected areas.

The focus here is therefore deliberately narrow. Two of us have for many years researched the wider benefits of protected and conserved areas, for their biodiversity values, ecosystem services, livelihoods and for a host of cultural, aesthetic and spiritual benefits.<sup>17</sup> Many of these do not fit neatly or convincingly into simple economic analyses. In this study we look only at economic benefits and indeed only at those benefits that are immediately realizable, and which support the protected area’s conservation objectives. This is not because we believe these are the only important benefits, nor do we think that all protected areas need to generate an income. But economic benefits provide a powerful lever to justify conservation to sceptics in those places where they do occur, and we have welcomed the chance to look more deeply into these issues.

Most of the examples are terrestrial and there are none from the high seas. High seas conservation is critically important,<sup>18</sup> but as yet there are relatively few examples and we did not find any convincing case studies. This is clearly an area that needs further investigation as more high seas protected areas are established in the future.

## Process

There are relatively few economic analyses of protected areas on a global scale. Those that

---

<sup>1</sup> **Economic valuation** refers to assigning monetary **value** to environmental factors (such as the quality of air and water and damage caused by pollution) that are normally not taken into account in financial **valuation**.

are available, including some recent studies, are discussed below, but as we started researching this volume it became clear that information would in some cases be hard to find. The project was therefore developed by:

1. Reaching out to a wide range of conservation specialists and organizations, and carrying out a detailed literature review, to find any available overviews, plus current examples of protected areas providing tangible economic benefits to local communities whilst delivering their conservation objectives.
2. Developing a series of case studies, which were then exhaustively and thoroughly checked by experts as being suitable for publication.
3. Developing an overview essay introducing protected area benefits in general and drawing lessons learned from the case studies and associated material.

## Audience

---

The potential audience for this report is wide ranging, from policy makers, at governmental and business level, to communities exploring the potential benefits of conservation. The results are hoped to inspire readers, to develop many more innovations and developments which link conservation objectives, sustainable livelihoods and resilient protected areas through the development of sustainable and appropriate economic benefits. The report also offers something of a reality check, outlining both details of what is needed to link conservation objectives successfully with economic benefits, but also highlighting where things can go wrong. It is certainly not a given that protected areas can, or should, provide economic benefits. However, when protected areas are effectively managed and governed their potential is substantial.

## Framework of the report

---

The report is in two main sections.

1. An introductory essay, which summarizes the concepts of ecosystem services, analyzes existing studies, provides an overview of the case

studies reported here and concludes with a section on lessons learned.

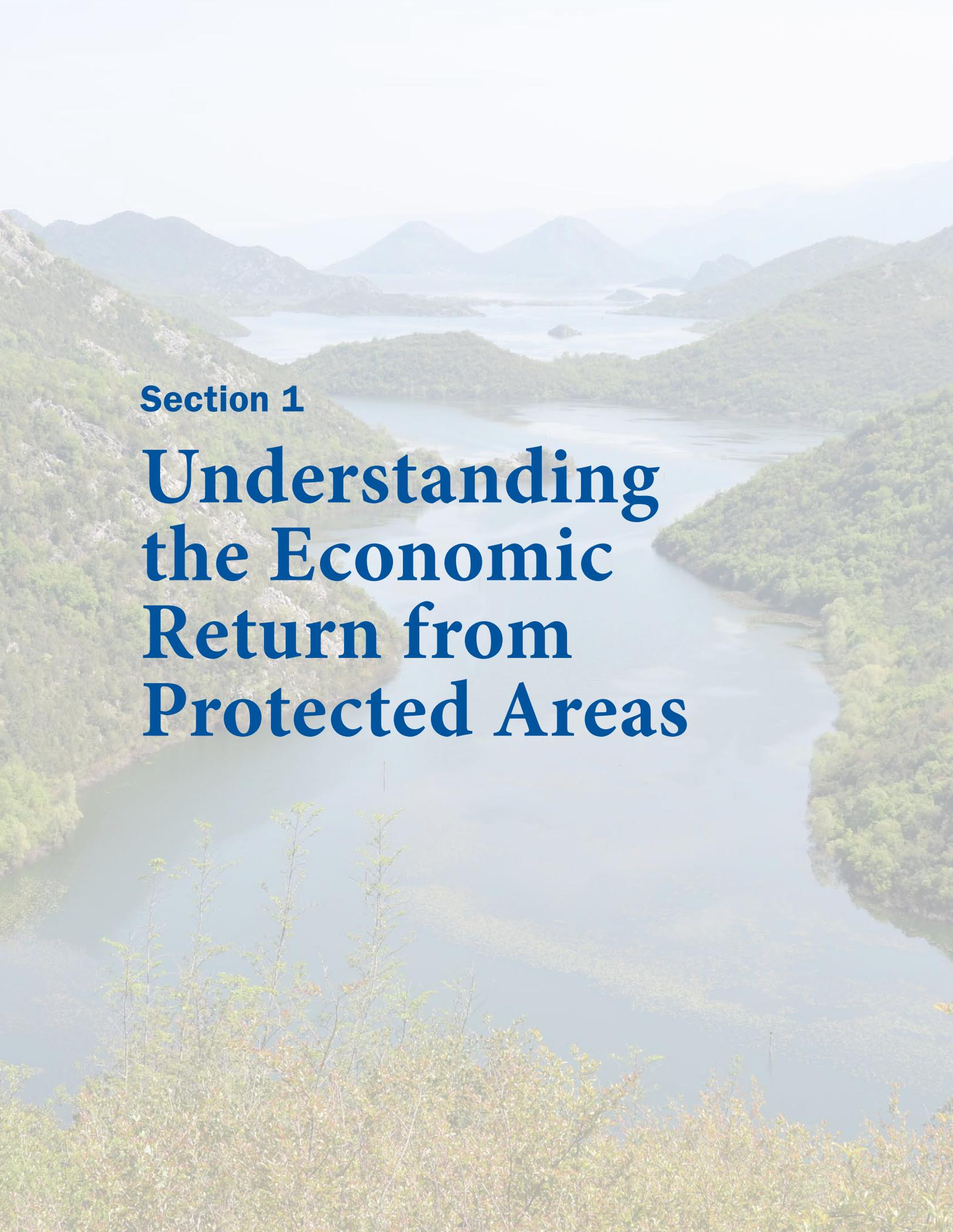
2. Short case studies from around the world highlighting a range of benefits and delivery mechanisms from many biomes. Each describes the one main ecosystem service being highlighted, the conservation value of the site, a description of the economic practices and a concise overview of tangible benefits.

The introductory essay starts with a discussion of the multiple benefits deriving from natural ecosystems, focusing particularly on biodiversity. It introduces protected areas and the various ways in which they can be managed, then looks at issues relating to conservation and development and at the key elements covered in the present study. Next, an overview of the case studies is given, and the results presented in terms of the potential interactions between conservation and maintaining livelihoods, drivers of conservation and development, what causes projects to fail and conversely the elements that help to drive success. Finally, some key recommendations are summarized.

Our results show that there are opportunities for some protected areas to provide economic returns, both for resident and local communities and to help support the work of protected areas. We however found that there is no single business model to be applied around the world, reflecting the uniqueness of the global protected area network, and that responses need to be tailored to individual situations. We also note that economic success is far from guaranteed, requiring extensive analysis, planning and adaptive management. We found there was no standard way of reporting economic benefits from protected areas and thus make some suggestions on what could make up a more standardized framework to report benefits globally. Finally, we wholeheartedly acknowledge that many important protected areas will never be capable of generating their own finances and will need continued support from governments or private donors.

As always, feedback, criticisms and suggestions are very welcome.

**Sue Stolton, Hannah Timmins and Nigel Dudley**



**Section 1**

**Understanding  
the Economic  
Return from  
Protected Areas**

## 1.1 Summary: Primer for policymakers: Key findings

---

This study focuses on actual economic benefits from protected areas that support conservation objectives. These can help to pay for management and ensure that resident or local people have the chance of a good livelihood. While total economic value of ecosystems has been well studied, many of these values lie outside the conventional market, and therefore unfortunately carry less political weight. Here, we look at measurable and accessible economic benefits from protected areas globally and draw on these to make some key policy recommendations. We focus on protected areas rather than Other Effective Area-Based Conservation Measures (OECMs), the new area-based conservation approach identified by the Convention on Biological Diversity, as when researching this few OECMs had been designated and thus no long-term economic studies are available.

Not all protected areas supply economic returns. Many were set up because natural resources had declined due to mismanagement or over-exploitation, others because the areas are important for biodiversity or ecosystem services. Many will continue to require state funding support and their success should not be measured narrowly in economic terms. Economic valuation is complex, often compounded by a lack of appropriate valuation techniques and / or standard methods. Furthermore, as the current pandemic has demonstrated, complete reliance on strategies such as tourism are subject to fluctuations and downturns, so that alternative emergency funding streams are sometimes required.

Understanding the economic and environmental benefits of protected areas is very important for various reasons, including to:

- Build a stronger constituency for conservation and sustainable development, by highlighting the economic effects of biodiversity and other ecosystem services.

- Justify the establishment and management costs of individual protected areas to governments and private donors by showcasing the returns from such investments as compared with the benefits from conversion.
- Encourage investment of more public funds into conservation.
- Publicize existing and potential economic benefits for communities living in or close to protected areas.

The 36 case studies from around the world provide additional evidence and support the growing call for the expansion of the global network of protected and conserved areas in the post-2020 biodiversity targets. Such a strategy is increasingly seen as an essential part of efforts to stem catastrophic biodiversity loss, mitigate climate change and provide a wide range of ecosystem services.<sup>19</sup> Linking conservation with a strategy for increasing local economic and social development can be a huge incentive for good management, if traditional owners, private owners, users and co-producers can see the concrete benefits.

Prior to presenting the case studies, an overview of the issues, challenges and lessons learned in terms of linking economic benefits with conservation objectives in protected areas is provided.

Section 1 ends with seven overall lessons learned and 22 recommendations for making conservation work and pay; these are organized under three themes: enabling conditions, good practices and reporting success. A summary of these recommendations is included here:

### **Lessons**

- 1 Sustainable management is at the heart of successful business models and needs to be carefully monitored and maintained.
- 2 Innovation works best from the ground up, with indigenous peoples and local communities as the

innovators or at least as willing and active partners/participants from the beginning.

- 3 A three-way link between communities, protected area managers and businesses is the most successful model for economic development connected to a protected area.
- 4 High-value and quality market products are a key element when use of natural resources is the basis of the economic model.
- 5 Successful models cannot simply be replicated, each protected area is different and needs its own approach; innovation is essential.
- 6 A diversification of money-making options is a good insurance policy in case one or more initiatives fail.
- 7 Climate change is providing fresh challenges to some economic models but also resulting in a number of additional funding models associated particularly with carbon capture and storage.

## **Recommendations**

### *Enabling conditions*

1. There must be something to sell – but it can be a product, ecosystem service or experience.
2. It is important to ensure there is a good market strategy an adequate market demand and honest, reliable supply chains.
3. A stable and supportive legal and political environment will greatly improve the chances of success.
4. Security of tenure over resources is vital in providing insurance that an enterprise can be sustainable, making stakeholders feel safe to invest, and more generally as a necessary basis for sustainable use and conservation.
5. Similarly, care is needed to ensure equitable benefits accrue, including to the poorest

members of society, which also helps to maintain support for conservation policies.

6. Seed funding and institutional support are both sometimes important in driving forward new projects, but conversely long-term donor support can be counterproductive by encouraging dependency.
7. Commercial expertise is needed and is absent from many remote communities, meaning that investment in education, technology transfer, training and capacity building is often important.
8. Local enthusiasm is key, and projects imposed in places where there is apathy or resistance will seldom work.
9. Even where successful sustainable businesses have been developed, protected areas need the assurance of sustainable, long-term funding to create favourable economic conditions for management in general and to provide replacement funding in cases of emergency.

### *Good practices*

10. Clear conservation objectives are also needed so that the economic activities support rather than undermine the central aims of nature conservation.
11. Monitoring and adaptive management are both essential; projects seldom work perfectly to begin with and will need to be adjusted as workers learn more, and as conditions change in the market.
12. Enterprises linked to a protected area need local relevance and to be appropriately matched to, and ideally build upon, local cultures, belief systems, traditional knowledge and practices.
13. Socially and environmentally responsible private sector partners are often needed, which means companies with good business sense but also in tune with the wider social and environmental aims of any project.

14. Government spending policies are also often essential in supporting green enterprise.
15. Community partners are vital, with appropriate governance structures and rights over the natural resources required for products and services.
16. Transparent benefit-sharing arrangements usually include agreed contributions to wider community development (schools, health clinics, etc.).
17. Local coordination with other enterprises, particularly if these are also associated with the protected area, can help to maximize gains – such as local food producers linking with ecotourism companies.
18. Conservation enterprises need to be nested within overall conservation strategies, covering issues of tenure rights, legality, mitigation of human-wildlife conflict, etc.
19. Sound financial planning should align with accounting best practices such as the GAAP (Generally Accepted Accounting Principles) and IRFS (International Accounting and Reporting Frameworks).
20. Use of voluntary certification systems can provide assurance that enterprises are truly sustainable and therefore help build markets and financial viability.

### *Reporting success*

21. Clarity on reporting economic results is important, both for internal purposes and to build evidence of wider benefits from protected and conserved areas.
22. More reporting of successful examples is needed and protected areas should also be encouraged to report on their methods and innovations to produce economic benefits where this is applicable given the area's conservation objectives.

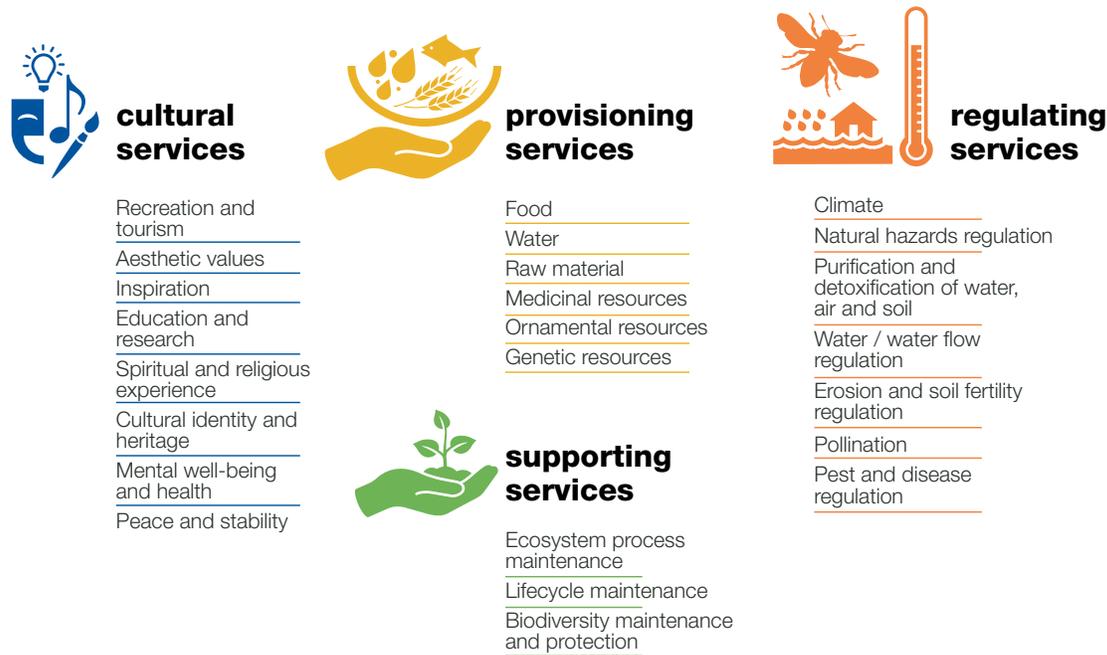
The cases collected here show that protected areas can contribute in very measurable ways to many of the UN Sustainable Development Goals, and to local and often national economic development. We therefore provide important additional arguments for ambitious targets for protected and conserved areas to be included in the CBD post-2020 global biodiversity framework's targets for area-based conservation measures.

## **1.2 Multiple benefits from natural ecosystems in protected and conserved areas**

Natural ecosystems support a very wide range of the ecosystem services essential for human life and wellbeing. Protected and conserved areas provide the most effective way yet identified to retain ecosystems and their associated services. They protect species,<sup>20</sup> habitats,<sup>21</sup> threatened human cultures<sup>22</sup> and ecosystem services.<sup>23</sup> All the key ecosystem services identified by the Millennium Ecosystem Assessment<sup>24</sup> can and do come from protected and conserved areas (see figure 1):

Of the four types of services, provisioning, regulating and aspects of cultural services are those that provide the clearest links, and incidentally also those most suitable for economic analysis of the sort being attempted here.

**Provisioning services:** Food security is supported by protected and conserved areas in a number of ways; through sustainable extraction inside their boundaries; as a result of spillover of healthy populations (particularly fish) in protected areas into places outside where they can be harvested;<sup>26</sup> and through the conservation of crop<sup>27</sup> and livestock wild relatives<sup>28</sup> used by agronomists for breeding. Water security is boosted because some natural ecosystems (particularly tropical mountain cloud forests and Andean *paramos*) increase net water flow.<sup>29</sup> Many other plant and animal-based materials come from the natural ecosystems in protected and conserved areas. And although it is not popularly seen as a part of protected areas,



**Figure 1: Ecosystem services adapted from the Millennium Ecosystem Assessment<sup>25</sup>**

many, particularly within IUCN management categories V and VI (see table 1), contain large areas of traditional agriculture, vineyards, cork oak forests, rubber tapping, collection of forest fruits and nuts and sustainable grazing.

**Regulating services:** some of the services that can be most readily translated into economic values – at least in theory – are the regulating services and a number are already subject to Payment for Ecosystem Service (PES) schemes.<sup>30</sup> The role of natural ecosystems in water security does not stop with issues of total flow, but water from pristine natural watersheds is generally purer than that from agricultural or industrialized watersheds and thus water purification charges are radically reduced, a benefit that a growing number of municipalities around the world are recognizing.<sup>31</sup> Perhaps even more important, natural ecosystems store vast amounts of carbon and today this is recognized as a critical function, bringing a new group of stakeholders into the debate about area-based conservation.<sup>32</sup> Particularly in light of the current COVID pandemic (see box 1), the role of healthy natural ecosystems in controlling disease is increasingly in the news,<sup>33</sup> along with the wider mental<sup>34</sup> and physical<sup>35</sup> health benefits

of protected areas. And finally, protected and conserved areas also provide many beneficial habitats and species that support human activities in the wider environment, such as pollinators, pest predators and the like.<sup>36</sup>

**Cultural services:** are incredibly important although it is difficult to assign an economic value to many of them – indeed part of their value is that they are *not* measurable in simple economic terms. Spiritual values like sacred natural sites, aesthetic values, and the importance of beautiful landscapes and seascapes for local and more distant communities are all important, as are historical artefacts: buildings, prehistoric remains and even ancient land and water management systems. One important exception to the difficulty of assigning an economic value to cultural services is that of recreation and tourism,<sup>37</sup> which paradoxically is often the easiest value of all to calculate.

**Supporting services:** such as soil, primary production and nutrient cycling are critically important, but under current economic systems are generally regarded as free goods. This is short-sighted. Total economic valuation studies of natural ecosystems have been helpful in bringing



*Krka National Park Croatia is home to the second oldest hydroelectric power plant in the world © Equilibrium Research*

attention to these core services, but it is still virtually impossible to identify concrete cases of communities or protected area agencies responsible for such areas making money as a result.

All of these values are not optional extras but are essential to the continuation of life on the planet. Maintaining and improving the global store of ecosystem services, along with the closely related issue of reducing the speed and severity of climate change, are the greatest challenges facing humanity as we draw towards the end of the first quarter of the 21<sup>st</sup> century.

### 1.3 The value of biodiversity

As increasingly large land and sea areas have been set aside for 'nature conservation' under a variety of management regimes (see section 1.4 below), the need to pay for their management, and sometimes to compensate for other values foregone, have both become increasingly important. At the same time, the related need of justifying conservation to decision-makers and policy influencers, and perhaps to an even greater extent to the communities living in or around protected and conserved areas, as well as the need to provide evidence of the potential

benefits of protection to landowners/title holders, have also grown more important.

We already know quite a lot about the value of ecosystem services. In 1997, a seminal paper<sup>38</sup> estimated the total global value of ecological systems and natural capital as being between US\$16-54 trillion a year as a minimum, using 1995 data. This and subsequent papers<sup>39</sup> explored both global and national values. Recalculating these figures some years later, the authors revised estimates upwards to US\$125-145 trillion.<sup>40</sup> Many more detailed studies have been carried out of particular biomes, sites, countries and services. For example, an estimate of the mental health benefits of protected areas around the world was given as US\$6 trillion a year in 2019.<sup>41</sup> Importantly though, much of this value is outside the market and best considered as non-tradable public benefits, highlighting the need for better accounting for public goods and services.<sup>42</sup> The need for new approaches and new thinking from government is still very evident twenty years or more after these issues first came into widespread public debate.<sup>43</sup>

In turn, these studies led to a rapid expansion of the evaluation of natural capital, and to the establishment of The Economics of Ecosystems and

Biodiversity (TEEB) initiative.<sup>44</sup> TEEB emerged in response to a proposal by the environment ministers of the G8+5 countries meeting in Potsdam, Germany to analyze the global economic benefit of biological diversity, the costs of the loss of biodiversity and the failure to take protective measures versus the costs of effective conservation.<sup>45</sup> The TEEB process continues and has also been applied at national and regional scales.<sup>46</sup> Natural Capital Valuation (NCV) has become an increasingly popular concept, although not without controversy including about the ethical issues related to the monetization of the environment. A recent analysis finds NCV supports protected areas in four ways, through making the case for protection to governments, informing planning, potentially addressing conflicts and identifying solutions.<sup>47</sup>

Whilst fully supporting these analyses and their findings, we note that they have as yet failed to stimulate changes in approaches to land and water management on the scale needed to significantly slow the loss of biodiversity and other ecosystem services. Benefits 'for future generations' or outside the market, particularly those that require public funding, are never particularly popular with taxpayers or governments. It is therefore still challenging to encourage significant investment in the long-term value of nature. At the moment, with a handful of exceptions, trends are going in the opposite direction. Initiatives have failed for a number of reasons, including political opposition, the difficulties of developing economic models that out-compete extractive resource use in the short term, and capacity shortfalls in many rural communities. Reasons for successes and failures are examined in more detail in the assessment of the case studies. While the growing number of success stories gives reasons for hope, developments are not yet taking place at the rate or scale required.

To a major extent, these issues are a matter of political and socio-cultural choice. The costs of nature conservation, even if we take the most generous estimates of what might be required,<sup>48</sup> are for example a fraction of what countries routinely spend on their armed forces.<sup>49</sup> But the

political reality is that conservation budgets are increasingly challenged within governments and by industry and are often under threat. At the same time, there has been serious and sometimes justifiable resistance from people who have lost out socially and economically because protected areas have been declared in or close to their traditional homelands. However, to add to the complexity, there are also a growing cohort of land/water owners or people/organizations with long-term management agreements looking for more sustainable ways to manage land in a way that brings in at least some returns but which contributes to conservation objectives.

There is, therefore, increasing interest in a slightly different kind of valuation: not one that looks at the huge but hard-to-realize values of all ecosystem services, but at the values that can either make money, or at least save identifiable amounts of money, in the immediate term.

Demands for this kind of valuation of protected areas come from four different angles:

- To build a stronger constituency for conservation and sustainable development at a global or national scale, by highlighting the economic value of biodiversity and other ecosystem services.
- To justify the establishment and management costs of individual protected areas to the government, treasury department, or to private donors, by showcasing the returns from such investments as compared with the benefits from conversion.
- To encourage investment of more public funds into conservation.
- To publicize existing economic benefits to communities living in or close to protected areas, and to identify potential benefits that could be realized in the future.

These differing needs are not necessarily all met with the same economic tools, although there is some overlap.

**Building a constituency for conservation:** A key incentive for economic valuation of nature is to provide arguments for conservation in a language understood by people outside the conservation field, and who may be uninterested or even resistant to a conservation message. Global, national or sometimes subnational values of ecosystem services involve complex economic assessment and modeling. As noted above, the entire biosphere was valued in 1997 at between US\$16-54 trillion per year, compared with the then global gross national product of around US\$18 trillion per year.<sup>50</sup>

In parallel with global studies, a number of other methodologies have been developed to assess benefits at national or sub-national levels.<sup>51</sup> These cover a wide range of methods and philosophies, from top-down approaches that draw on global data sets, such as Co\$ting Nature,<sup>52</sup> to bottom-up processes that assess local opinion and often include qualitative opinions, such as the Protected Area Benefits Assessment Tool.<sup>53</sup> Some approaches try to combine both, including InVEST from the Natural Capital project,<sup>54</sup> which has developed a large portfolio of assessments,<sup>55</sup> and TESSA, originally developed by BirdLife International.<sup>56</sup> Valuation methodologies have been developed<sup>57</sup> to look at particular ecosystems,<sup>58</sup> and at the values of

protected areas.<sup>59</sup> Assessments have been carried out for national protected area systems and for individual protected areas.<sup>60</sup> All are attempting to look at realizable values which do not impair an area's conservation objectives and many are implemented directly in collaboration with government agencies, linking findings with sustainable development strategies.

More recently, efforts have been made to assess costs and benefits of the 30% target for protected and conserved areas in the post-2020 global biodiversity targets. A study by over a hundred economists and ecologists concluded that implementing the proposal would make little initial difference to total (multi-sector) economic output, although a modest rise in gross output value is projected. A financial analysis showed that expanding protected areas to 30% would generate higher overall output (revenues) than non-expansion, estimated as an extra US\$64 billion-US\$454 billion per year by 2050. A partial economic analysis, focusing on forests and mangroves, found the 30% target had an avoided-loss value of US\$170-US\$534 billion per year by 2050, largely reflecting the benefit of avoiding the flooding, climate change, soil loss and coastal storm-surge damage that occurs when natural vegetation is removed.



*Tourists in Nahanni National Park Reserve and World Heritage site, Canada © Equilibrium Research*

The value for all biomes would be higher.<sup>61</sup> Concurrently, consultant McKinsey and Company released a study proposing detailed methodologies for assessment of costs and benefits under a 30% scenario.<sup>62</sup> Neither of these studies were available when we began researching this study and we welcome the renewed push to pinpoint hard economic data relating to conservation.

**Justifying management costs:** Protected areas are still, at least by area, overwhelmingly supported by public money: state governments and, in developing countries, national and international donor agencies.<sup>63</sup> Non-governmental organizations also carry an increasing proportion of the load. All these sources are demanding increased efficiency and cost effectiveness, with a focus first on management effectiveness,<sup>64</sup> and latterly also increasing demands for proof of economic values.

The assessment of natural capital, or more narrowly of the economic benefits from protected areas, has been carried out for individual protected areas and protected area systems around the world. This kind of assessment is often first done on a national scale, as is the case in recent studies in Iceland.<sup>65</sup> Canada provides another example. In 2017, 10.6% of Canada's land and inland waters was in protected areas, covering over one million km<sup>2</sup>. Annual contributions from Parks Canada include CAN\$4 billion to gross domestic product, 40,469 jobs, CAN\$2.5 billion in labour income and CAN\$532 million in tax revenue for governments.<sup>66</sup> Similarly, in the United States the US National Parks Service (USNPS) manages 417 areas, covering about 34 million hectares. The USNPS offers a publicly accessible web-based interactive tool providing year-by-year and trend data on visitor spending, jobs, labour income, value added and economic output information by sector for national, regional and local economies.<sup>67</sup> In 2019, 327.5 million visitors travelled to USNPS sites and spent approximately US\$21 billion in local gateway regions (defined as within 60 miles of a park).<sup>68</sup> This spending supported 340,500 jobs, and contributed US\$14.1 billion in employment

income, US\$24.3 billion in value added (contribution to Gross Domestic Product), and US\$41.7 billion in economic output. The lodging and restaurant and bar sectors saw the highest direct contributions to local gateway economies with US\$7.1 billion and US\$4.2 billion in economic output respectively.<sup>69</sup> The German government is supporting publication of a new guide on the economic analysis of visitation benefits.<sup>70</sup> Germany has 16 national parks, with 53 million visitors a year and €42.7 billion net expenditure, accounting for 85,000 job equivalents, mostly in rural areas.<sup>71</sup> In Zambia, analysis of spending patterns of visitors to the Lower Zambezi National Park and South Kuangwa National Park found that each visitor contributed on average US\$3,957-4,423 to household real incomes in communities surrounding the protected areas.<sup>72</sup>

The most successful valuation studies from the perspective of advocating for conservation are those that provide an instantly relatable figure. Working out the dollar value of the penguins that swam ashore every evening along the Great Coast Road in southern Victoria, Australia, drawing a nightly crowd of sightseers, helped secure the needed conservation funds for Parks Victoria. Simplistic though such a figure may be, it is something that a politician or civil servant can instantly understand and relate to. Similar studies have been carried out for other species. Due to tourists' willingness to pay to see and photograph the world's largest land mammal, an elephant contributes around US\$1.6 million to travel companies, airlines and local economies over its lifetime. By comparison, a dead elephant is worth US\$21,000 (raw ivory estimate) to criminal groups, making a live elephant around 76 times more valuable than a corpse.<sup>73</sup>

And it is important to note here that it is not just the total benefits but also where they are found: protected areas are often in rural areas with few other economic options, where supplying a few jobs has a disproportionate impact on the local economy; with knock-on effects for local traders, public transport, schools and so on.

### Identifying economic benefits to resident or local communities:

Much of the resistance to protected areas comes if and when adjacent communities lose out, or believe they are losing out, on the economic activities that would be available in the absence of a park, reserve, etc. Many of these frustrations can be real, if global values for nature and ecosystem services are supplied without considering the implications for the people living in the areas being conserved. Addressing the economic needs of people living in or near protected areas has become an increasingly important facet of management. Despite the popular conception of protected areas as pristine areas empty of people, many have people living inside, some contain large cultural landscapes, and even many national parks or wilderness areas in more pristine ecosystems are open to agreed uses by local people. Demonstrating that many protected areas are not just about protecting nature, but also helping to protect the livelihoods of indigenous peoples or other local communities is an important message in these circumstances.

The emerging debates about the implications of biodiversity conservation on local communities have led to important changes in perspective over the last few years, with conservation organizations increasingly emphasizing the need to stimulate flows of economic revenues from protected areas to people living in these areas or in neighbouring communities, who shoulder a disproportionate amount of the costs of conservation.<sup>74,75</sup> This has in turn stimulated a range of initiatives focusing on economic benefits linked to conservation objectives; some of these have been highly successful while some have either failed outright or fallen foul of changes in conservation laws, because formerly successful resources have been over-exploited or because of social and economic changes in communities over time.

At their best, these economic studies/projects provide forceful arguments for investment, or continued investment, in protected areas. They have helped, at least in part, to develop and progress markets for ecosystem services (such as clean water and carbon storage) which have

resulted in some conservation gains. And in a few cases, they have been the impetus behind conservation initiatives in the first place. For example, many of the self-declared Indigenous Protected Areas in Australia are stimulated in part by a desire to raise the livelihoods of resident indigenous communities,<sup>76</sup> see later case studies. At their worst they have raised expectations of a mass of unrealized benefits, set back the achievement of an area's conservation objectives and started a trend in the aim to put a value to all sorts of benefits of conservation, which should not be linked solely to market forces or the rigidly utilitarian 'pay-to-stay' concept. So, economic valuations can be useful but also need to be treated with considerable caution.

It is thus vital to stress that any economic activities in protected and conserved areas need to be established within a framework of safeguards, policies and standards to ensure they do not undermine conservation objectives or the rights of indigenous peoples, local and other communities. Standards to ensure that any benefits are equitably distributed are also important;<sup>77</sup> plenty of money-making schemes (including some in our case studies) continue to support a privileged minority rather than helping to raise overall living standards.

Some important tools exist, including methods for surveying visitors and working out their economic effects and impacts.<sup>78</sup> Value chain analysis is also important. Value chains are "... a sequence of related business activities from the provision of specific inputs for a particular product to primary production, transformation, marketing and up to the final sale of the particular product to consumers".<sup>79</sup> Value chain analysis can map the value chain to help understand how actors interact and who captures the value,<sup>80</sup> and it can evaluate both direct economic effects and also indirect effects on support sectors (e.g. agriculture, transport, maintenance, etc.).<sup>81</sup> In tourism, the value chain is a combination of services (e.g. accommodation, catering, excursions, transport), in which commodities play an important role (e.g. agricultural products, craft, etc.), many of which occur at the same time within the tourist destination.<sup>82</sup>

## 1.4 Some background: The places and the benefits being assessed

As noted above the remit of this current report is deliberately narrow; we are looking only at *protected areas* and *direct economic benefits*. And only examples that can uphold, and hopefully even advance, the conservation objectives of the area.

**Protected areas and other types of area-based conservation:** We are looking here at protected areas in the sense defined by the CBD and by IUCN, in other words for the CBD: “*a geographically defined area which is designated or regulated*

*and managed to achieve specific conservation objectives*”. Or in IUCN’s closely related definition: “*a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*”.<sup>83</sup>

Protected areas are not monolithic management regimes, but occur in a very large variety of shapes, sizes and management structures. The CBD and IUCN both recognize six main management categories and four governance types as outlined in tables 1 and 2 below.

**Table 1: IUCN and the CBD recognize several different protected area management categories**

| Category | Details  |
|----------|--|
| Ia       | Strictly protected areas set aside to protect biodiversity and also possibly geological/ geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such areas can serve as indispensable reference areas for scientific research and monitoring.   |
| Ib       | Usually large unmodified or slightly modified protected areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.  |
| II       | Large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.   |
| III      | Areas set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.   |
| IV       | Areas aiming to protect particular species or habitats and management reflects this priority. Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.   |
| V        | Areas where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.   |
| VI       | Areas conserving ecosystems and habitats, together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area. |

**Table 2: Protected area governance types**

| Type | Details  |
|------|--|
| A    | A government body (such as a Ministry or Park Agency reporting directly to the government) manages the protected area and determines its management aims and objectives.                                       |
| B    | Complex institutional mechanisms and processes are employed to share management authority and responsibility among a plurality of (formally and informally) entitled governmental and non-governmental actors. |
| C    | Protected areas under individual, cooperative, NGO or corporate control and/or ownership set up and managed under not-for-profit or for-profit schemes.  |
| D    | Includes two main subsets: (1) indigenous peoples’ areas and territories established and run by indigenous peoples and (2) community conserved areas established and run by local communities.                 |

More recently, the CBD has also recognized a new form of area-based conservation, drawing on the wording of Aichi 11 that refers to “... *systems of protected areas and other effective area-based conservation measures...*” (our emphasis). After considerable debate, CBD Parties adopted a definition of other effective area-based conservation measures or OECMs in November 2018 at the fourteenth Conference of the Parties in Egypt: “A *geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values.*” This covers three main situations:

1. **Secondary conservation** – active conservation of an area where biodiversity outcomes are only a *secondary* management objective (e.g. some conservation corridors).
2. **Ancillary conservation** – areas delivering *in-situ* conservation as a by-product of management, even though biodiversity conservation is *not* an objective (e.g. some military training grounds).
3. **Primary conservation** – areas meeting the IUCN definition of a protected area, but where the governance authority (i.e. community, indigenous peoples’ group, religious group, private landowner or company) does not wish the area to be reported as a protected area.<sup>84</sup>

OECMs are new and at the time of writing only a handful have been designated; there has certainly not been time for detailed economic analysis. The current report is therefore limited to protected areas, but many of the concepts and values being discussed will in time be equally applicable to many OECMs; indeed, the opportunities for economic activities may well be even greater in these cases.

**The benefits under consideration:** As noted above there are a range of assessments and

assessment methodologies now in place to assess overall benefits from protected areas; and some even try to put theoretical values on these benefits. All are useful – but the focus of this report is on the tangible, ‘money in your pocket’ type of benefit. Clearly only a small subset of the whole; but an important one in the ongoing argument for supporting the whole concept of area-based conservation. Economic benefits, where they can be measured, range from the very large to the rather small. Size is by no means everything. Even quite modest values can be important if they accrue to people with no other economic options or provide critical top-up for people living a subsistence or low-wage lifestyle. The ‘mopane worm’, actually the caterpillar of the moth *Imbrasia belina*, is widely consumed as a delicacy by people across southern Africa.<sup>85</sup> The annual harvest may contribute up to a quarter of a household’s cash income, depending on the quantity of mopane worms harvested, the proportion that is sold and the household’s other sources of income.<sup>86</sup> At the other extreme, some REDD+ schemes talk in terms of tens of millions of dollars. Perhaps even more important than the size of the benefits is who gets them.<sup>87</sup> While ecosystem services from protected areas do help reduce poverty,<sup>88</sup> in many cases they continue to benefit an elite, leaving the poorest members of society without, and incidentally therefore with no stake in the conservation success of the protected area.<sup>89</sup>

## 1.5 Conservation and economic development: Can we have both?

This report focuses on protected areas that are all listed on the World Database on Protected Areas<sup>90</sup> and thus adhere to the IUCN and CBD definitions of a protected area.<sup>91</sup> The IUCN definition is clarified by a series of principles, including: “for IUCN, only those areas where the main objective is conserving nature can be considered protected areas; this can include many areas with other goals as well, at the same level, but in the case of conflict, nature conservation will be the priority”.

Many protected areas therefore have other management priorities – cultural, tourist-related, etc. – but to be a protected area recognized by IUCN, conservation needs to take priority.<sup>92</sup> Balancing economic activities against this imperative is therefore tricky.

However, it is clear that resource use is an accepted part of management in many protected areas. No global survey has taken place, but it is estimated that tens of millions of people currently use resources within protected areas.<sup>93</sup> However, a proportion of this is illegal uses<sup>94, 95</sup> and outside the scope of our study. Illegal and damaging use of natural resources within protected areas is one of the greatest threats facing conservation, leading for example to the ‘empty forests’ syndrome,<sup>96</sup> where forest have been stripped of all their largest animals and any valuable plants. Many protected areas have been set up precisely because natural resources were declining due to mismanagement or over-exploitation.

As the concept of protected areas has evolved, there has been an increasing understanding that sustainable resource use is often compatible with, and in some cases can even contribute to, conservation objectives. Protected and conserved areas contribute to all the UN Sustainable Development Goals (SDGs) and play a key role in the attainment of several.<sup>97</sup> In addition to protecting life on land and in the ocean, particular links are with SDGs relating to zero hunger, clean water and sanitation, climate action, good health and well-being, sustainable cities and communities, and peace, justice and strong institutions.<sup>98</sup>

Getting the right balance involves not just agreeing on what is hoped to be a sustainable offtake which does not impact conservation objectives but also monitoring this over time, adjusting if necessary, and policing to make sure that everyone sticks to agreements. National laws and policies can both help and hinder. Sometimes, where use by local people is deemed harmless but national laws do not allow any use, managers turn a blind eye. In other cases, strict protection in one

area can have a neutral or even beneficial impact on resource use outside of the strict protection zone; exemplified in monitoring the impacts of marine protected areas on fisheries.<sup>99,100,101,102,103</sup> When looking beyond state-managed protected areas, many Indigenous Protected Areas, or ICCAs – Territories for Life, are predicated on sustainable use, although this may be subsistence with only indirect economic value. Similarly, many privately protected areas are managed to ensure that economic benefits cover management costs.<sup>104</sup> Over the past couple of decades, even some apparently strictly protected areas have been increasingly opening their borders to sustainable use by local or traditional communities; for example, Bwindi National Park in Uganda allows the collection of some material from the park (see case study). The decision to allow Native Americans to collect traditional medicinal and other herbs in national parks<sup>105</sup> is a hopeful, albeit belated, symbol of this new attitude.

The need to ensure and maintain sustainable resource use can provide the incentive for protection and conservation efforts and generate much-needed revenue to finance protected areas.<sup>106</sup> But like all broad social changes, the re-opening of many protected areas to traditional uses has supporters and opponents, successful examples, and failures. Managers point to examples of opening areas to fishing and seeing a dramatic reduction in fish populations as communities reap a sudden bonanza. Laboriously agreed sustainable use plans can be undermined by one or two people not prepared to follow the rules. Schemes that have been carefully set up over many years can fall victim to chance, accident or sudden changes in policy. Later we describe several schemes that were once highly successful and identified for inclusion in this study but had to be rejected because something had gone wrong.

While it is possible to combine conservation and economic development, and help ensure support for conservation, achieving a successful and sustainable balance is far from easy. We are still to some extent feeling our way. Some much-publicized opportunities have been slow

to develop, including the carbon market, still waiting for final agreement after more than a decade (which has certainly hampered the level of uptake). Other successful enterprises are so specific to a particular place that they will not be possible to replicate elsewhere (case studies on the benefits from collecting crocodile eggs in Australia and marine turtle eggs from Costa Rica in section 2 exemplify this). Moving from individual projects to mainstream acceptance is always challenging, perhaps particularly so in conservation.<sup>107</sup>

Furthermore, not all protected areas can supply useful economic benefits. Many sites that are essential for conservation, or for global ecosystem services like climatic stability or control of land degradation, will not produce 'benefits' in a form that is suitable for standard economic exploitation. Such areas are extremely important and often irreplaceable. Collective effort, usually in the form of state support, will remain important here and the arguments marshalled in this study are in no way supposed to imply that these areas are 'less valuable' than those producing a measurable economic income.

## 1.6 Why this study: Aims and challenges

Given the caveats mentioned immediately above, this study was conceived to gather cases of protected areas producing clear economic benefits to local and more distant communities where conservation objectives are sustained, secured – and ideally enhanced. It draws, in particular, on discussions that took place at the World Parks Congress in Sydney, Australia in 2014, at two CBD Conferences of Parties, in Cancun, Mexico in 2016 and Sharm el Sheik, Egypt in 2018, along with work through the IUCN World Commission on Protected Areas' Natural Solutions specialist group.

The key elements we were looking for:

1. **The economic gain must be real/tangible and quantified.** Many studies of total economic value rely heavily on theoretical or assumed values. For example, over 90% of the provisioning value of tropical forests in some of the most rigorous studies of total economic value is for presumed medicinal value of



*Tropical farms in corridor between Gola Rainforest National Park © Nicolas Tubbs, Fauna and Flora International*



**Figure 2: Location and biome of each case study**

species growing there;<sup>108</sup> this may be true but is seldom enough to convince a government to leave a forest standing. So, whilst recognizing and supporting the concept of total economic value, in the current study we have chosen a narrower focus: mainly direct economic effects and sometimes also consideration of indirect economic effects.<sup>109</sup>

**2. The economic benefit should not undermine the area's conservation objective.**

In most of the case studies the conservation outcomes are very clear, but as some of the potential case studies rejected for this report have shown, this is unfortunately not always the case.

**3. The protected area must be recognized on the World Database on Protected Areas (WDPA),**

in other words be fully recognized as a protected area, by government law or other effective means. There are two partial exceptions: in the case study from Sierra Leone we focused on the area between two blocks of Gola National Park where connectivity is essential as part of an overall

transboundary conservation project. In the Malaysia case study, the site is due to be fully protected, but data in the WDPA is currently being updated.

**4. A wide geographic spread of examples,** the cases explored are not limited to particular economic systems, levels of development or ecosystems and we sought to include a variety of biomes (see figure 2).

**5. Areas that include many different stakeholders and co-producers,** who might be residents in the protected area, people living nearby, protected area employees, visitors, and also sometimes more distant communities. Income from a combination of natural and human-driven resources is sometimes known as 'co-production' and we examine cases of co-production here.<sup>110,111,112</sup> The aim was to present case studies where local governance and equity were also key features – although there are a couple of case studies where clearly more could be done to ensure equitable benefit sharing.

6. **Areas highlight a variety of benefits.** While tourist income is critically important to many protected areas, it is not open to all and is inherently volatile. A single event, like a terrorist attack, can undermine tourism in a particular country, while the 2020 pandemic halted tourism everywhere and created huge problems for many protected areas. Here we aim to explore a much wider range (see figure 4) of types of benefit.

### Box 1: COVID-19

Although this report was started long before COVID-19 became the dominant phrase of 2020, it was finalized while the pandemic was still very much ongoing. A full assessment of impacts is still a long way off. But there has been a dramatic, temporary impact on incomes from ecotourism; it is not clear what the impacts will be in the longer term. A survey of African safari tour operators found that over 90% had lost more than 75% of bookings and many had none at all,<sup>113</sup> impacting the more than 16 million people directly or indirectly employed in tourism in Africa. The Mara Naboisho Conservancy in Kenya, for example, provided the main cash income for over 600 Maasai families.<sup>114</sup> The economy of entire towns like Hoedspruit next to Kruger National Park in South Africa virtually came to a standstill.<sup>115</sup> The dangers of relying on international tourism to sustain conservation have been recognized for a long time,<sup>116</sup> but those protected areas relying heavily on tourist dollars are at present facing an uncertain future.<sup>117</sup>

We aimed to focus on one key benefit per case study so we could explore these in greater detail. However, most protected areas have multiple benefits, both those that have a clear economic value and others that are less easily quantifiable. The review does not focus specifically on poverty reduction (a review of which was conducted for CBD a decade ago)<sup>118</sup> although we have previously studied the links between poverty and protected areas<sup>119</sup> and recognize the importance

of these relationships. These issues are discussed in more detail below.

All case studies were subject to expert review (which in practice also meant that several apparently likely cases had to be abandoned) and are fully referenced. For ease of comparison all values were also converted to US dollars, although the fluctuating value of the many currencies, particularly during the current pandemic, means that this is a rather inexact process at the present. In some cases, we used an inflation calculator to update to current values.<sup>120</sup>

The study was much more difficult than we had expected given previous work on ecosystem services from protected areas, and its publication is delayed in consequence. In some cases, market pressures and competition make economic data hard to come by; profits and losses are not released. In other situations, with many diffuse and widely spread stakeholders, no-one knows how much money is flowing in or out. Too many values were still largely theoretical, extrapolated or projected; this was the case with many carbon and water projects that are still under development. Some of the cases we report here fall into this category, but we have focused predominantly on those that are already operational and therefore more convincing. There has also been variable effort in addressing these issues; cases proved very hard to find in the United States and Canada for instance but are much more widely reported in the tropics. (This may be caused by the reporting requirements of donor countries and agencies.) Many economic analyses are reported from Western Europe, but the lessons learned from these types of cases are sometimes hard to transfer to poorer countries. Perhaps most importantly, there are no agreed standards for reporting on economic benefits from protected areas, an issue we will come back to in the recommendations section. Some types of benefits were also more problematic than we had supposed. For example, marine protected areas and fisheries are held up as a clear example of benefits<sup>121</sup> but in some cases can be hard to regulate or susceptible to over-commodification and changes

in policy. Changes in government attitudes, as for example has happened dramatically in Brazil,<sup>122</sup> mean that some previously successful cases no longer work effectively.

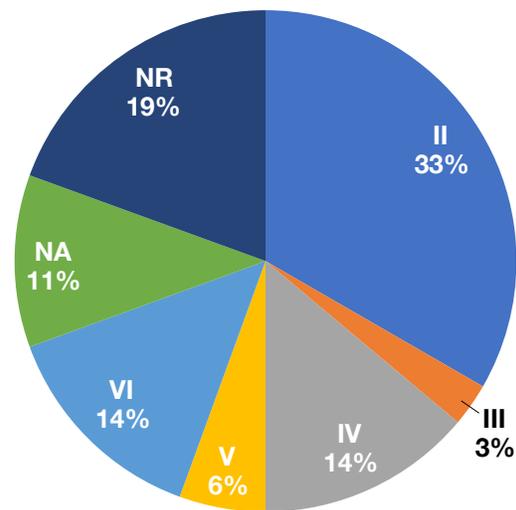
The focus on existing, recognizable and reported benefits also meant that the cases were biased towards terrestrial and some coastal areas. There is mounting evidence that increased coverage of marine protected areas (MPAs) is vital for environmental stability,<sup>123,124</sup> and that they can pay their own way in terms of benefits produced versus costs of designation and maintenance.<sup>125</sup> However, many MPAs are still so new that there are few studies of their economic benefits and for high seas MPAs many of these benefits will additionally be unsuited to the particular focus here.

In retrospect, we should perhaps have predicted some of the data problems. Similar challenges were found in obtaining reporting data for Aichi targets and in previous systematic reviews, for example of evidence for the impacts on human wellbeing arising from the establishment and maintenance of terrestrial protected areas between 1992 and 2012. This particular study concluded that the nature of the research reported forms a diverse and fragmented body of evidence unsuitable for the purpose of informing policy formation on how to achieve win-win outcomes for biodiversity and human wellbeing.<sup>126</sup> We hope that the current overview does provide some more concrete ways forward but also note that this is clearly an area where further research is urgently needed.

### 1.7 Overview of case studies

Whilst not a large enough sample to give definitive information, an analysis of the cases shows some definite trends.

In terms of management aims, most of the examples are either in IUCN category II (national park although note that not all places called 'national park' fall into this category) for those focused on tourism, or IUCN categories V and VI (protected

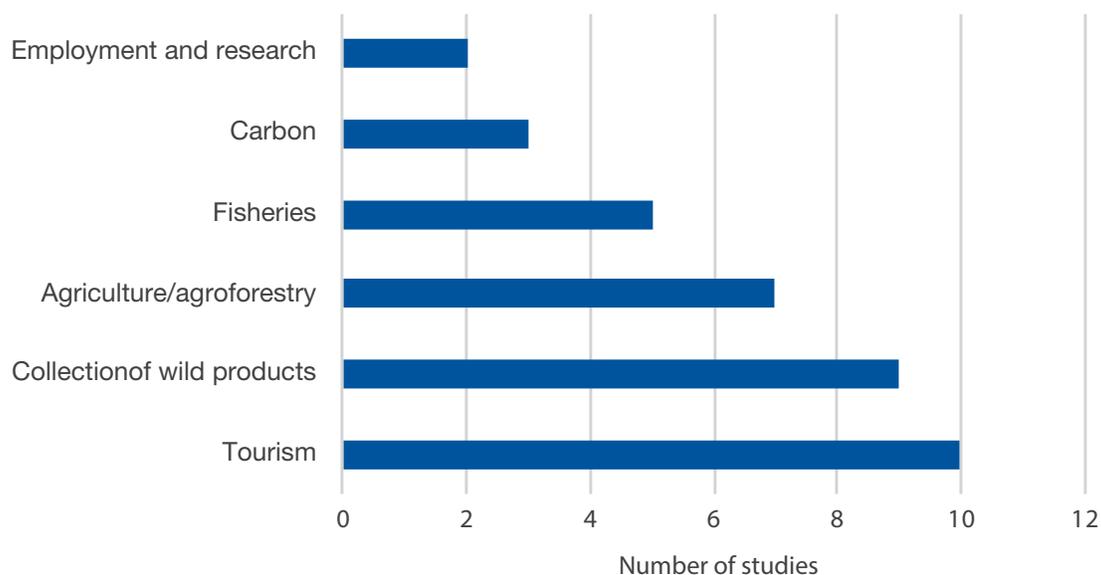


**Figure 3: Percentage of case studies presented falling into IUCN categories (II, III, IV, V and VI).** For some protected areas the category was not recorded (NR), while others such as World Heritage sites are not assigned a category (NA).

landscape/seascape and sustainable use or extractive reserves) for those where sustainable agriculture, grazing and collection of resources such as non-timber forest products is important. This also suggests that the most strictly protected areas (IUCN categories Ia and Ib) will be likely to have fewer direct economic values, which might be expected; these areas deliberately have less tourism and stricter levels of protection (see figure 3).

There will however be exceptions; some indigenous peoples use wilderness areas for activities like fur trapping (as for example in the Arctic National Wildlife Refuge),<sup>127</sup> which may have an important economic value, and just about any protected area can supply ecosystem services such as disaster risk reduction.<sup>128</sup> The latter is under-represented in the current study because most of these values accrue to governments in terms of money not spent in disaster relief, or in some cases in avoided expenditure in engineered disaster prevention strategies: both these are important but slightly too many steps removed from immediate beneficiaries for inclusion here.

Although all the case studies offer very different examples of the type, development and, often,



**Figure 4: The six main categories of values identified in the case studies**

management of benefits, for ease of discussion we characterized six main themes of benefits producing economic effects (see figure 4):

1. Tourism
2. Collection of wild products
3. Sustainable agriculture, grazing and agroforestry
4. Carbon as an ecosystem service
5. Fisheries
6. Employment and research

**Tourism or ecotourism** is important in ten of the case studies; this is by far the commonest subject for economic analysis in protected areas and in some countries it is difficult to find information about anything else. Tourism remains critically important to protected areas globally.<sup>129</sup> Tourism values are not all the same though; some accrue fairly widely amongst local communities and small-scale entrepreneurs,<sup>130</sup> while in other cases the bulk of the benefits flow to just a few people and local people remain largely disenfranchised. These tensions were mentioned in the Rwanda case study for instance, despite tourism being the largest earner of foreign exchange.

In Scotland, the arrival of a single pair of rare (for Scotland) migratory birds has spawned a

whole cottage industry of hotels, guest houses and seasonal workers. Associated industries are also important, such as the handicrafts that are sold at the entrance to many protected areas and provide a valuable lifeline for local communities, illustrated here in the case studies from Uganda and Jordan. In a time when long-haul leisure travel is increasingly challenged because of its impact on climate change,<sup>131</sup> reliance on foreign visitors may be risky and building a domestic market may be a key step for survival in the medium term. While some tourist values come mainly from domestic visitors, with the case studies from India, Germany and Finland falling into this category, the United States national parks have a mix of foreign visitors alongside Americans, and protected areas in Malawi and Costa Rica cater overwhelmingly to foreign visitors. Community ownership of the tourism operation ensures maximum profits stay local, as in the examples from The Philippines and Costa Rica (Monte Alto Protected Zone).

**Collection and sale of wild products:** The second main category was the collection of wild plant and animal products (excluding fisheries which are a significant category in themselves) from protected areas and the sale of these in processed or unprocessed form. This can simply be the direct and sustainable collection of common wild foods, such

as betel nut in Bangladesh, honey in Malaysia, Brazil nuts in Bolivia and turtle eggs in Costa Rica. Or in other cases individual protected areas exploit wild resources for quite specialized markets such as crocodile eggs from Australia and coco de mer palm seeds from the Seychelles; these models are less likely to be easily replicated elsewhere but are interesting examples of innovative, sustainable marketing. These benefits are only possible when a valuable product – usually a fruit or a renewable resource like honey – can be collected from a natural ecosystem and compete on the open market with more intensive forms of production; in many cases the link with the ‘natural area’ provides the added value as is the case of products made in and sold from the biosphere reserve in Germany. Wild-collected medicinal herbs can be a major source of income, as demonstrated by the collection of Cordyceps fungi in Bhutan, a key product from all Bhutan’s more mountainous protected areas, and Devil’s Claw in Namibia.

**Sustainable agriculture, grazing and agro-forestry:** Although agriculture and livestock grazing are not popularly considered to be part of protected area management, they remain major

land-uses in many category V protected areas, in sustainable management practices found, for instance, in *Satoyama* in Japan and, increasingly, in conservancies in Africa. Experience shows that domestic livestock and wild animals can co-exist in the long term and that this can be a more equitable and sustainable option than trying to separate the two and creating social tensions. (It should be noted that there are also many cases where mixing livestock and wildlife has proven disastrous for both; co-existence only works if it is carefully planned and monitored.) We present cases of grazing in Kenya and Argentina, and mixed traditional farming in Switzerland. There is also some processing of wild or sustainably produced products from protected areas, to make chocolate in Sierra Leone and Belize, and a range of products sold to tourists in Lebanon and Jordan.

**Fisheries:** Freshwater and marine protected areas (MPAs) can provide a range of economic benefits. Fisheries can be substantially enhanced by conservation inside protected areas leading to increased fish density and size in surrounding waters due to the spillover (the movement of fish from protected to unprotected areas)<sup>132</sup>



Soap production at Ajloun Forest Reserve, Jordan © Othman Tawalbeh, RSCN



Researchers at Reserva Particular Do Patrimônio Natural Reserva Ecológica De Guapiaçu, Brazil © Guapiaçu Ecological Reserve (REGUA)

and nursery effect (where protected areas act as fish spawning and nursery grounds).<sup>133</sup> Careful management of fisheries, usually by small-scale artisanal fishers can benefit from higher yields than in non-protected waters,<sup>134,135</sup> as shown by the examples from Velondriake Locally Managed Marine Area (LMMA) in Madagascar and Vueti Navakavu LMMA in Fiji. Fisheries can provide additional economic benefits to local communities if the area is also popular for tourism, and thus has an increased market for fish, as in Lake Skadar in Montenegro. The Morocco case study and Fernando de Noronha MPA in Brazil provide an example of how using the full range of these options has increased fisheries' income and stimulated other economies to develop.

**Payment for ecosystem services, particularly carbon:** There are a set of options under the general title of Payment for Ecosystem Services (PES). This has for years been touted as the likely saviour of protected areas in terms of funding, although we found it quite hard to find concrete projects with reportable profits that provide local benefits. To some extent this is because some successful schemes do not release figures. But

there are also many schemes still in the process of development, with expected figures, or projected figures, which are often designed to attract investors and therefore possibly rather optimistic. We have cases from Madagascar and Australia but would have liked to include a broader spectrum of results from a wider range of services.

**Employment and research:** In two case studies we specifically focused on the wider values of research and employment. In one private reserve in Brazil, regular visits from research scientists are an important income source, as they use local accommodation and bring money into the area. The direct role of protected areas in supplying employment is also significant, particularly in rural communities where other opportunities may not exist. This was, for instance, identified as a main value in the Panda Reserves in China, and also a key element in many of the other case studies in section 2.

We draw on these case studies in the following section to make some preliminary observations about economic values from protected areas and what does and does not work in terms of developing sustainable funding models.

## 1.8 Livelihoods and conservation: A developing field

For many decades conservation initiatives have tried to balance the needs of biodiversity with the importance of reducing poverty and for conservation to contribute to the UN's Sustainable Development Goals (SDGs).<sup>136</sup> Two overarching strategies have evolved:

### 1. Alternative livelihood projects

(Alt-livelihoods) are characterized as those projects where conservation objectives are met by substituting a livelihood strategy that is causing harm to a biodiversity target, for example, through unsustainable use, with one that has a lesser, or negligible, impact on the same target. Examples of alternative livelihoods include ecotourism, craft making or beekeeping as substitutes for expanding subsistence agriculture around protected areas, or seaweed farming as an alternative to artisanal fishing. Alt-livelihood projects have been, and continue to be, at the root of many conservation responses to pressures on protected areas. Amongst the case studies collected here, the tourism enterprises are examples, particularly in developing countries, along with such initiatives as handicrafts in Uganda and the production of herbal soaps in Jordan.

### 2. Community-based natural resource

**management** (CBNRM) defines an approach that combines conservation objectives with the generation of economic benefits for rural communities.<sup>137</sup> It is based around a set of rules, drawn up and agreed by an identified community (a village, ethnic grouping or group of resource users) relating to the management of natural resources and aiming to sustain these resources over time. In the case of CBNRM in or around protected areas, the managing body would also be part of the agreement (this might be the community itself in the case of an ICCA). CBNRM aims to create the right incentives and conditions

for an identified group of resource users to use natural resources sustainably within defined areas. Whereas Alt-livelihoods look for alternatives to unsustainable practices, CBNRM is a method which helps communities continue, or restart, traditional practices in a sustainable way that links cultural heritage, livelihoods, sustainability and conservation objectives. Amongst our cases, grazing management in Argentina and Kenya are classic examples of CBNRM.

CBNRM is generally a collective response, involving a whole community in one way or another, and aimed at overall management of a habitat or system. Alt-livelihoods, by contrast, may or may not involve everyone within a community and tend to focus on specific projects some of which, like tourism, are only indirectly related to management of natural resources. In practice, the distinction between the two is sometimes rather tenuous and overlap occurs.

The effectiveness of both Alt-livelihoods<sup>138</sup> and CBNRM<sup>139</sup> has been questioned, with plenty of examples of failed schemes amongst both. However, evidence to date does not suggest that the approaches are inherently flawed, but rather that they have in many cases been poorly thought through, and if monitoring has taken place at all it has not been rigorous enough to draw concrete conclusions. The lack of any theory of change, detailed background research about needs and attitudes, or follow-up monitoring were all identified as important gaps in many schemes.<sup>140</sup>

In addition to this focus on poverty alleviation and development of sustainable livelihoods, a new emphasis has evolved to capture the potential of market-based instruments to create commodities whose trade can benefit local people, and particularly address income poverty, along with supporting conservation objectives. Again, two overarching strategies have evolved, both of which overlap with CBNRM and Alt-livelihoods:

1. **Conservation enterprises** are defined as businesses that generate economic, and ideally social benefits, in ways that help meet conservation objectives; they incentivize biodiversity conservation by providing benefits to stakeholders who engage in a business for the production and sale of related goods and services. Enterprises range from ecotourism services and beekeeping to handicrafts or timber and non-timber forest products.<sup>141</sup> Often, conservation enterprises can charge higher prices than more destructive or 'business-as-usual' competitors, due to a proportion of consumers being willing to pay a premium for biodiversity-friendly products or services, or for products/services associated with specific areas known for their conservation activities. However, conservation enterprises which do not have clear social policies and safeguards can result in elite capture of benefits, with little social or truly effective conservation benefits. Managed collection of crocodile eggs in Australia and marine turtle eggs in Costa Rica, described in the case studies below, are both classic conservation enterprises.

2. **Outcomes-based payments** for conservation are primarily linked to PES (payments for ecosystem services), biodiversity offsets and carbon credits. The latter are generally part of the REDD+ process, 'reducing emissions from deforestation and forest degradation,' involving forest conservation and sustainable management and enhancement of forest carbon stocks in developing countries. These schemes usually limit harmful activities, for example, PES schemes that focus on stopping forest loss to protect water resources, or carbon credits providing impetus to stop deforestation, using funds offsetting greenhouse gas emissions elsewhere. Similar initiatives based on active management include impact investment bonds and wildlife credits. These can all be categorized under the concept of biodiversity credits or 'biocredits,' defined as units of biodiversity emerging from pre-agreed management that improves biodiversity against a baseline,

for example its quantity, value or composition. An independent standards body issues credits to authorize a project, which is independently verified. Credits may be bought and sold in a market transaction or through direct deals.<sup>142</sup> The REDD+ schemes in Australia and Madagascar described in the case studies rely on outcome-based payment.

Virtually all these concepts are still under development. New ideas, new business models and new initiatives are emerging all the time. There are still problems; the long lead time in agreeing the details of a global REDD+ scheme has slowed uptake and undermined business confidence. None of the community-based approaches are perfect, nor can they ever guarantee success. But on the other hand, the huge burst of interest in such CBNRM, Alt-livelihoods, conservation enterprises and outcome-based payments is attracting a lot of smart thinkers. These are found at community-level within rural societies facing rapid change, and in sectors of both alternative and mainstream business, where people are increasingly prepared to look seriously at sustainability options and implications for contemporary business models.

Below, we use the case studies in the report plus other evidence to review what we know about what is and what is not likely to work.

### **1.9 Drivers of conservation and development: A starting point or retrofitting?**

Linking successful conservation with local development can be the driver for conservation, when the traditional owners, private land/water holders, users or co-producers of an area see the benefits of conservation as a strategy for increasing local development, economic and social security. Alternatively, one or more of the approaches outlined above can be 'retrofitted' into an area where conservation has for some time been



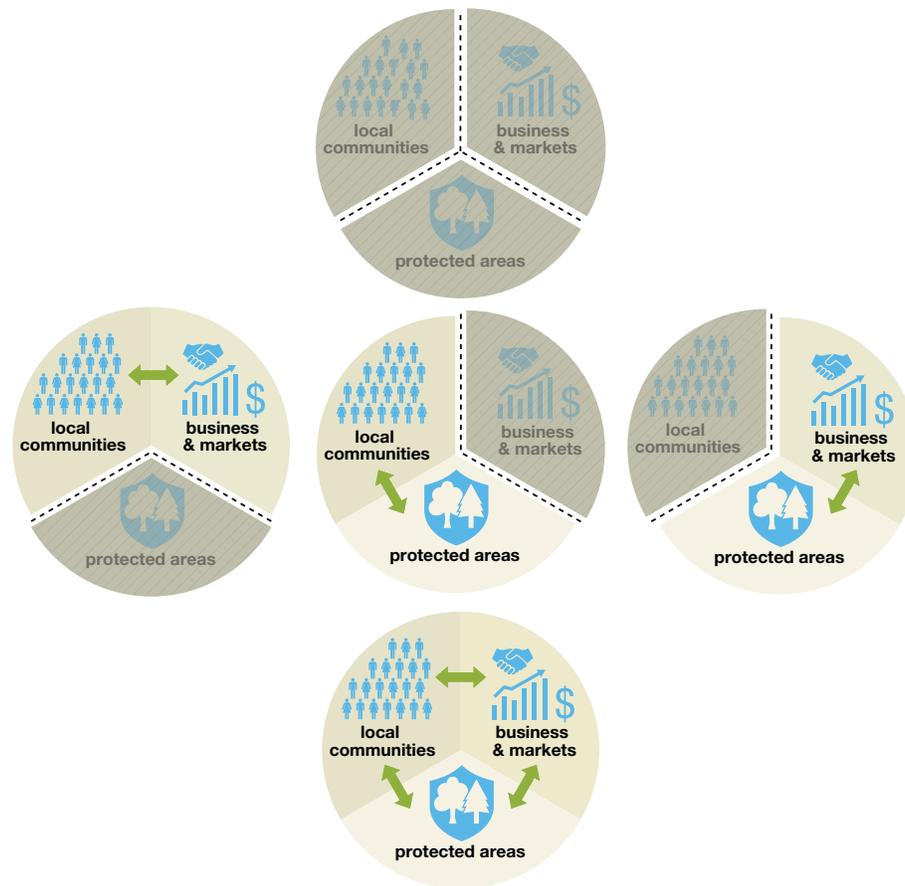
*Octopus catch, Velondriake Paysage Harmonieux Protégé, Madagascar © Garth Cripps, Blue Ventures*

the sole driver of management but where new opportunities for linking conservation with development are a possibility. This is the case, for example, of carbon markets and other PES schemes, or for the recognition of natural ecosystems in disaster risk reduction. It can also be used in places where it is recognized that protected areas have increased or exacerbated poverty; where national, and even sometime regional/international, policies have left local communities with few livelihood options, for example where rural depopulation or domestic conflict have left few employment opportunities; or where resources have been depleted or their quality has so declined outside of conservation areas that developing sustainable resource use within conservation areas becomes an economic reality.

The first option has been termed as ‘conservation from the inside-out’,<sup>143</sup> working with existing land and water managers, and is often the driver for the development of privately protected areas, indigenous and community conserved areas, conservancies, etc. Examples of this approach in

the case studies include biosphere management in Switzerland and locally managed marine areas (LMMAs) in Fiji and Madagascar.

The more traditional approach to the development of protected areas is driven by outside agencies, either nationally or internationally, that advocate for and set up protected areas. In these models, one common outcome is that any economic benefits from the protected area are not generated by the area’s traditional owners or local communities, but rather by outside businesses such as ecotourism companies, water companies, and so on. In these areas, the three-way link between local communities, protected area and business (see figure 5) must often be rebuilt. If local communities feel disenfranchised and resentful, this can be challenging, although successful examples exist, and it is important that we learn from these. In Uganda, there has been long-term resentment about Bwindi National Park, in part because it is on rich volcanic soils that could be used for farming, and also because some of the local Batwa people were dispossessed when the protected area was set up.



**Figure 5: Linking benefits from protected areas, businesses and local communities<sup>144</sup>**

Rebuilding community trust is in this case a long-term enterprise.

Figure 5 explores the different types of relationships that can develop between protected areas, business and local communities including indigenous peoples. The figure outlines five scenarios to characterize these relationships, which range from poor practices where there are no relationships between protected areas, business and local communities (option 1) to best practice where all three constituencies are working together (option 5):

**1. No understanding/recognition of the links** between the protected area, business and local communities. This reflects the status quo in many protected areas; values and benefits are understood and used by different groups of stakeholders independently. This lack of interaction between the value provider (the

protected area) and those who may benefit from these values (businesses or local communities) has several implications. Management of the protected area tends not to consider how values are being used, creating a major risk that the value is degraded or lost. Flows of benefits, particularly financial flows, are rarely equitable.

**2. Business and local communities linked**, but no understanding/recognition of the link to protected areas. Members of local communities are directly employed, for example, in tourism businesses, or have employment in enterprises that rely on ecosystem services maintained by the protected area, such as water bottling or hydroelectric power plants, or on commercial production of resources from the area, such as production of herbs or honey. This can lead to good links between business and local communities, but the relationship with the protected

area is not obvious. This means the protected area is not recognized and cannot capitalize on the potential support for protecting the values which supply the benefits used commercially and effective management of the resource may not be in place. Businesses may also not recognize the extent to which they are reliant on the natural resources from protected areas and projects can end up not being linked to the area's conservation objectives and are thus not sustainable.

**3. Protected areas working with local communities**, but there is little link to business and markets. In this case, protected areas, or projects working within protected areas, work closely with local communities to share benefits, create and enhance income generation through sustainable resource use, etc. However, the links to business and available markets for local products may not be present, hampering the success of these projects.

**4. Business and protected areas are directly linked**, but with no direct link to local communities. In this option, official or unofficial management agreements between the protected area and beneficiary businesses usually mean the protected area is supported, either financially or in kind. A classic example here is concessions for tourism related activities. Local communities can be beneficiaries through, for example, employment by the business or development projects funded by local businesses, but they are not directly linked to the benefits or fully aware of the benefits provided by the protected area, and the flow of benefits is unlikely to be sustainable.

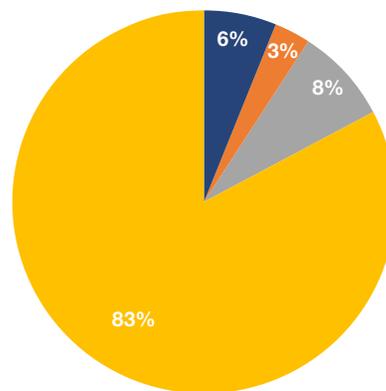
**5. A three-way direct link between protected areas, business and local communities.**

In this ideal option, there are direct links between all three entities. For example, a business which relies on resources from the protected area has a memorandum of understanding with the protected area and either directly employs local people or provides support for local development (e.g. financial support or training related to business

management) with full engagement and participation of local people (e.g. through involvement in management structures or other decision-making bodies). All parties are engaged in the management and governance of the benefit. This option is likely to produce the most equitable flow of benefits and positive results for all parties concerned, and to ensure the sustainability of both protected area values and businesses reliant on these values.

Figure 6 uses the concepts behind figure 5 to summarize the relationships in the case studies developed for this report. Perhaps not surprisingly the vast majority (83%) were from the final scenario outlined above, representing best practice where protected areas, business and local communities had led to successful conservation and economic outcomes benefiting local communities. Any project which fell under scenario one would be unlikely to succeed and thus, not surprisingly, there are no examples of the scenario in our study.

■ Scenario 2 ■ Scenario 3 ■ Scenario 4 ■ Scenario 5



Key:

Scenario 2: Business and local communities linked, but no understanding / recognition of the link to protected areas  
 Scenario 3: Protected areas are working with local communities, but there is little link to business and markets  
 Scenario 4: Business and protected areas are directly linked, but no direct link to local communities  
 Scenario 5: A three-way direct link between protected areas, business and local communities

**Figure 6: Analysis of the types of relationship between protected areas, business and local communities in the case studies presented**



*Ripe Cacao pods in the Maya Mountain North Forest Reserve, Belize © Maximiliano Caal, Ya'axche Conservation Trust*

A literature review carried out for the CBD a decade ago suggested that the poor tend to depend disproportionately on relatively low value or 'inferior' goods and services from biodiversity, while the more affluent groups are more likely to engage in biodiversity conservation when higher commercial values are available (sometimes at the expense of poorer local communities).<sup>145</sup> The existence of successful economic benefits from a protected area therefore does not necessarily mean that poverty reduction or inequalities within the community are being reduced; in fact the reverse can occur if a wealthy elite can cash in at the expense of other people. Monitoring of projects therefore needs to look at a wide range of factors.

Several of the case studies focus on ensuring the full value of resources stay local by developing local production facilities. This can be easy where production processes are relatively simple, as in the examples from Jordan, Uganda and Lebanon. In Switzerland, a special brand highlighting the

protected area has been developed to enhance marketing. Both cacao-based agroforestry enterprises in Belize and Sierra Leone have ensured linkages with fair trade producers, whilst in Argentina it has been estimated that the value of wool to local producers could increase almost four-fold if refined locally.

In the terms used by the United Nations, it is not enough to look only at the first of the Sustainable Development Goals (SDG1: No poverty), but is also important to consider SDG10 (reduced inequalities), SDG5 (gender equality) and others relating to health, sanitation and decent work. In this context, it is also paramount that any economic activity does not undermine conservation aims; SDG 15 (life on land) and SDG 14 (life below water) along with SDG13 (climate action).



Wool production in Península Valdés, Argentina © Ricardo Baldi, Cenpat-conicet

### 1.10 What causes projects to fail?

Small enterprises in rural areas have to survive in volatile conditions, often without the security of savings to help them through lean times. Of course, smaller businesses can also be more versatile and adaptable, but this depends on a clear understanding of business conditions and opportunities.

While much of this report focuses on successful attempts to create sustainable economies associated with protected areas, it is perhaps even more important to understand why projects sometimes fail.<sup>146</sup> So, before looking at some of the components of success, we start by discussing some of the cases that did not finally make it into the report, and outline what went wrong. Our research identifies a number of key factors; several of these may operate simultaneously.

**Market forces too strong to resist:** Sustainability is often fragile; what works for one generation may not be as attractive for the next. In 1985,

Brazil's National Council of Rubber Tappers proposed the concept of extractive reserves (*Reserva Extrativista*, or RESEX) as a means of protecting large tracts of forest whilst improving economic development for local communities.<sup>147</sup> RESEX in Brazil are publicly owned but communities have rights to traditional extractive practices (hunting, fishing, rubber tapping, etc.). Chico Mendes RESEX, named after the environmentalist and rubber tapper assassinated in 1988, is in the state of Acre. Here, harvesting latex led to low rates of deforestation.<sup>148</sup> In 2009, it was estimated that families extracted up to 260 kg annually, however this had decreased from a 1995 average of 714 kg due to unstable rubber markets and the economic crash of 2008. The government invested US\$10 million in building the Natex condom factory in Xapuri in 2008,<sup>149</sup> the world's only producer of native-forest latex condoms, a non-profit employing 170 people, paying above-market prices for latex and supporting the Ministry of Health's fight against HIV.<sup>150</sup> However, more recently the reserve is under threat again from farmers and ranchers pressuring

for subdivision and grazing use, and deforestation has increased dramatically since 2017. Even some of the rubber tappers and Brazil nut collectors are reported to be switching to cattle because it is more profitable.<sup>151</sup> Some sources now rank it as one of the most threatened protected areas in Brazil.<sup>152</sup>

**Unsustainable use:** Some projects fail because, while they might make money for communities, the environment continues to degrade. The Nha Trang Bay (NTB) reef is Vietnam's most biodiverse coastal ecosystem and is of critical importance as a major nursery ground to other coral reefs around Vietnam and possibly Cambodia. It is also a major centre for aquaculture, with exports worth around US\$400 million per year,<sup>153</sup> but with fisheries facing mounting risks from pollution and overfishing. The NTB MPA was created in 2002 as a pilot initiative to enable the sustainable management of the fringing reef communities, while securing the livelihoods of local fishers.<sup>154</sup> The most popular form of aquaculture in NTB is the rearing of spiny, green and red lobster in floating cages attached to rafts. In 2005, around 1,600 families were likely to be benefiting from lobster farming in NTB and earning approximately US\$4,000 per year per family.<sup>155</sup> The project was supported by the World Bank, GEF and DANIDA. But unfortunately, there are now many examples of unsympathetic coastal development, with 600,000 tourists in 2015. Overfishing, illegal coral collection, pollution from onshore sources and increasing lobster culture are all causing problems.<sup>156</sup>

**Oversupply and poor market access:** Prespa National Park (PNP) makes up the Albanian fifth of the first transboundary protected area in the Balkans; the Transboundary Prespa Park, joining Macedonia and Greece. It includes mountainous mixed forests with 270 species of birds (it is an Important Bird Area) and 60 mammals. The park is one of the last European refuges for the Balkan lynx (*Lynx balcanicus*). Twelve villages border PNP<sup>157</sup> on the Albanian side in Korçë district and the park itself provides habitat for a rare species of the perennial plant, *Sideritis raeseri*, valued highly across the region as a herbal remedy. The dried

flowers are used to prepare 'mountain tea', used traditionally to treat inflammation, gastrointestinal disorders, coughs and anaemia.<sup>158</sup> Just over 50 km<sup>2</sup> of PNP was allocated for the collection of *S. raeseri*, generating a potential annual harvest of over 2,800 kg, with a hundred families organized into the Prespa Marketing Organization.<sup>159</sup> However, supply badly outstripped demand, there was a failure to gain market access and sales collapsed; apparently no tea at all was sold in 2019.

**Changes in legislation:** Legislative changes can sometimes undermine successful projects even if this is not the intention. The Amani Forest Nature Reserve is situated on some of Tanzania's most fertile soils and under threat from conversion to farming. In response, a butterfly farming project created an economic incentive for local communities to conserve the forest.<sup>160</sup> To start a butterfly farm, the farmer collected a few specimens from the forest to raise. Once the larvae pupate, they were collected by Amani Butterfly Project staff, sorted, packaged and shipped to buyers around the world. From the villages in Amani's buffer zone, four hundred farmers, half of them women, increased their annual household income by an average of 25% from the rearing and sale of butterflies. Coveted species, such as the bright blue forest king emperor (*Charaxes xiphares*) sold for about US\$3 per pupae, 70% of which went to the farmers, 10% to the village development fund (governed by an elected board of twelve butterfly farmers) to build schools, etc., the balance paid project staff salaries and operational costs. Between 2004 and 2019, annual sales grew from about US\$20,000 to over US\$80,000. However, in response to concerns about trophy hunting and the spread of zoonotic diseases, the Government of Tanzania banned all live cross-border wildlife trade, which includes butterfly pupae, the trade has collapsed and the project has had to close.<sup>161</sup>

As well as these examples from our own case study research, projects can fail for numerous reasons including:

**Poor value chains and low revenues:** Many projects simply do not make enough money to make a meaningful contribution to either people's livelihoods or the security of a protected area.

**Internal conflicts:** Successful projects usually involve cooperation between three different actors: local people, businesses and protected area authorities. Within indigenous or local communities, many different people often need to work together. There are many ways in which things can go wrong: the desire of one group to control more than their share, breakdown in communication, jealousies, misunderstandings, corruption or simply problems with human relationships. Internal conflict is often identified as the major factor in failure in small to medium-sized enterprises,<sup>162</sup> although we have found no specific studies on this in the context of protected and conserved areas.

**Unforeseen pressures:** A single event can undermine years of effort. The COVID-19 crisis, ongoing at the time of writing and likely to be a dominant factor for some time to come, has highlighted the fragility of many ecotourism ventures. Throughout the world, tourism has collapsed; the world's largest industry is at a virtual standstill. While this has been devastating for many coastal communities, ski resorts and cultural sites, the World Tourism Council estimates that there are in excess of 20 million jobs linked to wildlife tourism;<sup>163</sup> most of these will now be on hold and the speed at which they will recover, if at all, remains uncertain.<sup>164</sup> Funding for protected areas is likely to further contract and many associated community projects will face huge challenges, we can predict that many will simply fail. The pandemic is a particularly acute example of a more general phenomenon. A single terrorist attack in Bwindi National Park, Uganda, undermined the country's wildlife tourism for some years; similar issues now threaten many other countries where domestic tourism is or was on the increase. Earthquakes, hurricanes and the impact of environmental degradation can all undermine what were once profitable enterprises.

## 1.11 Conclusions: What do the case studies tell us about the nature of success?

---

The cases discussed above are disheartening, perhaps particularly when good projects are undermined by forces beyond people's control. But the better news is that many good examples still do exist. Although only a preliminary collection of examples, the case studies presented in section 2 already allow us to identify some of the elements that need to be in place to successfully and sustainably link protected areas, local communities and business in ways which lead to economic benefits.

**Effective and sustainable management is at the heart of successful business models:** it should go without saying that effective and sustainable management is a critical element but in practice this is sometimes forgotten. Successful examples presented here include the collection of medicinal fungi from national parks in Bhutan where the park management ensures collection is only made by people living within its boundaries, and the amounts collected are quite carefully controlled to avoid exhausting this resource. This is also the philosophy of Locally Managed Marine Areas (LMMAs) and other marine protected areas linked to local fishing communities.

**Innovation works best from the ground up:** it is clear from many of the case studies that initiatives have been successful because the people involved have been innovators or willing participants in new ideas from the start. Examples include the cases from Argentina, Fiji and Morocco, although this bottom-up approach seems to be across the board. This makes perfect sense but also creates a challenge; does this make progress impossible in the absence of a local entrepreneur? In practice this is not the case; careful seeding of ideas can come from 'outside'; from protected area managers in the case of state or some privately protected areas, or from associated NGOs or development agencies. But in these cases additional care is needed to ensure that the community is really



Lake Skadar, Skadarsko Jezero National Park, Montenegro © Equilibrium Research

behind the initiative and not just paying lip-service in the hope of some short-term support, meaning that the start-up negotiation process is likely to take longer (and that schemes should not go forward if there is no real level of support).

**A three-way link between communities, protected area managers and businesses is the most successful model:** referring to Figures 5 and 6, most of the successful projects are where protected areas, communities *and* businesses all work in harmony together. This can usually only happen if appropriate governance and equity measures are in place. Links between just business and protected areas can be successful in terms of making money, as in ecotourism in Rwanda and India, but not necessarily provide as much as they could do in terms of local livelihoods resulting in lack of equity usually as a result of poor governance. As mentioned above, smaller but better distributed economic effects may be more beneficial to the long-term conservation success of a protected area than major profits going to a minority. Similarly a link between business and local communities that does not involve the

protected area, as seemed to be the case in Lake Skadar, is problematic because it means the people who know most about the needs of conservation are cut out of the conversation; again impacting effective management and governance.

**Ecotourism needs publicity and unique selling points:** despite the huge growth in ecotourism, most of the successful international ventures have something unique to offer, or at least can persuade tourists that they have something unique. Of the ones we highlight, the Indian site is one of the places with the best chance of seeing a tiger; Rwanda has highly unusual access to gorillas, along with luxury accommodation for high-end tourists, the Philippine site has a cave system voted one of the seven new wonders of the world and both the US sites are globally famous. When attracting domestic tourists, the needs are more modest: pleasant scenery, good places to stay and eat, interesting wildlife and a tourist infrastructure of footpaths, bike trails and visitor centres, as shown for instance in the example from Germany.



*Aldabra Atoll is over 1,000 km of the main island of the Seychelles, with much of the funding coming from tourists to Vallée de Mai, one of the world's smallest natural UNESCO World Heritage Sites © Equilibrium Research*

**High-value and quality market products are a key element in natural resource use:** and in addition, they should be capable of collection without causing damage to biodiversity, portable and with an adequate market. Betel nuts from Bangladesh, Brazil nuts from Bolivia, the seeds from the Seychelles and honey from Malaysia all fit these requirements. Collection from a protected area can provide an added selling point and can, with good liaison, also attract project funds with which to engage marketing experts, to help to agree more profitable sales for local collectors/producers, who in other circumstances can be exploited by middlemen.

**Successful models cannot simply be replicated:** while some of the approaches outlined here, such as ecotourism, sustainable grazing, or fishing, can be applied in many places, others are unique. The protected area in Costa Rica where turtle eggs are collected is the only such site in the world and covered by unique legal exemptions. The fact that a few tourists are willing to pay large sums of money for suggestive looking seed cases is a way of supporting two World Heritage sites in the

Seychelles, but again a unique situation. The wider message here is that if people look at the resources available and think innovatively, they have sometimes found a way of raising some money without undermining the central conservation ambitions.

**Protected areas differ in their ability to deliver economic benefits:** although this survey is too small to draw global conclusions, it is notable that most of the examples come from the less strictly protected areas, typically IUCN management categories V and VI or category II for ecotourism. Strict nature reserves (category Ia) and wilderness areas (Ib) are less likely to provide such benefits, although there are some examples.<sup>165</sup> This reinforces the earlier observation that many protected areas will continue to require external support to maintain their unique values.

**A diversification of funding is a good insurance policy:** many enterprises remain at risk from sudden changes in conditions beyond the control of an individual community or protected area management. Therefore, diversification offers important additional insurance against

failure of one part. Locally managed marine areas (LMMAs) provide some income from selling fish, but they also supply food directly to communities even if the commercial market declines or fails. Cordyceps collection is a huge boon in Bhutan but the collectors continue to farm and home-stay tourism is developing in case the species declines, or the market collapses in the face of more effective alternatives.

**Climate change is providing fresh challenges** to some economic models, but also a number of additional funding models associated particularly with carbon capture and storage. We explore some of these in the case studies.

### 1.12 Recommendations: Making conservation work and pay

---

Trying to find the balance between conservation objectives and economic benefits is far from easy; win-win situations are not common in any walk of life. For every protected area and potential project, new assessments, studies and monitoring based on local and external knowledge are necessary.<sup>166</sup> However, through reviewing the case studies presented here and other relevant literature<sup>167,168,169,170,171,172</sup> that has analyzed projects and characterized elements of success when developing conservation enterprises, a number of enabling conditions and good practices have been identified.

#### **Enabling conditions**

Projects will have a much greater chance of success if they exist in a supportive environment. Of the steps listed below, clearly the existence of a product and a market are essential. All the others can be worked around in some circumstances, but the task will be much more difficult if they are absent.

**1. Something to sell:** Whether this is a product, like a fish, or a benefit, like carbon storage, or the experiences that make up a successful ecotourism venture. Not all protected areas may have this option; this does not mean they

are unimportant as a protected area, but rather that they need a different funding model.

- 2. A good market strategy that assesses long-term market demand, competition and supply chains:** Clearly products need a reliable market. A small profitable enterprise can encourage many others to try to cash in and result in oversupply; it is important to have a good understanding of the market, market trends and competition. The presence of a strong and stable market, and access to these markets, are both vital to ensure success. Knowing the value of products at different stages along the supply chain is also crucial, so that local producers do not lose out to unscrupulous middlemen.
- 3. Stable and supportive legal and political environment:** Success is much easier to achieve if projects take place in conditions where national laws and policies help rather than hinder. It is therefore important to have knowledge of and ensure compliance with government requirements (e.g. national laws and regulations relating to health, safety, export, land tenure, land use, transportation, benefit sharing, etc.). Policies and legal frameworks should assist sustainable resource use and provide sanctions against overuse of resources by participants and outsiders.
- 4. Security of tenure over resources:** Those involved in a project need to have confidence that they are secure, through land ownership, or through long-term agreements relating to tenure and/or use. Running a profitable business in the absence of this kind of security can simply encourage less scrupulous and more powerful people to move in and take over and will not lead to stakeholders feeling it is safe to invest. Security of tenure is also vital more generally as the basis of sustainable use and conservation.
- 5. Equitable benefits:** Care is needed to ensure equitable benefits accrue, including to the

poorest members of society, which also helps to maintain support for conservation policies.

**6. Seed funding and institutional support:**

Whilst not essential, support in getting started, through microfinance projects, low cost or zero-interest loans, start-up grants and the provision of technical expertise can all help kick-start a successful project.<sup>173</sup> This should be temporary; although grant funding can be important to develop conservation businesses, it can stifle enterprises by encouraging dependency and is rarely fully sustainable. This could even include protection from competition, if feasible, while in the process of developing viable funding models.

**7. Commercial expertise:** Successful enterprises need a whole range of expertise including business planning, market research, risk analysis, competitor analysis, deal negotiating, deal structuring and financing, ensuring market access, supporting marketing and promotion, access to and maintenance of equipment, infrastructure, etc. Training and capacity building are usually major contributions to project success. The concept of ‘conservation enterprise incubators’ describes an approach where technical assistance, development grants, and/or debt or equity financing is provided to assist new commercial ventures to grow to the point of viability or follow-on funding.

**8. Local enthusiasm:** None of the above will be enough unless a critical number of people are determined to see the project go ahead. Experience in all the case studies suggests that bottom-up approaches are those with the greatest chance of success.

**9. Stable, long-term financing:** While the case studies show many examples of protected areas providing a useful economic contribution, they also reinforce the fact that many business opportunities are fragile, susceptible to change and can often only partially support maintenance of the site. Unforeseen events, like the

ongoing pandemic or a terrorist attack, can suddenly wipe out tourism for a period of years. Protected area systems therefore still need the assurance of sustainable, long-term funding that can help, both by creating favourable economic conditions and by providing replacement funding in cases of emergency.

**Good practices**

Once enough enabling conditions are identified and the enterprise is deemed to be possible, there are a series of steps that can help to increase the chances of success.

**10. Clear conservation objectives:** Livelihood gains such as increased economic returns do not necessarily lead directly to improved conservation practices. Indeed, they can become drivers for increased resource use and unsustainable practices as some of the failed examples mentioned above demonstrate. Any enterprise based on resource use in protected areas should ensure that appropriate research into the potential environmental impacts of the enterprise has been carried out and appropriate monitoring, quotas, etc. are in place. There should also be clarity of the link between the enterprise and conservation objectives to reinforce people’s role as stewards of natural resources. Use of existing good practice guidelines, such as the UNCTAD BioTrade Principles and Criteria,<sup>174</sup> can provide a firm foundation. Higher management agencies need to monitor and where necessary intervene if core conservation values risk being undermined.

**11. Monitoring and adaptive management:**

Working out quotas, sustainable yields, maximum tourism numbers and other variables is difficult, and conditions may also change over time – what is sustainable in a normal season may be overharvesting in a period of unseasonal weather for instance. All projects therefore need an agreed monitoring system, which ideally will involve the people using the product (who should have a strong incentive for

sustainability). The monitoring system should include agreed tipping points for indicators (a certain decline of harvested species, signs of damage from ecotourism) which if reached will indicate that changes are needed; this is the essence of adaptive management.

**12. Local relevance:** Enterprises linked to protected areas need to be appropriately matched to, and ideally build upon, local cultures, belief systems, traditional knowledge and practices. The enterprise should be aligned with the needs, aspirations and capacity (or potential capacity) of local people and needs to be either driven by, or developed from the beginning in collaboration with, the communities who will be directly involved over the long term.

**13. Socially and environmentally responsible private sector partners:** It is important to find the right business partners: they need to be good businesspeople but also attuned

and sympathetic to the wider social and environmental aims of the operation. Many of the enterprises presented in the case studies have private sector business partners who help develop the enterprise, access commercial markets, advise on messaging, packaging and marketing. Partner businesses should have track records in prioritizing social and environmental benefits as well as success in profit-making.

**14. State support:** Government spending policies are often essential in supporting green enterprise, for example preferential purchasing can help while the project is developing economic viability.

**15. Community partners with appropriate governance structures:** A vital element is to find and reach agreement with community organizations with rights over the natural resources needed for products and services. These organizations need strong governance;



*Drinking cacao from Maya Mountain North Forest Reserve © Maximiliano Caal, EcoTourism Belize*

including well-articulated and functioning management structures that adhere to the principles of participation, transparency, accountability, equity and effectiveness.<sup>175</sup> Encouraging local leadership capacity, including the ability to transition leadership over time, is critical to achieving and sustaining conservation enterprises.

**16. Transparent benefit-sharing arrangements:** Benefit-sharing is the intentional transfer of monetary and nonmonetary incentives (goods, services or other benefits) to stakeholders funded by revenues derived from those results. Typically, only a small percentage of community members receive direct cash benefits in the form of wages from conservation enterprise employment or incomes. Ideally, wider community members should also receive some form of benefits in the form of improved community services (e.g. infrastructure, education and healthcare) supported by the conservation enterprise.

**17. Local coordination:** Good ideas can also proliferate. It is important that there is coordination with other conservation enterprises. Research suggests that businesses operating in and around protected areas may have little contact with each other<sup>176</sup> and be missing out on opportunities for mutually beneficial collaboration.

**18. Conservation enterprise is nested in overall conservation strategy:** Successful conservation is complex, and a suite of conservation strategies is usually needed that, depending on the area, can include awareness-building, research, assessment and monitoring, securing land tenure and resource rights for indigenous peoples and/or local communities, law enforcement, human-wildlife conflict mitigation and so on. All strategies, including conservation enterprises, need to work together to reduce threats and achieve conservation objectives.

**19. Sound financial planning:** Financial planning and reporting should be aligned with accounting best practices such as the GAAP (Generally Accepted Accounting Principles) and IARF (International Accounting and Reporting Frameworks). Sufficient planning, forecasting, risk management and understanding the resilience of business models is vital for success. (More discussion on reporting is provided below.)

**20. Use of certification systems:** A recognized voluntary certification system can provide assurance to consumers that enterprises associated with protected areas really are sustainable and thus boost returns from the green consumer market. Many schemes focus on commodities, such as the Forest Stewardship Council, Marine Stewardship Council and those covering agricultural products like palm oil, soy and beef.<sup>177</sup> Other systems look generally at reducing impacts on wildlife, such as the Wildlife Friendly Enterprise Network, which has for instance been developing a Gorilla Friendly™ pledge in Rwanda, Uganda and DRC,<sup>178</sup> and Certified Elephant Friendly™ Tea in India.<sup>179</sup>

### **Reporting success**

One clear finding of this report – an unexpected one – is the difficulty in getting not only good examples but also clear and up-to-date economic information. Some suggestions are given below drawn from the case studies (and from the many potential case studies rejected due to lack of clarity of information).

**21. Clarity on reporting economic benefits is needed:** Clarity on reporting success is vital to attract funding and secure investment and should be readily and easily available and both transparent and accurate. Some suggestions on how to achieve this include:

- **Gross or net:** Gross is the total income before taxes and other deductions; net the income after deductions and taxes. We

assume that most of the reporting provided in the material we used to assess the case studies was for net income, but this was rarely clear. We recommend that reporting of economic benefits is consistently for **net income** (see box 2).

## Box 2: Understanding costs

Reporting net income is recommended, but it is also useful to provide clarity on the calculations that determine gross to net income. Understanding the following assists in growth, attracting further investment or incentives, and in reducing costs to be more resource efficient:

- General expenses
- Extraordinary expenses
- Conservation related expenses
- Staffing (e.g. all employment related expenses)
- Risk costs (including losses and related loss, administrative time, etc.)
- Transaction costs (e.g. the costs of bringing a good or service to market)
- Available tax deductions and incentives (tax efficiency is often overlooked as a tool to increase net income).

- **Return on investment:** Another form of expressing economic benefits is through the return on investment; the money made or lost on an investment over a specified time period. This can be expressed as the ratio between net profit (over a certain period) and cost of investment (resulting from an investment of some resources at a point in time). Some projects we found had involved significant, multi-year funds but never achieved an overall profitable economic return, even if they supplied important *local* socio-economic benefits. This type of information is vital in understanding the viability of projects as well as any potential replicability. We recommend that reporting includes **return on investment** after a specified period of years (e.g. 10 years).

- **Annual reporting:** Most income was reported on a yearly basis (financial or tax year). The period became more confused for activities which are only carried out for short periods of the year (e.g. fisheries open for only short periods or produce harvested seasonally). In some cases, even the year being reported was not clear. We recommend reporting is consistently for **annual income** with the year of reporting indicated, even if the period of activity is for less than a whole year.

- **Income trends:** Benefits from protected areas tend to be highly variable; either due to harvest fluctuations or demand. A close look at income trends also forces entities and projects to really evaluate their income sources and take stock of any vulnerabilities. Many projects thus prefer to report on income trends over periods of years. This makes sense and should be encouraged with the time-frame being reported made clear and with annual reporting also carried out, as noted above. We would recommend reporting **income trends** with a clear indication of the time-period.

- **Sustainable resource use trends:** Understanding economic benefits, and the conservation impact of developing these benefits, is much easier if the rate of resource use is also provided. This varies widely from entry fees from tourists, tourist bed-nights, harvest of wild resources, agricultural products or fisheries, outputs of manufactured products (e.g. numbers of baskets made, soaps, jams, etc.). And as above this can be subject to seasonal fluctuations. Details of monitoring methods used to provide harvest trends and the format of measurements (kg, kg per km<sup>2</sup>, number of products, etc.) can all help to understand the economic benefits and should ideally be linked to monitoring plans for

all elements of protected area management. We recommend providing clarity of resource use in terms of **annual resource use, trends and details of the method for measuring resource use**.

- **Distribution of benefits:** Issues of benefit-sharing are discussed above; but just as important is the reporting of the benefits themselves. Reporting varies widely. Sometime benefits are reported as per person, sometimes per household or even per village. The per household measure is particularly difficult to compare, as household numbers vary dramatically around the world.<sup>180</sup> We recommend increasing clarity by splitting reporting between **direct beneficiaries** (e.g. the person receiving the income such as the hand-icraft maker or fisher) and **associated beneficiaries** (e.g. households).
- **Importance of benefits:** In each case study below, we have included the average adjusted net national income per capita (US\$) data from the World Bank.<sup>181</sup> This ranges from over US\$64,000 per year in Switzerland to under US\$250 per year in Malawi. We did this to try to provide some context to the relative importance of the economic returns being reported. To understand the importance of the contribution of economic benefits from protected areas it is important to understand this context more clearly. Some projects report the percentage of annual income the resource provides (e.g. income from Brazil nut collection could provide 100% of annual income whilst income from wild herbs to make local soap may provide less than 10%). We recommend that reporting provides clarity on the relative importance of benefits, ideally through **indication of the percentage of annual income for direct and associated beneficiaries** the benefit provides.

- **Contribution to conservation:** Given the context of economic benefits from protected areas, many case studies also report on the contribution of the incomes received being fed back into protected area management. In some cases, this contribution is a very significant proportion of the management costs. A clear way of indicating this contribution is by fully costing the protected area's management plan and then reporting the percentage attributed to these costs by the economic benefit. This can show the finance gap for effective management as well as the full contribution of the benefit to effective management. If costs are not ring-fenced for management then there needs to be a way to report on their benefit for the area as a whole. Most of the recommendations regarding reporting given above are relevant here as well; with the significance of the benefit for management or for a specific management activity (e.g. fire mitigation, patrolling, etc.) again being particularly important. In addition, co-benefits can be added to the contribution to conservation beyond just the monetary assistance for conservation management, such as business growth, additional employment, ecological infrastructure investment, etc. We recommend reporting provides clarity on the relative importance of benefits, ideally through an **indication of the percentage of annual income for protected management as a whole, or for specific management activities**.

## 22. More reporting of successful examples:

Importantly, we would like to encourage many more protected areas to report on their methods and innovations to produce economic benefits where this is applicable given the area's conservation objectives. The case studies below provide a simple format for reporting, and hopefully the guidance above on reporting economic benefits can

help provide clarity. A database such as IUCN's Panorama,<sup>182</sup> provides an excellent reporting format for successful projects.

Finally, the case studies and analysis provide powerful evidence that land and water set aside for conservation is not 'dead space', tied up for the protection of biodiversity and nebulous ecosystem services, but also produce concrete benefits for both local and more distant communities. Many of the cases recorded here have involved a change in attitude by stakeholders – governments,

companies or communities – who were initially reluctant to support protected areas but changed their minds when they saw real economic returns, often in places with few other options. These arguments are particularly pertinent as the world builds up to agreeing important new targets for conservation from 2020 to 2030. The environmental and climate arguments for retaining large areas of natural ecosystems are already well known. Here we provide extra evidence that saving the world does not also have to cost the earth.

## References

- 1 Dudley, N. and Stolton, S. (eds.) 2003. *Running Pure: The importance of forest protected areas to drinking water*, WWF International and the World Bank, Gland, Switzerland and Washington DC.
- 2 <https://www.iucn.org/commissions/world-commission-protected-areas/our-work/natural-solutions>
- 3 [https://wwf.panda.org/our\\_work/biodiversity/protected\\_areas/arguments\\_for\\_protection/](https://wwf.panda.org/our_work/biodiversity/protected_areas/arguments_for_protection/)
- 4 Stolton, S. and Dudley, N. (eds.) 2010. *Arguments for Protected Areas*, Earthscan, London.
- 5 Secretariat of the Convention on Biological Diversity. *Protected Areas in Today's World: Their Values and Benefits for the Welfare of the Planet*. Technical Series no. 36. Montreal.
- 6 Ivanić, K.-Z., Stolton, S., Figueroa Arango, C.F. and Dudley, N. (2020). *Protected Areas Benefits Assessment Tool + (PA-BAT+): A tool to assess local stakeholder perceptions of the flow of benefits from protected areas*. IUCN, Gland, Switzerland.
- 7 Dudley, N., Stolton, S., Belokurov, A., Krueger, L., Lopoukhine, N., MacKinnon, K., Sandwith, T. and Sekhran, N. 2009. *Natural Solutions: Protected Areas Helping People Cope with Climate Change*. IUCN-WCPA, TNC, UNDP, WCS, the World Bank and WWF, Gland, Switzerland, Washington, D.C. and New York.
- 8 Stolton, S., Mansourian, S. and Dudley, N. 2010. *Valuing Protected Areas*. The World Bank and GEF, Washington, DC.
- 9 Dudley, N., Harrison, I.J., Kettunen, M., Madgwick, J. and Mauerhoffer, V. 2016. Natural solutions for water management of the future: Freshwater protected areas at the 6th World Parks Congress. *Aquatic Conservation: Marine and Freshwater Ecosystems* 26 (Suppl. 1): 121-132.
- 10 Dudley, N., Mansourian, S., Stolton, S. and Suksuwan, S. 2008. *Safety Net: Protected areas and poverty reduction*, WWF International, Gland, Switzerland.
- 11 Dudley, N. Higgins-Zogib, L. and Mansourian, S. 2006. *Beyond Belief: Linking Faiths and Protected Areas to Support Biodiversity Conservation*. WWF and Alliance of Religions and Conservation. Gland, Switzerland and Manchester, UK.
- 12 Kettunen, M., Berghofer, A., Bouamrane, M., Bruner, A., Chape, S., Conner, N., Dudley, N., Gidda, S.B., Morling, P., Mulongoy, K.J., Pabon, L., Seidl, A., Stolton, S., ten Brink, P. and Vakrou, A. 2011. Recognizing the value of protected areas. In: ten Brink, P. (ed.) *The Economics of Ecosystems and Biodiversity in National and International Policy Making*. TEEB and Earthscan, London.
- 13 Kettunen, M. and Ten Brink, P. (eds.) *Social and Economic Benefits of Protected Areas: An assessment guide*. Earthscan, London.
- 14 Sullivan, S. 2010. Green capitalism, and the cultural poverty of constructing nature as service-provider. *Radical Anthropology* 3: 18-27
- 15 Hockings, M., Dudley, N., Napolitano Ferreira, M., MacKinnon, K., Pasha, M.K.S. et al. 2020. Editorial essay: Covid-19 and protected and conserved areas. *PARKS* 26: 7-24.
- 16 See for instance Campbell, A., Kapos, V. Lysenko, I. et al. 2008. *Carbon emissions from forest loss in protected areas*, UNEP WCMC, Cambridge; Gray, C., Hill, S.L., Newbold, T., Hudson, L., Börger, L., et al. 2016. Local biodiversity is higher inside than outside terrestrial protected areas worldwide. *Nature Communications* 7: 12306.
- 17 See for instance Stolton, S. and Dudley, N. (eds.) 2010. *Arguments for Protected Areas*. Earthscan, London.
- 18 Freestone, D., Laffoley, D., Douvère, F. and Badman, T. 2016. *World Heritage in the High Seas: An idea whose time has come*. World Heritage Report no. 44. UNESCO, Paris.
- 19 Dinerstein, E., Vynne, C., Sala, E., Joshi, A.R., Fernando, S. et al. 2019. A global deal for nature: Guiding principles, milestones and targets. *Science Advances* 5: eaaw2869.
- 20 See for example: Gray, C., Hill, S.L., Newbold, T., Hudson, L., Börger, L., et al. 2016. Local biodiversity is higher inside than outside terrestrial protected areas worldwide. *Nature Communications* 7: 12306. DOI: 10.1038/ncomms12306.
- 21 Joppa, L.N. and Pfaff, A. 2011. Global protected area impacts. *Proceedings of the Royal Society B* 278: 1633-1638.
- 22 [http://wwf.panda.org/wwf\\_news/?228691/indigenouspeopleinisolatedinitialcontactwwfperueffort-stopprotectpeopleandforests](http://wwf.panda.org/wwf_news/?228691/indigenouspeopleinisolatedinitialcontactwwfperueffort-stopprotectpeopleandforests)
- 23 Stolton, S. and Dudley, N. 2010. *Arguments for Protected Areas: Multiple benefits for Conservation and Use*, Earthscan, London.
- 24 Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-being: Synthesis*, Island Press, Washington, DC, USA.
- 25 *Ibid.*
- 26 Halpern, B.S. 2003. The impact of marine reserves: Do reserves work and does reserve size matter? *Ecological Applications* 13(1): 117-137.
- 27 Iriondo, J.M., Dulloo, E., and Maxted, N. (eds.) 2008. *Conserving Plant Genetic Diversity in Protected Areas: Population Management of Crop Wild Relatives*, CAB International Publishing, Wallingford.
- 28 McGowan, P.J.K., Mair, L., Symes, A., Westrip, J.R.S., Wheatley, H. ... Butchart, S.M. 2017. Tracking trends in the extinction risk of wild relatives of domesticated species to assess progress against global biodiversity targets. *Conservation Letters* e12588.
- 29 Hamilton, L.S., Juvik, J.O. and Scatena, F.N. 1994. *Tropical Montane Cloud Forests*, Ecological Studies Series Vol. 110, Springer-Verlag, New York, Berlin, London, Paris and Tokyo.
- 30 Pagiola, S., Bishop, J. and Landell-Mills, N. (eds.) 2002. *Selling Forest Environmental Services: Market-based mechanisms for conservation and development*, Earthscan, London, UK.
- 31 Dudley, N. and Stolton, S. (eds.) 2003. *Running Pure: The importance of forest protected areas to drinking water*, WWF International and the World Bank, Gland, Switzerland and Washington, DC.
- 32 Dudley, N. 2008. *The use of protected areas as tools to apply REDD carbon offset schemes – a discussion paper*. WWF, Gland, Switzerland.
- 33 Plowright, R.K., Parrish, C., McCallum, H., Hudson, P.J., Ko, A., Graham, A. and Lloyd-Smith, J. 2017. Pathways to zoonotic spillover. *Nature Reviews Microbiology* 15(8): 502-510. doi:10.1038/nrmicro.2017.45.
- 34 Buckley, R., Brough, P., Hague, L., Chauvenet, A., et al. (2019). Economic value of protected areas via visitor mental health. *Nature Communications* 10: 5005. Doi:10.1038/s41467-019-12631-6.
- 35 Cook, R., Karesh, W. and Osofsky S. 2004. *One world, one health: Building interdisciplinary bridges to health in a globalized world*. Wildlife Conservation Society, Bronx, New York, USA. [http://www.oneworldonehealth.org/sept2004/owoh\\_sept04.html](http://www.oneworldonehealth.org/sept2004/owoh_sept04.html)
- 36 FAO. 2019. *The State of the World's Biodiversity for Food and Agriculture*. Rome.
- 37 Balmford, A., Green, J.M.H., Anderson, M., Beresford, J., Huang, C., Naidoo, R., Walpole, M. and Manica, A. 2015. Walk on the wild side: Estimating the global magnitude of visits to protected areas, *PLoS Biology* 13(2): e1002074. doi.org/10.1371/journal.pbio.1002074

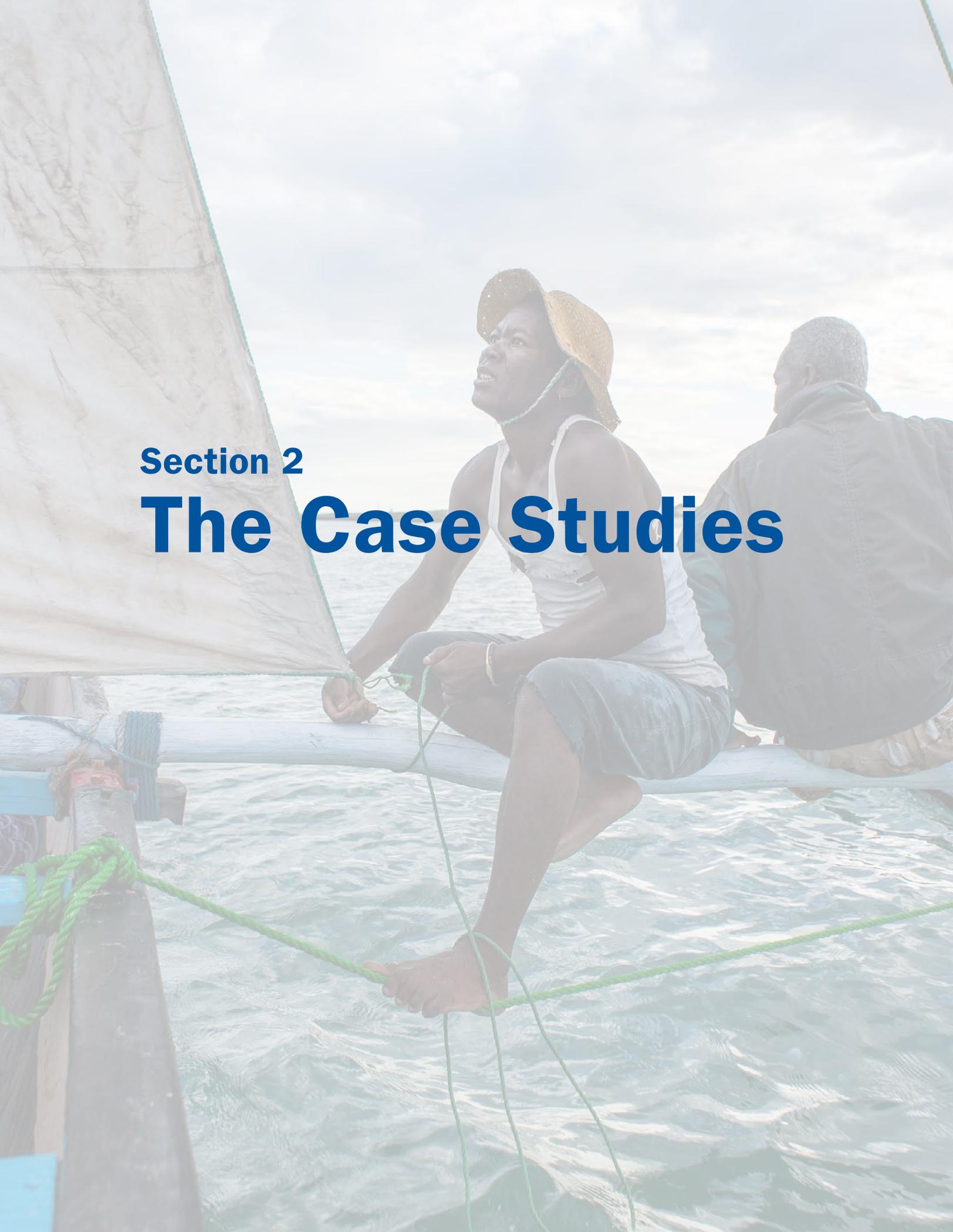
- 38 Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V.O., Paruelo, J., Raskin, R.G., Sutton, P. and van den Belt, M. 1997. The value of the world's ecosystem services and natural capital. *Nature* **387**: 253-260.
- 39 For example Kubiszewski, I., Costanza, R., Anderson, S. and Sutton, P. 2017. The future value of ecosystem services: Global scenarios and national implications. *Ecosystem Services* **26**: 289-301.
- 40 Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S.J., Kubiszewski, I., Farber, S. and Turner, R.K. 2014. Changes in the global value of ecosystem services. *Global Environmental Change* **26**: 152-158.
- 41 Buckley, R., Brough, P., Hague, L., Chauvenet, A., Fleming, C., Roche, E., Sofija, E. and Harris, N. 2019. Economic value of protected areas via visitor mental health. *Nature Communications* **10**: e5005
- 42 de Groot, R., Brandt, L., van der Ploeg, S., Costanza, R., Bernard, F., Braat, L., Christie, M., Crossman, N., Ghermandi, A., Hein, L., Hussain, S., Kumar, P., McVittie, A., Portela, R., Rodriguez, L.C., ten Brink, P. and van Buekering, P. 2012. Global estimates of the value of ecosystems and their services in monetary units. *Ecosystem Services* **1**: 50-61.
- 43 Costanza, R., de Groot, R., Braat, L., Kubiszewski, I., Fioramonti, L., Sutton, P., Farber, S. and Grasso, M. 2017. Twenty years of ecosystem services: How far have we come and how far do we still need to go? *Ecosystem Services* **28**: 1-16.
- 44 ten Brink, P. (ed.) 2011. *The Economics of Ecosystems and Biodiversity in National and International Policy Making*. TEEB and Earthscan, London.
- 45 <http://www.teebweb.org/about/the-initiative/> (accessed 7/6/2020).
- 46 Kettunen, M., Vihervaara, P., Kinnunen, S., D'Amato, D., Badura, T., Argimon, M. and ten Brink, P. 2013. *Socio-economic importance of ecosystem services in the Nordic Countries – Synthesis in the context of The Economics of Ecosystems and Biodiversity (TEEB)*. Nordic Council of Ministers, Copenhagen.
- 47 UFZ and WWF. 2020. *Natural Capital in international environmental cooperation: Concepts and applications*. Report by UFZ – Helmholtz Centre for Environmental Research, Leipzig; WWF Germany, Berlin.
- 48 See estimates for example in Balmford, A., Bruner, A., Cooper, P., Costanza, R., Farber, S., et al. 2002. Economic reasons for conserving biodiversity. *Science* **292**; Balmford, A., Gravestock, P., Hockley, N., McClean, C.J. and Roberts, C.M. 2004. The worldwide costs of marine protected areas. *Proceedings of the National Academy of Sciences* **101**(26): 9694-9697.
- 49 For instance the UK Government invested around £311 million in biodiversity conservation in 2017/18 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/829158/15\\_Funding\\_for\\_biodiversity\\_2019\\_rev.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/829158/15_Funding_for_biodiversity_2019_rev.pdf) and around £36 billion on defence <https://www.statista.com/statistics/283300/united-kingdom-uk-military-defense-spending-y-on-y/#:~:text=In%202019%20the%20United%20Kingdom,pounds%20between%202010%20and%202013>. Accessed 17<sup>th</sup> June 2020.
- 50 Costanza, R., d'Arge, R., de Groot, R. et al. 1997. The value of the world's ecosystem services and natural capital. *Nature* **387**, 253-260. <https://doi.org/10.1038/387253a0>
- 51 Neugarten, R.A., Langhammer, P.F., Osipova, E., Bagstad, K.J., Bhagabati, N., Butchart, S.H.M., Dudley, N., et al. 2018. *Tools for measuring, modelling, and valuing ecosystem services: Guidance for Key Biodiversity Areas, natural World Heritage Sites and protected areas*. IUCN, Gland, Switzerland.
- 52 Mulligan, M. 2015. Trading off agriculture with nature's other benefits, spatially. In: C.A. Zolin and R. de A.R. Rodrigues (eds.) *Impact of Climate Change on Water Resources in Agriculture*. CRC Press, Boca Raton, Florida.
- 53 Ivanić, K.-Z., Stolton, S., Figueroa Arango, C. and Dudley, N. 2020. *Protected Areas Benefit Assessment Tool plus (PA-BAT+): A tool to assess local stakeholder perceptions of the flow of benefits from protected areas and other natural sites*. IUCN, Gland, Switzerland.
- 54 Sharp, R., Tallis, H.T., Ricketts, T., Guerry, A.D., Wood, S.A. ... Douglass, J. 2018. *InVEST Version 3.4.4 User's Guide*. The Natural Capital Project, Stanford University, University of Minnesota, The Nature Conservancy, and World Wildlife Fund. Available at: [data.naturalcapitalproject.org/nightly-build/invest-users-guide/html/](https://data.naturalcapitalproject.org/nightly-build/invest-users-guide/html/)
- 55 Mandle, L. and Natural Capital Project. 2019. Database of publications using InVEST and other Natural Capital Project software. Stanford Digital Repository. Available at: <https://purl.stanford.edu/bb284rg5424>
- 56 Peh, K.S.-H., Balmford, A.P., Bradbury, R.B., Brown, C., Butchart, S.H.M., Hughes, F.M.R., MacDonald, M.A., Stattersfield, A.J., Thomas, D.H.L., Trevelyan, R.J., Walpole, M. and Merriman, J.C. 2017. *Toolkit for Ecosystem Service Site-based Assessment (TESSA)*. Version 2.0. Cambridge, UK.
- 57 Neugarten, R.A., Langhammer, P.F., Osipova, E., Bagstad, K.J., Bhagabati, N., Butchart, S.H.M., Dudley, N., et al. 2018. *Tools for measuring, modelling, and valuing ecosystem services: Guidance for Key Biodiversity Areas, natural World Heritage Sites and protected areas*. IUCN, Gland, Switzerland.
- 58 Turner, R.K., Georgiou, S. and Fisher, B. 2008. *Valuing Ecosystem Services: The case of multi-functional wetlands*. Earthscan, London.
- 59 Kettunen, M. and Ten Brink, P. (eds.) 2013. *Social and Economic Benefits of Protected Areas: An assessment guide*. Earthscan, London.
- 60 See for example: Adams, C., Seria da Motta, R., Arigoni Ortiz, R., Reid, J., Ebersbach Aznar, C. et al. 2008. The use of continent valuation for evaluating protected areas in the developing world: Economic valuation of Morro di Diabo State Park, Atlantic Rainforest, São Paulo State (Brazil). *Ecological Economics* **66**: 359-370; Subade, R.F. 2007. Mechanisms to capture economic values of marine biodiversity: The case of Tubbataha Reefs UNESCO World Heritage Site, Philippines. *Marine Policy* **31**: 135-142.
- 61 Waldron, A., Adams, V., Allan, J., Arnell, A., Asner, G. et al. 2020. *Protecting 30% of the planet for nature: Costs, benefits and economic implications*. Cambridge.
- 62 Claes, J., Conway, M., Hansen, T., Henderson, K., Hopman, D. et al. 2020. *Valuing Nature Conservation: A methodology for quantifying the benefits of protecting the planet's natural capital*. McKinsey and Company.
- 63 Mansourian, S. and Dudley, N. 2008. *Public Funds to Protected Areas*. WWF, Gland, Switzerland.
- 64 Hockings, M., Stolton, S., Leverington, F., Dudley, N. and Courrau, J. (2006). *Evaluating Effectiveness: A Framework for Assessing Management Effectiveness of Protected Areas*. 2<sup>nd</sup> Edition, IUCN, Gland, Switzerland.
- 65 Siltanen, J. 2018. Economic impact of Iceland's protected areas and nature-based tourism sites, Institute of Economic Studies University of Iceland.
- 66 <https://www.pc.gc.ca/en/agence-agency/bib-lib/plans/dp/dp2019-20/index> (accessed 3 October 2020).
- 67 <https://www.nps.gov/subjects/socialscience/vse.htm>
- 68 Cullinane T.C. and Koontz, L. 2020. *2019 national park visitor spending effects: Economic contributions to local communities, states, and the nation*. Natural Resource Report NPS/NRSS/EQD/NRR—2020/2110. National Park Service, Fort Collins, Colorado.
- 69 *Ibid.*
- 70 Spenceley, A., Schägner J.P., Engels, B., Engelbauer, M., Erkkonen, J., et al. (eds.) 2020. *Visitors count! Guidance*

- for protected areas on the economic analysis of visitation. UNESCO, BfN, Paris and Bonn.
- 71 <https://www.bfn.de/fileadmin/BfN/service/Dokumente/skripten/Skript431.pdf>
- 72 <https://www.profor.info/knowledge/economic-impact-protected-areas> (accessed 3 October 2020).
- 73 David Sheldrick Wildlife Trust. 2020. *Dead or Alive: Valuing an Elephant*. Leatherhead, UK.
- 74 Howe, C., Corbera, E., Vira, B., Brockington, D. and Adams, W. 2020. Distinct positions underpin ecosystem services for poverty alleviation. *Oryx* **54**(3), 375-382. doi:10.1017/S0030605318000261
- 75 Holden, E., Linnerud, K. and Banister, D. 2014. Sustainable Development: *Our Common Future* Revisited. *Global Environmental Change*, **26**, 130-139. <https://doi.org/10.1016/j.gloenvcha.2014.04.006>
- 76 Tran, T.C. 2020. A review of successes, challenges, and lessons from Indigenous protected and conserved areas. *Biological Conservation* **241**: 108271.
- 77 Dudley, N., Burlando, C., Cooney, R., Jones, S. and Kehaulani Watson, T. 2016. Draft principles for justice and equity in access to and distribution of benefits from ecosystem services in protected areas. In: Burlando, C., Te Pareake Mead, A., Marker Noshirwani, M., Seagle, C. and Kehaulani Watson, T. *From Solutions to Resolutions: A New Social Compact for Just and Effective Conservation of Biodiversity*, *Policy Matters* **20**: 41-54.
- 78 Spenceley, A., Schägner J.P., Engels, B., Engelbauer, M., Erkkonen, J., Job, H., Kajala, L., Majewski, L., Metzler, D., Mayer, M., Rylance, R., Scheder, N., Smith-Christensen, C., Beraldo Souza, T., Cullinane Thomas, C. and Woltering, W. (In press) *Visitors count! Guidance for protected areas on the economic analysis of visitation*. UNESCO, BfN, EU JRC.
- 79 GTZ. 2007. *Value links manual: The methodology of value chain promotion*. Eschborn, Germany.
- 80 Spenceley, A., Habyalimana, S., Tusabe, R. and Mariza, D. 2010. Benefits to the poor from gorilla tourism in Rwanda. *Development Southern Africa* **27** (5): 647-678.
- 81 Spenceley, A. and Meyer, D. 2016. Tourism and poverty reduction: Principles and impacts in developing countries. In: Spenceley, A. and Meyer, D. (eds.) 2016. *Tourism and poverty reduction: Principles and impacts in developing countries*. Routledge, London and New York, pp. 1-23.
- 82 Ashley, C., Mitchell, J. and Spenceley, A. 2009. *Tourism-led poverty reduction program: Opportunity study guidelines*. International Trade Centre. [http://www.intracen.org/uploadedFiles/intracenorg/Content/Exporters/Sectoral\\_Information/Service\\_Exports/Tourism/Opportunity%20Studies%20Guidelines%20TPRP.pdf](http://www.intracen.org/uploadedFiles/intracenorg/Content/Exporters/Sectoral_Information/Service_Exports/Tourism/Opportunity%20Studies%20Guidelines%20TPRP.pdf)
- 83 Dudley, N. (ed.) 2008. *Guidelines for Applying Protected Area Management Categories*. IUCN, Gland, Switzerland.
- 84 IUCN-WCPA Task Force on OECMs. 2019. *Recognising and reporting other effective area-based conservation measures*. IUCN, Gland, Switzerland.
- 85 Makhado, R., Potgieter, M., Timberlake, J. and Gumbo, D. 2014. A review of the significance of mopane products to rural people's livelihoods in southern Africa. *Transactions of the Royal Society of South Africa* **69**(2): 117-122. DOI: 10.1080/0035919X.2014.922512.
- 86 Gondo, T., Frost, P., Kozanayi, W., Stack, J. and Mushongahande, M. 2010. Linking knowledge and practice: Assessing options for sustainable use of mopane worms (*Imbrasia belina*) in southern Zimbabwe. *Journal of Sustainable Development in Africa* **12**(1): 281-305.
- 87 Dudley, N., Burlando, C., Cooney, R., Jones, S. and Kehaulani Watson, T. 2016. Draft principles for justice and equity in access to and distribution of benefits from ecosystem services in protected areas. In: Burlando, C., Te Pareake Mead, A., Marker Noshirwani, M., Seagle, C. and Kehaulani Watson, T. 2016. *From Solutions to Resolutions: A New Social Compact for Just and Effective Conservation of Biodiversity Policy Matters* **20**: 41-54.
- 88 Andam, K.S., Ferraro, P.J., Sims, K.R.E., Healy, A. and Holland, M.B. 2010. Protected areas reduced poverty in Costa Rica and Thailand. *Proceedings of the National Academy of Sciences* **107**: 9996-10001.
- 89 Corbera, E., Kosoy, N. and Martínez Tuna, M. 2007. Equity Implications of Marketing Ecosystem Services in Protected Areas and Rural Communities: Case Studies from Meso-America. *Global Environmental Change* **17**: (3-4): 365-380. doi:10.1016/j.gloenvcha.2006.12.005
- 90 <https://www.protectedplanet.net/> (accessed 2/6/2020).
- 91 Dudley, N. (ed.) 2008. *Guidelines for Applying Protected Area Management Categories*. Gland, Switzerland: IUCN.
- 92 *Ibid.*
- 93 Kothari, A., Cooney, R., Hunter, D., MacKinnon, K., Muller, E., Nelson, F., Oli, K.P., Pandey, S., Rasheed, T. and Vavrova, L. 2015. Managing resource use and development, in G.L. Worboys, M. Lockwood, A. Kothari, S. Feary and I. Pulsford (eds) *Protected Area Governance and Management*, pp. 789-822, ANU Press, Canberra.
- 94 Mukul, S.A., Rashid, A.Z.M.M., Uddin, M.B. and Khan, N.A. 2016 Role of non-timber forest products in sustaining forest-based livelihoods and rural households' resilience capacity in and around protected area: A Bangladesh study, *Journal of Environmental Planning and Management* **59**: 4, 628 642, DOI:10.1080/09640568.2015.1035774
- 95 Mavah, G.A., Funk, S.M., Child, B., Swisher, M.E., Nasi, R. and Fa, J.E. 2018. Food and livelihoods in park-adjacent communities: The case of the Odzala Kokoua National Park, *Biological Conservation* **222**, 44-51, <https://doi.org/10.1016/j.biocon.2018.03.036>.
- 96 Redford, K.H. 1992. The empty forest. *BioScience* **42** (6): 412-422.
- 97 Dudley, N., Ali, N., Kettunen, M. and MacKinnon, K. 2017. Protected areas and the Sustainable Development Goals. *PARKS* **23** (2): 9-12.
- 98 *Ibid.*
- 99 Lester, S., Halpern, B., Grorud-Colvert, K., Lubchenco, J., Ruttenger, B.I., Gaines, S.F., Airamé, S. and Warner R.R. 2009. Biological effects within no-take marine reserves: A global synthesis. *Marine Ecology Progress Series* **384**: 33-46.
- 100 Lynham, J., Nikolaev, A., Raynor, J., Vilela, T. and Villaseñor-Derbez, J.C. 2020. Impact of two of the world's largest protected areas on longline fishery catch rates. *Nature Communication* **11**: 979. <https://doi.org/10.1038/s41467-020-14588-3>
- 101 Côté, I.M., Mosquera, I. and Reynolds, J.D. 2001. Effects of marine reserves characteristics on the protection of fish populations: A meta-analysis. *Journal of Fish Biology* **59**: 178-189.
- 102 Guidetti, P. and Sala, E. 2007. Community-wide effects of marine reserves in the Mediterranean Sea. *Marine Ecology Progress Series* **335**: 43-56.
- 103 Sala, E. and Giakoumi, S. 2018. No-take marine reserves are the most effective protected areas in the ocean. ICES (Int. Counc. Explor. Sea) *Journal of Marine Science* **75** (3): 1166-1168.
- 104 Mitchell, B.A., Stolton, S., Bezaury-Creel, J., Bingham, H.C., Cumming, T.L., Dudley, N., Fitzsimons, J.A., Malleret-King, D., Redford, K.H. and Solano, P. 2018. Guidelines for privately protected areas. Best Practice Protected Area Guidelines Series No. 29. Gland, Switzerland: IUCN.
- 105 Henion, L.A. 2019. Cherokee Indians can now Harvest Sochan within a National Park. *Smithsonian Magazine*. October 2019.
- 106 Kothari, A., Cooney, R., Hunter, D., MacKinnon, K., Muller, E., Nelson, F., Oli, K.P., Pandey, S., Rasheed, T. and Vavrova, L. 2015. Managing resource use and development, in G.L.

- Worboys, M. Lockwood, A. Kothari, S. Feary and I. Pulsford (eds) *Protected Area Governance and Management*, pp. 789-822, Canberra, Australia: ANU Press.
- 107 Mills, M., Bode, M., Mascia, M.B., Weeks, R., Gelcich, S., Dudley, N., Govan, H., Archibald, C.L., Romero-de-Diego, C., Holden, M., Biggs, D., Glew, L., Naidoo, R. and Possingham, H.P. 2019. How conservation initiatives go to scale. *Nature Sustainability* 2: 935-940.
- 108 De Groot, R., Brander, L., van der Ploeg, S., Costanza, R., Bernard, F., van Beukering, P. 2012. Global estimates of the values of ecosystems and their services in monetary units. *Ecosystem Services* 1: 50-61.
- 109 Watson, P. Wilson, J., Thilmany, D. and Winter, S. 2007. Determining economic contributions and impacts: What is the difference and why do we care? *The Journal of Regional Analysis and Policy* 27 (2): 1-15.
- 110 Díaz, S. et al. 2015. The IPBES Conceptual Framework – connecting nature and people. *Current Opinion in Environmental Sustainability* 14 (1): 1-16. <https://doi.org/10.1016/j.cosust.2014.11.002>
- 111 Reyers, B. et al. 2013. Getting the measure of ecosystem services: A social-ecological approach. *Frontiers in Ecology and the Environment* 11 (5): 268-273.
- 112 Spangenberg, J.H. et al. 2014. Provision of ecosystem services is determined by human agency, not ecosystem functions. Four case studies. *International Journal of Biodiversity Science, Ecosystem Services & Management* 10 (1): pp. 40-53.
- 113 <https://www.safaribookings.com/blog/coronavirus-outbreak>
- 114 <https://www.basecampexplorer.com/foundation/emergency-appeal/>
- 115 Pers. comm. Candice Stevens, Wilderness Foundation Africa, South Africa.
- 116 <https://www.thelionssharefund.com/content/thelionssharefund/en/home/news/COVID-19-response-call-for-proposals/>
- 117 Spencely, A. (in prep.) COVID-19 and protected area tourism: A spotlight on impacts and options in Africa. Report to EU DEVCO. Eurata Consortium.
- 118 Roe, D. 2010. *Linking Biodiversity Conservation and Poverty Alleviation: A State of Knowledge Review*. CBD Technical Series No: 55, Montréal, Canada: CBD.
- 119 Dudley, N., Mansourian, S., Stolton, S. and Suksuwan, S. 2010. Do protected areas contribute to poverty reduction? *Biodiversity* 11: 5-7.
- 120 <https://www.officialdata.org/>
- 121 Roberts, C.M. and Hawkins, J.P. 2000. *Fully-protected marine reserves: A guide*, WWF Endangered Seas Campaign, Washington, DC, USA and Environment Department, University of York, UK.
- 122 Carvalho, W.D. et al. 2019. Deforestation control in the Brazilian Amazon: A conservation struggle being lost as agreements and regulations are subverted and bypassed. *Perspectives in Ecology and Conservation* 17(3): 122-130.
- 123 McCauley, D. 2019. Here are 5 of the biggest threats to our oceans and how we can solve them. World Economic Forum. <https://www.weforum.org/agenda/2018/06/5-ways-we-can-improve-ocean-health/> (accessed 18 October 2020).
- 124 Hoegh-Guldberg, O. et al. 2015. *Reviving the Ocean Economy: The case for action – 2015*. WWF International, Gland and Geneva, Switzerland.
- 125 Brander, L.M., van Beukering, P., Nijsten, L., McVittie, A., Balcomb, C. et al. 2020. The global costs and benefits of expanding Marine Protected Areas. *Marine Policy* 116: 103953.
- 126 Pullin, A.S., Bangpan, M., Dalrymple, S., Dickson, K., Haddaway, N.R., Healey, J.R. et al. 2013. Human well-being impacts of terrestrial protected areas. *Environmental Evidence* 2: 19. <https://doi.org/10.1186/2047-2382-2-19>
- 127 Casson, S.A., Martin V.G., Watson, A., Stringer, A., Kormos, C.F. (eds.). 2016. *Wilderness Protected Areas: Management guidelines for IUCN Category 1b protected areas*. IUCN, Gland, Switzerland.
- 128 Dudley, N. Buyck, C., Furuta, N., Pedrot, C., Bernard, F. and Sudmeier-Rieux, K. 2015. *Protected Areas as Tools for Disaster Risk Reduction: A handbook for practitioners*. IUCN and the Ministry of Environment, Japan.
- 129 Leung, Y-F, Spenceley, A., Hvenegaard, G. and Buckley, R. (eds.) 2018. *Tourism and visitor management in protected areas: Guidelines for sustainability*. Best Practice Protected Area Guidelines Series No. 27, Gland, Switzerland: IUCN.
- 130 Das, D. and Hussain, I. 2016. Does ecotourism affect economic welfare? Evidence from Kaziranga National Park, India. *Journal of Ecotourism* 15 (3): 241-260.
- 131 Higham, J., Cohen, S.A., Cavaliere, C., Reis, A. and Finkler, W. 2015. Climate change, tourist air travel and radical emissions reduction. *Journal of Cleaner Production*. DOI: 10.1016/j.jclepro.2014.10.100.
- 132 Dalton, R. 2010. Reserves 'win-win' for fish and fishermen. *Nature* 463: 1007; Kerwath, S.E., Winker, H., Götz, A. and Attwood, C.G. 2013. Marine protected area improves yield without disadvantaging fishers. *Nature Communications* 4: doi: 10.1038/ncomms3347; Gofii, R., Adlerstein, S., Alvarez-Berastegui, D., Forcada, A., Reñones, O., Criquet, G., Polti, S., Cadiou, G., Valle, C., Lenfant, P., Bonhomme, P., Pérez-Ruzafa, A. Sánchez Lizaso, J.L., García-Charton, J.A., Bernard, G. Stelzenmüller, V. and Planes, S. 2008. Spillover from six western Mediterranean marine protected areas: Evidence from artisanal fisheries. *Marine Ecology Progress Series* 366: 159-174.
- 133 Di Franco, A., Calò, A., Pennetta, A., De Benedetto, G., Planes, S. and Guidetti, P. 2015. Dispersal of larval and juvenile seabream: Implications for Mediterranean marine protected areas. *Biological Conservation* 192: 361-368.
- 134 Giakoumi, S., Scianna, C., Plass-Johnson, J., Micheli, F., Grorud-Colvert, K., Thiriet, P., Claudet, J., Di Carlo, G., Di Franco, A., Gaines, S.D., Garcia-Charton, J.A., Lubchenco, J., Reimer, J., Sala, E. and Guidetti, P. 2017. Ecological effects of full and partial protection in the crowded Mediterranean Sea: A regional meta-analysis. *Nature Scientific Reports* 7: 8940.
- 135 Sciberras, M., Jenkins, S.R., Mant, R., Kaiser, M.J., Hawkins, S.J. and Pullin, A.S. 2015. Evaluating the relative conservation value of fully and partially protected marine areas. *Fish and Fisheries* 16: 58-77.
- 136 Dudley, N., Ali, N., Kettunen, M. and MacKinnon, K. 2017. *Protected areas and the Sustainable Development Goals*. *PARKS* 23 (2): 9-12
- 137 Thakadu, O.T. 2005. Success factors in community based natural resources management in northern Botswana: Lessons from practice. *Natural Resources Forum*. 29 (3): 199-212. doi:10.1111/j.1477-8947.2005.00130.x.
- 138 Roe, D., Booker, F., Day, M., Zhou, W., Allebone-Webb, S., Hill, N.A.O. et al. 2015. Are alternative livelihood projects effective at reducing local threats to specified elements of biodiversity and/or improving or maintaining the conservation status of those elements? *Environmental Evidence* 4: 22. <https://doi.org/10.1186/s13750-015-0048-1>.
- 139 Pailler, S., Naidoo, R., Burgess, N.D., Freeman, O.E. and Fisher, B. 2015. Impacts of Community-Based Natural Resource Management on Wealth, Food Security and Child Health in Tanzania. *PLoS ONE* 10 (7): e0133252. <https://doi.org/10.1371/journal.pone.0133252>
- 140 Roe, D. et al. 2015. Op cit.
- 141 Boshoven, J. 2018. *The Nature of Conservation Enterprises: A 20-year retrospective evaluation of the theory of change behind this widely used approach to biodiversity conservation*, Washington, USA: USAID.

- 142 Porras, I. and Steele, P. 2020. *Making the market work for nature: How biocredits can protect biodiversity and reduce poverty*. IIED Issue Paper. IIED, London, UK.
- 143 Western, D., Tyrrell, P., Brehony, P., Russell, S., Western, G. and Kamanga, J. 2020. Conservation from the inside-out: Winning space and a place for wildlife in working landscapes. *People and Nature* **00**: 1-13. <https://doi.org/10.1002/pan3.10077>
- 144 Ivanić, K.-Z., Stolton, S., Figueroa Arango, C.F. and Dudley, N. 2020. *Protected Areas Benefits Assessment Tool + (PA-BAT+): A tool to assess local stakeholder perceptions of the flow of benefits from protected areas*. Gland, Switzerland: IUCN.
- 145 Roe, D. 2010. *Linking Biodiversity Conservation and Poverty Alleviation: A State of Knowledge Review*. CBD Technical Series No: 55, Montréal, Canada: CBD.
- 146 Foale, S., Wini, L. and Fernandes, L. 2017. *The Arnavon Community Marine Conservation Area: A review of successes, challenges and lessons learned*. A report to the MAC BIO project. GLZ, IUCN, SPREP, Suva.
- 147 Fearnside, P.M. 1989. Extractive Reserves in Brazilian Amazonia: An opportunity to maintain tropical rain forest under sustainable use. *BioScience* **39**(6): 387-393.
- 148 Vadjunec, J.M., Valerio, C.A. and Ludewigs, T. 2009. Land-use/land-cover change among rubber tappers in the Chico Mendes Extractive Reserve, Acre, Brazil. *Journal of Land Use Science* **4**(4): 249-274. DOI: [10.1080/17474230903222499](https://doi.org/10.1080/17474230903222499)
- 149 AFP. 2014. Brazil has a latex love factory. Available at: <https://www.standardmedia.co.ke/article/2000142980> (accessed 24/3/2020).
- 150 Hofmeister, N. 2020. Conflict in the Chico Mendez Reserve threatens this pioneering Amazonian project. *Mongabay*. Available at: <https://news.mongabay.com/2020/01/conflict-in-the-chico-mendes-reserve-threaten-this-pioneering-amazonian-project/>
- 151 Pinto, D. 2020. In famed Chico Mendes reserve, Brazil nut harvesters fight to save the forest. *Mongabay*, 22 April 2020. <https://news.mongabay.com/2020/04/in-famed-chico-mendes-reserve-brazil-nut-harvesters-fight-to-save-the-forest/> (accessed 26 June 2020).
- 152 <https://www.redebrasilatual.com.br/ambiente/2019/11/se-nada-for-feito-reserva-extrativista-chico-mendes-vai-viar-pasto/> (accessed 26 June 2020).
- 153 Anon. 2019. Nha Trang sets up zone for cage aquaculture. *Viet Nam News*. September, 23/2019. <https://vietnamnews.vn/society/535774/nha-trang-sets-up-zone-for-cage-aquaculture.html>
- 154 Dung, L.D. 2009. Nha Trang Bay marine protected area, Vietnam: Initial trends in coral structure and some preliminary linkages between these trends and human activities (2002-2005). *Aquatic Ecosystem Health & Management* **12** (3): 249-257.
- 155 Thao, N.T.K. 2012. Opportunities and Challenges in Lobster Marine Aquaculture in Viet Nam: The Case of Nha Trang Bay. Master Thesis in Fisheries and Aquaculture Management and Economics FSK-3911. The Norwegian College of Fishery Science, University of Tromsø, Norway and Nha Trang University, Viet Nam.
- 156 Bui Thi Thu Hien et al. 2014. Vietnam Marine Protected Area Management Effectiveness Evaluation. IUCN, Gland, Switzerland.
- 157 Bojadzi, A., Brajanoska, R., Stefkov, G., Fotiadis, G., Shumka, S. and Avukatov, V. 2012. *Conservation Action Plan for Mountain tea in the Prespa Lakes Watershed* (Final Report). UNDP/GEF project "Integrated ecosystem management in the Prespa lakes basin".
- 158 Romanucci et al., 2017. Traditional uses, chemical composition and biological activities of *Sideritis raeseri*. *Journal of the Science of Food and Agriculture* **97** (2): 373-383.
- 159 CNVP. 2018. *CNVP Supporting Development of Mountain Tea in Prespa National Park*. CNVP website. Available at: <http://www.cnvp-eu.org/eng/new.php?mv=12&id=883>.
- 160 United Nations Development Programme. 2012. *Amani Nature Reserve, Tanzania. Equator Initiative Case Study Series*. New York.
- 161 Tanzania Forest Conservation Group Committee Minutes. 2019. 2 July 2019.
- 162 See for instance Mezher, T., El-Saouda, R., Nasrallah, W. and Al-Ajam, M. 2008. Entrepreneurship in Lebanon: A model of successes and failures. *International Journal of Arab Culture, Management and Sustainable Development* **1** (1); Nangoli, S., Turinawe, D.D., Kituyi, G.M., Kusemererwa, C. and Jaaza, M. 2013. Towards enhancing business survival and growth rates in LDCs: An exploratory study of the drivers of business failure amongst SMEs in Kampala, Uganda, *International Journal of Humanities and Social Science* **3** (8): 284-291; Zehrer, A. and Haslwanter, J. 2010. Management of Change in Tourism – The Problem of Family Internal Succession in Family Tourism SMEs. *Electronic Journal of Family Business Studies* **4** (2). <https://www.jyu.fi/jsbe/en/entrepreneurship/ejfb>
- 163 World Travel and Tourism Council. 2019. The economic impact of global wildlife tourism, August 2019. <https://travesiasdigital.com/wp-content/uploads/2019/08/The-Economic-Impact-of-Global-Wildlife-Tourism-Final-19.pdf>
- 164 Spencely, A. (in prep.) COVID-19 and protected area tourism: A spotlight on impacts and options in Africa. Report to EU DEVCO. Eurata Consortium.
- 165 Sylvén, M. and Martin, V.G. 2020. Nature-based Solutions: The concepts of "wilderness," "rewilding," and "Nature Needs Half" and their critical importance for Nature based Solutions. The WILD Foundation. [wild.org/wilderness-specialist-group](http://wild.org/wilderness-specialist-group)
- 166 Kothari, A., Cooney, R., Hunter, D., MacKinnon, K., Muller, E., Nelson, F., Oli, K.P., Pandey, S., Rasheed, T. and Vavrova, L. 2015. Managing resource use and development, in G.L. Worboys, M. Lockwood, A. Kothari, S. Feary and I. Pulsford (eds) *Protected Area Governance and Management*, pp. 789-822, ANU Press, Canberra, Australia.
- 167 Elliott, J. and Sumba, D. 2010. *Conservation enterprise: What works, where and for whom?* International Institute for Environment and Development, London, UK.
- 168 Boshoven, J. 2018. *The Nature of Conservation Enterprises: A 20-year retrospective evaluation of the theory of change behind this widely used approach to biodiversity conservation*. Washington, USA: USAID.
- 169 Baker, A. and Boshoven, J. 2017. *Building a conservation enterprise keys for success*, USAID, Washington, USA.
- 170 Durbin, J., King, D., Calderwood, N., Wells, Z. and Godoy, F. 2019. *Benefit Sharing at Scale: Good Practices for Results-Based Land Use Programs*, The World Bank, Washington, DC, USA.
- 171 Roe, D. 2010. *Linking Biodiversity Conservation and Poverty Alleviation: A State of Knowledge Review*. CBD Technical Series No: 55, CBD, Montréal, Canada.
- 172 Iyer, V., Mathias, K., Meyers, D., Victorine, R. and Walsh, M. 2018. *Finance Tools for Coral Reef Conservation: A Guide*, Wildlife Conservation Society, Washington DC, USA.
- 173 Dudley, N., Chatterton, P., Cramer, E., Cremonesi, A., Deau, R., Havemann, T., Hoffmann-Riem, H., Neupane, T., Safford, A., Scheuch, P., Shandilya, O., Skvaril, P., Stolton, S. and Varma, S. 2016. *Impact in the Forest: The Potential for Business Solutions to Combat Deforestation in Large Forest Landscapes in Asia*, WWF-Switzerland, Zürich.
- 174 UN Conference on Trade and Development. 2007. UCTAD BioTrade Initiative: BioTrade Principles and Criteria. United Nations, Geneva and New York.

- 175 Dudley, N., Burlando, C., Cooney, R., Jones, S. and Kehaulani Watson, T. 2016. Draft principles for justice and equity in access to and distribution of benefits from ecosystem services in protected areas. In: Burlando, C., Te Pareake Mead, A., Marker Noshirwani, M., Seagle, C. and Kehaulani Watson, T. *From Solutions to Resolutions: A New Social Compact for Just and Effective Conservation of Biodiversity Policy Matters* **20**: 41-54.
- 176 Ivanić, K.Z., Štefan, A., Porej D. and Stolton, S. 2017. Using a participatory assessment of ecosystem services in the Dinaric Arc of Europe to support protected area management. *PARKS* **23** (1).
- 177 Potts, J., Wenban-Smith, M., Turley, L. and Lynch, M. 2018. *State of Sustainability Initiatives 2018: Standards and the Extractive Economy*. IISD, Ottawa.
- 178 [https://wwf.panda.org/wwf\\_news/press\\_releases/?353432/Celebrated-partnership-for-mountain-gorillas-announces-conservation-international-as-new-coalition-member](https://wwf.panda.org/wwf_news/press_releases/?353432/Celebrated-partnership-for-mountain-gorillas-announces-conservation-international-as-new-coalition-member) (accessed 19 October 2020).
- 179 <https://wildlifefriendly.org/elephant-friendly-tea-standards/> (accessed 19 October 2020).
- 180 For example see: <https://population.un.org/Household/index.html#/countries/4> (accessed 28 June 2020).
- 181 <https://data.worldbank.org/indicator/NY.ADJ.NNTY.PC.CD> (accessed 28 June 2020).
- 182 <https://www.iucn.org/resources/conservation-tools/panorama> (accessed 28 June 2020).

A woman wearing a white tank top and a straw hat is sitting on the edge of a boat, looking out at the ocean. She is holding a green rope. Another person is visible behind her, wearing a dark jacket. The background shows a cloudy sky and the sea.

**Section 2**

# **The Case Studies**

## 2.1 Argentina: Península Valdés World Heritage Site

*Certified Wildlife Friendly® wool from Península Valdés is an attractive commodity internationally generating up to US\$288,000 annually, whilst reducing rates of conflict between ranchers and native predators and ungulates.*



Guanaco (*Lama guanicoe*) and sheep grazing on Península Valdés © Ricardo Baldi, Cenpat-conicet

**Ecosystem service:** Livestock ranching

**Protected area:** Península Valdés Protected Area and World Heritage Site, Size: 4,000 km<sup>2</sup>, WDPA Code: 16889, IUCN management category: VI

**Adjusted net national income per capita (US\$):** 12,366

### Conservation value

Península Valdés (PV) is an arid temperate grassland and has a suite of grassland predators and prey including guanacos (*Lama guanicoe*), Darwin's rhea (*Rhea pennata*), puma (*Puma concolor*), pampas cat (*Leopardus colocolo*), Geoffroy's cat (*Leopardus geoffroyi*) and culpeo foxes (*Lycalopex culpaeus*). PV is also an important source of food for more than 20,000 birds and as a regular stopover for a critically endangered subspecies of red knot (*Calidris canutus rufa*).<sup>1</sup>

### Description

Ranchers in Patagonia have been sustained by the wool economy since their arrival at the end of the 19<sup>th</sup> century, but recent falls in wool prices combined with decreased productivity of the land due to pervasive overgrazing and severe droughts have damaged livelihoods.<sup>2,3</sup> Historically, ranchers have hunted wild predators and herbivores to reduce direct and indirect losses; research has shown an inverse relationship between guanacos and sheep densities with guanacos pushed into more marginalized habitats,<sup>4,5</sup> with loss of habitat connectivity being a particular problem.<sup>6</sup> These unsustainable practices were particularly problematic inside the popular PV Tourism Nature Reserve where management is successfully protecting coastal wildlife but most of the steppe is privately owned by ranchers.<sup>7</sup>

To combat these threats, a group of six ranchers operating inside the reserve formed the Merino de Península Valdés group to commit to achieving a coexistence between sheep farming and wildlife.<sup>8</sup> Their sustainable grazing management plan decreased the herd stocking rate and permitted only the non-lethal control of predators and guanacos (e.g. guardian dogs).<sup>9</sup> In 2016, their wool was Certified Wildlife Friendly®.<sup>10</sup> These ranches have an average of 2,000 sheep each (at the sustainable low stocking rate) and produce between 6,500-8,000 kg of fine merino wool per year. The raw wool is bought by one of two international companies and fetches between US\$5.50-6.00 per kg, generating US\$35,750 to US\$48,000 per ranch annually. The ranchers also invested in a small facility to process part of the wool separately to maintain traceability and reach markets willing to buy certified wool. Experimental batches of their top wool sold in Buenos Aires for US\$22.50 per kg which could produce an annual turnover of US\$180,000.<sup>11</sup>

### Tangible benefits

Income: Certified Wildlife Friendly® wool generates up to US\$48,000 per ranch per year, which could be increased to US\$180,000 per ranch if wool was refined locally through different market mechanisms.

### References

- 1 Baldi, R., Cheli, G., Udrizar Sauthier, D.E., Gatto, A., Pazos, G.E. and Javier Avila, L. 2017. Animal diversity, distribution and conservation. In: Bouza, P. and Bilmes, A. (eds.) *Late Cenozoic of Peninsula Valdés, Patagonia, Argentina*. Springer, pp. 263-303.
- 2 Merino de Península Valdés website: <http://merinopeninsula-valdes.com/eng/who-we-are/> (accessed 21/3/2020).
- 3 Chartier, M. and Rostagno, C. 2006. Soil erosion thresholds and alternative states in north-eastern Patagonian rangelands. *Rangeland Ecology & Management* **59**: 616-624.
- 4 Nabte, M., Marino, A.I., Rodríguez, M.V., Monjeau, A. and Saba, S.L. 2013. Range Management Affects Native Ungulate Populations in Peninsula Valdés, a World Natural Heritage. *PLoS One* **8** (2): 55655.
- 5 Baldi, R., Albon, S.D. and Elston, D.A. 2001. Guanacos and sheep: Evidence for continuing competition in arid Patagonia. *Oecologia* **129**: 561-570.
- 6 Antún, M. and Baldi, R. 2019. Choosing what is left: The spatial structure of a wild herbivore population within a live-stock dominated landscape. *PeerJ* **8**: e8945 DOI 10.7717/peerj.8945
- 7 Stein, J. 2020. Buenos Aires Based Brand ‘Cubreme’ Sources Wildlife Friendly™ Merino Wool For New Collection, Wildlife Friendly Enterprise Network website: <http://wildlifefriendly.org/buenos-aires-based-brand-cubreme-sources-wildlife-friendly-merino-wool-for-new-collection/> (3/4/20).
- 8 *Ibid.*
- 9 Baldi, R. 2020. Instituto Patagónico para el Estudio de los Ecosistemas Continentales (IPEEC), Centro Nacional Patagónico-CONICET (interviewed 21/3/2020).
- 10 WFEN and WCS-Argentina. 2016. Announce Availability of Traceable Certified Wool from Iconic Peninsula Valdés, Wildlife Friendly Enterprise Network website: <http://wildlife-friendly.org/fiberswithaconsciencepv/> (accessed 22/3/2020).
- 11 Baldi, R. 2020. *Op. cit.*

## 2.2 Australia: Warddeken Indigenous Protected Area

*Warddeken Indigenous Protected Area provides over 250 jobs to Indigenous Australians through employment in traditional fire and wildlife management and monitoring funded by US\$2.6 million in carbon credit sales.*

**Ecosystem service:** Carbon saving

**Protected area:** Warddeken Indigenous Protected Area (IPA), Size: 13,704.96 km<sup>2</sup>, WDPA ID: 555548231, IUCN management category: VI

**Adjusted net national income per capita (US\$):** 41,489

### Conservation value

Warddeken IPA covers almost three-quarters of the West Arnhem Plateau bioregion, one of Australia's biodiversity 'hot spots' and home to many unique and endemic plants, animals and ecosystems. In 'stone and gorge country', the area also contains very important cultural, rock art and archaeological sites.

### Description

Indigenous Protected Areas (IPAs) are areas of land and sea managed by indigenous groups as protected areas for biodiversity conservation through voluntary agreements with the Australian Government.<sup>1</sup> IPAs deliver positive environmental, cultural, social and economic benefits for indigenous peoples, their families, and indigenous communities.<sup>2</sup> IPAs contribute 44% (over 670,000 km<sup>2</sup>) towards Australia's National Reserve System<sup>3</sup> and together with the Australian Government's Indigenous Ranger Program, these programmes provide meaningful employment for almost 3,000 indigenous Australians in land and sea management.

The Warddeken IPA, registered under the ownership of the Nawarddeken people in 2009 and managed by the indigenous owned Warddeken Land Management Ltd (WLML), suffers from low employment along with many other IPAs in Australia's Northern Territory. WLML has addressed this in a number of ways. Indigenous Rangers, funded by the Indigenous Advancement Strategy, manage fire risks, invasive feral plants and

animals, and monitor threatened species. Between 2009 and 2015, WLML generated an income of around US\$2.6 million from the sale of carbon offsets from traditional fire management. During the same period, the IPA increased its staff from 50 to 131 (22 of which were permanent) – in 2015, the IPA employed staff for a total of 4,208 days of employment. In total, between 2009 and 2015 the IPA employed, both full time and part time, 253 indigenous peoples (47% were women) paying some US\$2.3 million in gross salaries.<sup>4</sup>

An added benefit is that IPA staff become role-models in the community, playing an important role in generating social cohesion and increasing collective esteem. Moreover, studies indicate indigenous Australians working 'on country' (i.e. in nature through programmes like the IAS) have improved mental and physical health, and often reduced risks of diabetes and kidney disease and lower blood pressure.<sup>5</sup>

### Tangible benefits

**Income and jobs:** During the period of 2009 to 2015, the IPA employed a total of 253 indigenous Australians thanks to around US\$2.6 million generated from the sale of carbon credits.

### References

- 1 Indigenous Protected Areas. Australian Government, Department of Agriculture, Water and the Environment website. Available at <https://www.environment.gov.au/land/indigenous-protected-areas> (accessed 4/4/2020).
- 2 Farr, M., Stoeckl, N., Esparon, M., Grainger, D. and Larson, S. (2016). *Economic values and Indigenous protected areas across Northern Australia*. James Cook University, Townsville.
- 3 Jarvis, D., Stoeckl, N., Hill, R. and Pert, P. 2018. *Indigenous land and sea management programs: Can they promote regional development and help "close the (income) gap"?* Australian Social Policy Association.
- 4 Social Ventures Australia report. 2016. *Social Return on Investment analysis of the Warddeken Indigenous Protected Area and associated Indigenous ranger programme*. Department of the Prime Minister and Cabinet. Available at: <https://www.niaa.gov.au/sites/default/files/publications/Warddeken%20SROI.pdf>
- 5 Farr, M. et al. *Op. cit.*

## 2.3 Australia: Fish River Station

*Fish River is managing wildfires, enabling indigenous connection to country and re-establishing traditional fire management regimes whilst bringing in over US\$160,000 annually through avoided CO<sub>2</sub> release and sale of carbon credits.*



Controlled burning at Fish River Station, Australia © Paul Jenkins, Indigenous Land and Sea Corporation

**Ecosystem service:** Carbon saving

**Protected area:** Fish River Station, Size: 1,780.53 km<sup>2</sup>, WDPA ID: 555577079, IUCN management category: II

**Adjusted net national income per capita (US\$):** 41,489

### Conservation value

Fish River Station, located on the Daly river in the Northern Territory of Australia, contains a mosaic of savannah, sandstone ranges, monsoon forest wetlands including those of Fish river and other tributaries that feed into the Daly river. The property was purchased in 2010 by the Indigenous Land and Sea Corporation (ILSC). The Daly river's wetlands are a stronghold for the pig-nosed turtle (*Carettochelys insculpta*) and are nationally significant for another seven freshwater turtle species. The property also protects a huge diversity of fish and some 255 animal species, including such threatened species as the northern quoll (*Dasyurus hallucatus*), the Gouldian finch

(*Erythrura gouldiae*), the northern masked owl (*Tyto novaehollandiae kimberli*) and the partridge pigeon (*Geophaps smithii*).

### Description

Historically, Australia's indigenous peoples conducted skilled fire management regimes over large parts of northern Australia's tropical savannah landscape, but the arrival of Europeans interrupted these practices and removed indigenous peoples from their ancestral lands in many areas.

The Fish River Fire Project in the Northern Territory sought to improve fire management and reinstate indigenous peoples as rightful landowners and environmental stewards – it was also the first early dry season savannah burning project to be declared under the Australian Government's Carbon Farming Initiative and one of the first to have sold carbon credits. The Initiative pays the project carbon credits for carbon abatement

through controlled mosaic burning in the early dry season. This method, based in traditional knowledge and Western science, has been proven to reduce uncontrolled fires in the late dry season, thereby avoiding greater emissions of methane and nitrous oxide. Before the project started, 75% of Fish River Station would burn annually, the abatement is the difference between those emissions and the total emissions over the project year – and works out at an average of 12,260 credits (or 12,260 t CO<sub>2</sub>e avoided release).<sup>1</sup>

### **Tangible benefits**

Income: The second tranche of credits was sold to Caltex Australia in 2014 for over US\$13/t, generating over US\$160,000 per year towards the management of Fish River Station by the ILSC.<sup>2,3</sup> The sale of carbon credits since then has generated roughly the same amount each year.<sup>4,5</sup>

### **References**

- 1 Walton, N. and Fitzsimons, J. 2015. Payment for ecosystem services in practice – savanna burning and carbon abatement at Fish River, northern Australia. In: *Valuing Nature: Protected Areas and Ecosystem Services* (eds Figgis, P., Mackey, B., Fitzsimons, J., Irving, J., Clarke, P.), pp. 78-83. Australian Committee for IUCN, Sydney.
- 2 *Ibid.*
- 3 Roberts, E. and Keough, P. 2014. *Indigenous Land Corporation Annual Report 2013-2014*. Indigenous Land Corporation. Available at: <https://www.ilsc.gov.au/wp-content/uploads/2019/09/ILC-Annual-Report-2013-2014-Full-Document.pdf>
- 4 Indigenous Land Corporation. 2016. *Indigenous Land Corporation Annual Report 2015-2016*. Available at: <https://www.ilsc.gov.au/wp-content/uploads/2019/09/17461-ILC-2016-AR-full-draft-11-final-low-res.pdf>
- 5 Pers. comm. with Paul Jenkins, ILSC staff. 12/5/2020.

## 2.4 Australia: Djelk Indigenous Protected Area

*The collection, incubation and sale of wild crocodile hatchlings generates up to US\$45,000, of which over 65% is paid to Djelk's indigenous landowners in crocodile egg royalties.*



*Crocodile egg collection in Djelk Indigenous Protected Area, Australia © Alex Earl, BAC*

**Ecosystem service:** Crocodile eggs and hatchlings

**Protected area:** Djelk Indigenous Protected Area, Size: 6,718.62 km<sup>2</sup>, WDPA ID: 555548780, IUCN management category: VI

**Adjusted net national income per capita (US\$):** 41,489

### Conservation value

Djelk Indigenous Protected Area (IPA), managed by the Bawinanga Rangers, covers coastline, rivers, floodplains, rainforest and savannah and extends to the rocky escarpments of the Arnhem Land Plateau, in the Northern Territory. The dominant vegetation type is eucalypt woodland and open forest, interspersed with floodplain swamps, coastal vine thickets, monsoon rainforests and, in the southern reaches of the IPA, by sandstone heathlands, which is considered a threatened ecological community. The IPA

protects at least 13 threatened plant and animal species and around 43 plant species endemic to the Northern Territory.

### Description

Saltwater crocodiles (*Crocodylus porosus*) are culturally significant to the indigenous peoples of Djelk IPA and Arnhem Land more broadly,<sup>1</sup> an area encompassing 102 clan estates.<sup>2</sup> Despite access to vast natural resources, these communities are characterized by economic marginalization and low participation in the market economy.<sup>3</sup> To combat this, in 1991, the Bawinanga Aboriginal Corporation (BAC) established a commercial operation as part of its Rangers programme to harvest, incubate and sell saltwater crocodile eggs collected from wild crocodile populations along the Liverpool, Tomkinson, Cadell and Blyth river systems. During the wet season, from

November to May, crocodiles lay an average of 50 eggs per female.<sup>4</sup> BAC is issued a permit to collect a maximum of 3,000 eggs per season<sup>5</sup> by the Parks and Wildlife Commission of the Northern Territory to ensure sustainability under their crocodile management plan.<sup>6</sup>

During an average wet season, BAC carefully collects around 2,000 viable eggs, these are then incubated, monitored and eventually transported to specialized farms when they come close to hatching. The harvest is conducted by the Bawinanga Rangers who look after the Djelk IPA. Several Darwin-based crocodile farms and a research facility have been purchasing fertile eggs or hatchlings. The revenue is put back into the land management programme and supports the employment of the Bawinanga Rangers. Up to US\$30,000 in royalties is paid each year to traditional landowners for using their land to collect eggs.<sup>7</sup>

### Tangible benefits

Income and jobs: BAC generates just under US\$45,000 annually, of which US\$30,000 is paid to indigenous landowners in royalties for the collection of crocodile eggs and much of the remainder is used to employ the ranger team.

### References

- 1 Zander, K.K., Austin, B.J. and Garnett, S.T. 2014. Indigenous Peoples' Interest in Wildlife-Based Enterprises in the Northern Territory, Australia. *Human Ecology* 42 (1): 115-126.
- 2 Concu, N. 2011. Developing an effective conservation and sustainable use economy: Two Arnhem Land case studies. Charles Darwin University, Darwin. Available at: [https://www.nespnorthern.edu.au/wp-content/uploads/2016/02/TRaCK\\_6.3\\_Final\\_Report.pdf](https://www.nespnorthern.edu.au/wp-content/uploads/2016/02/TRaCK_6.3_Final_Report.pdf) (Accessed 10/06/20).
- 3 Fordham, A., Fogarty, W. and Fordham, D. 2010. *The Viability of Wildlife Enterprises in Remote Indigenous Communities of Australia: A Case Study*. Centre for Aboriginal Economic Policy Research. The Australian National University. Canberra ACT 0200.
- 4 Austin, B.J. and Corey, B. 2012. Factors contributing to the longevity of the commercial use of crocodiles by Indigenous people in remote Northern Australia: A case study. *The Rangeland Journal*. 34 (3): 239-248, <https://doi.org/10.1071/RJ11082>
- 5 Pers. comm. with Ingrid Stonhill and Alex Earl, Bawinanga Aboriginal Corporation staff. 09.06.20.
- 6 Commercial Services. Djelk Rangers website. Available at: <https://www.bawinanga.com/what-we-do/bawinanga-rangers/what-we-do/> (Accessed 10/06/20).
- 7 Ingrid Stonhill and Alex Earl. *Op. cit.*

## 2.5 Bangladesh: Lawachara National Park

*The indigenous Khasia people generate US\$95,000 annually from the sale of forest-friendly betel leaf and nut using traditional practice of forest-based farming within the national park.*

**Ecosystem service:** Non-timber forest products

**Protected area:** Lawachara National Park,  
Size: 12.50 km<sup>2</sup>, WDPA ID: 142993, IUCN  
management category: II

**Adjusted net national income per capita (US\$):** 1,484

### Conservation value

The semi-evergreen and mixed deciduous forests of Lawachara National Park support 266 species of birds and 50 mammal species including a population of about 60 critically endangered western hoolock gibbons (*Hoolock hoolock*).

### Description

Lawachara National Park (LNP), in north-east Bangladesh, is named after one of the two villages (or *punji*) inside its boundaries; both ancestral dwellings of the Khasia indigenous group, a Bangladeshi ethnic minority.<sup>1</sup> These are two of 30 punjis surrounding LNP that have been co-managing and protecting the park with the Bangladesh Forest Department since 2005 through a USAID conservation initiative entitled ‘Nishorgo’ meaning idyllic nature.<sup>2</sup> The Khasia depend on LNP’s forest for a number of different NTFPs, including bamboo, cane, fuelwood, mushrooms, wild vegetables (such as bamboo shoots, taro, etc.) wild fruits (such as chapalish, kau, jackfruit, cane fruits, bananas, dewa, etc.) and medicinal plants.<sup>3</sup>

The Khasia are also highly dependent on LNP for their traditional practice of forest-based farming of betel leaves (*Piper betle*), which they have been growing since 1952.<sup>4</sup> Betel leaves are very popular with people of South and South-East Asia and their descendants around the world, creating a high market demand and value. The leaf is usually chewed, for its medicinal qualities, as ‘*pann*’ with slices of betel nut and lime.

The betel leaf vine requires trees for support and as such the Khasia never fell trees in their allocated area of the park, but instead prune branches for fuelwood and lumber. Cultivation uses traditional conservation-friendly practices and research has found tree species richness and diversity and avian richness in betel agroforests were higher than, or similar to, secondary forests in the area.<sup>5</sup> On average, Khasia households earn US\$1,477 from betel sales each year – 71% of their annual income,<sup>6</sup> with one hectare of betel agroforestry generating around US\$950 annually.<sup>7</sup>

### Tangible benefits

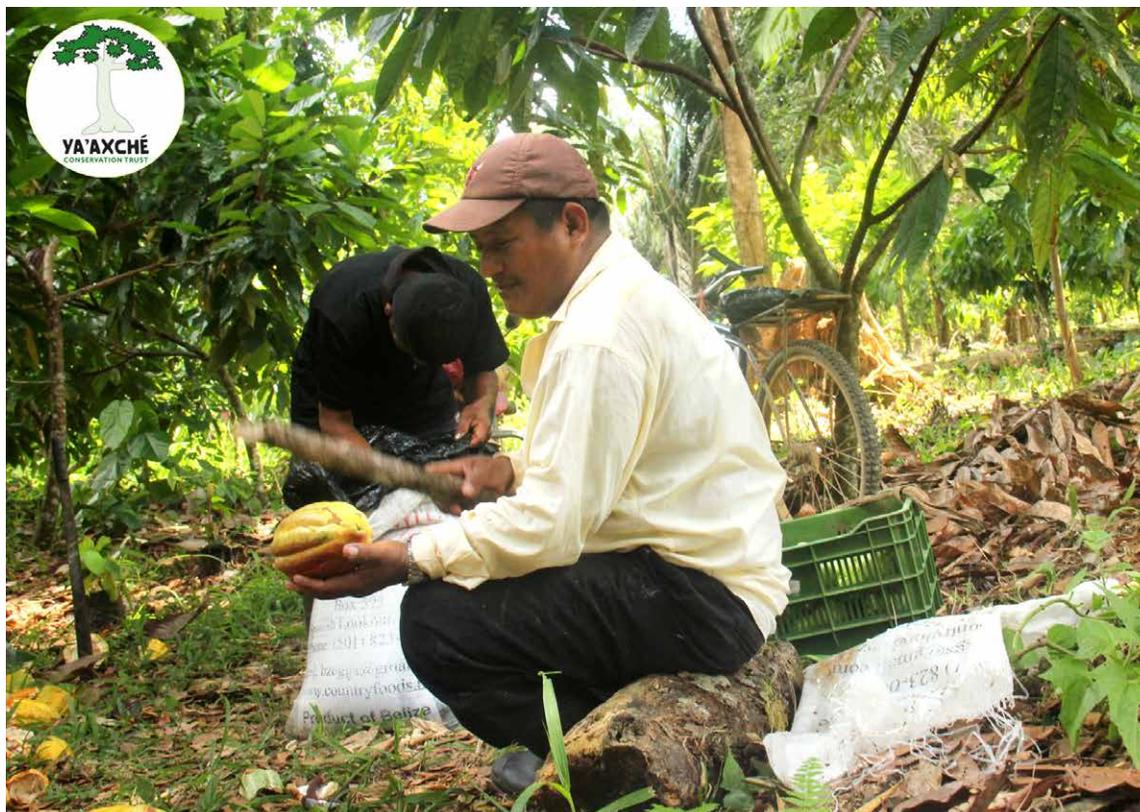
Income: the annual sale of betel leaves from agroforestry plantations generates US\$95,000 for the 102 households divided between the two forest villages inside LNP.

### References

- 1 USAID. 2006. *Management Plans for Lawachara National Park*. International Resources Group, Washington, DC. 20036.
- 2 Pers. comm. with Sumaiya Firoze, staff at USAID Bangladesh. 26/5/2020.
- 3 *Implications of livelihood dependence on NTFPs in Lawachara National Park*. 2009. Country Compass – Bangladesh. Non-wood News. No. 19. Food and Agriculture Organization of the United Nations (FAO).
- 4 Islam, J. and Nath, T.K. 2014. Forest-based betel leaf and betel nut farming of the Khasia indigenous people in Bangladesh: Approach to biodiversity conservation in Lawachara National Park (LNP). *Journal of Forestry Research* 25: 419-427.
- 5 Quazi, S.A. and Ticktin, T. 2016. Understanding drivers of forest diversity and structure in managed landscapes: Secondary forests, plantations, and agroforests in Bangladesh. *Forest Ecology and Management* 366: 118134.
- 6 Islam, J. and Nath, T.K. 2014. *Op. cit.*
- 7 Rahman, M., Rahman, M.M. and Islam, M. 2009. Financial viability and conservation role of betel leaf based agroforestry: An indigenous hill farming system of Khasia community in Bangladesh. *Journal of Forestry Research* 20: 131-136.

## 2.6 Belize: Maya Mountain North Forest Reserve

*Cacao-based agroforestry generates US\$9,500 for local farmers whilst providing habitat for jaguar, howler monkeys, tapir, ocelot and many more species in a small area within a national forest reserve.*



Cacao breaking, Maya Mountain North Forest Reserve, Belize © Maximiliano Caal, Ya'axche Conservation Trust

**Ecosystem service:** Cacao

**Protected area:** Maya Mountain North Forest Reserve, Size: 168.92 km<sup>2</sup>, WDPa ID: 28850, IUCN management category: VI

**Adjusted net national income per capita (US\$):** 3,793

### Conservation value

Maya Mountain North Forest Reserve provides habitat for threatened species such as the endangered Central American spider monkey (*Ateles geoffroyi*), Yucatan black howler monkey (*Alouatta pigra*) and Baird's tapir (*Tapirus bairdii*), as well as vulnerable white-lipped peccary (*Tayassu pecari*), and threatened species such as harpy eagles (*Harpia harpyja*), scarlet

macaws (*Ara macao*) and all five of Belize's wild cat species.

### Description

The indigenous Maya of Trio village have practised slash-and-burn agriculture for generations, but by the mid-2000s, the available community lands had degraded soils and few options for growing food crops or commodities,<sup>1</sup> with no new land available. A group of 31 local cacao farmers formed the Trio Farmers Cacao Growers (TFCG) in 2011. The farmers wished to establish legal access to a 3.8 km<sup>2</sup> plot in the Maya Mountain North Forest Reserve for cacao-based agroforestry, beekeeping and cultivation of annual crops.<sup>2,3</sup>

In 2015, with support from Ya'axché Conservation Trust (co-managers of the Forest Reserve), TFCG were given stewardship of the area as Belize's first agroforestry concession, under strict conditions for organic cultivation and sustainable harvesting, with no slash-and-burn.

Cacao-based agroforestry utilizes the shade of forest trees to grow cacao and other crops as part of an integrated climate-smart farming system.<sup>4</sup> The use of shade trees enhances the cocoa beans whilst protecting forest cover, connectivity, soils and biodiversity. The TFCG members are confident the concession will stimulate the local economy and lead to improved community development.<sup>5</sup> Field cameras in the concession area have confirmed the presence of jaguar, howler monkeys, tapir and many more species, demonstrating the biodiversity benefits of this farming practice. Cacao is a long-term investment requiring 4-5 years to produce an economically viable yield, but in 2019, the TFCG harvested over 5,350 kg of wet cacao beans, purchased direct from the farmers by 'Uncommon Cacao', the first international Transparent Trade<sup>6</sup> cacao trader.<sup>7</sup> In 2019, individual farmers harvested an average of 166 kg (366 pounds) of cacao a month within the concession area, with a value of US\$1,124 at the US\$3.07 per kg paid by Uncommon Cacao.<sup>8</sup>

## Tangible benefits

Income: cultivation and marketing of shade-grown cacao generates a revenue of US\$309 per farmer.

## References

- 1 IAF website. Available at: <https://archive.iaf.gov/resources/publications/annual-reports/2013/belize.html> (accessed 23/3/2020).
- 2 Beaton, M. 2019. Belize's First Agroforestry Concession for Conservation and Livelihoods. A Case Study Report. Ya'axché Conservation Trust. [https://yaaxche.org/wp-content/uploads/mmnfr\\_agroforestry\\_concession\\_case\\_study\\_yaaxche.pdf](https://yaaxche.org/wp-content/uploads/mmnfr_agroforestry_concession_case_study_yaaxche.pdf)
- 3 Mitchell, N., St. Clair, A., Brown, J., Berrett, B. and Rodriguez, A. 2018. *Forward Together: A Culture-Nature Journey Towards More Effective Conservation in a Changing World*. Proceedings of the 2018 US/ICOMOS Symposium. Available at: <http://openarchive.icomos.org/2306/1/Requena-et-al.-2019-US-ICOMOS-Proceedings.pdf>
- 4 2020. *Farmers Growing Cacao in a Forest Reserve*. Ya'axché Conservation Trust website. Available at: <https://yaaxche.org/news/farmers-growing-cacao-in-a-forest-reserve/> (accessed 23/3/2020).
- 5 Beaton, M. 2019. Belize's First Agroforestry Concession for Conservation and Livelihoods. A Case Study Report. Ya'axché Conservation Trust. [https://yaaxche.org/wp-content/uploads/mmnfr\\_agroforestry\\_concession\\_case\\_study\\_yaaxche.pdf](https://yaaxche.org/wp-content/uploads/mmnfr_agroforestry_concession_case_study_yaaxche.pdf)
- 6 <http://transparenttradecoffee.org/> (accessed 6/6/2020).
- 7 Uncommon Cacao. 2018. *2018 Transparency Report*. Available at: <https://indd.adobe.com/view/4afb053a-306c-4f52-8612-f77b23c7d466>
- 8 Pers. comm. with Zoe Jewell, Wildtracks, and Christina Garcia, Ya'axché Conservation Trust. 9/4/2020.

## 2.7 Bhutan: Wangchuck Centennial National Park

*The sustainable harvest of a valuable medicinal plant brings households almost US\$5,000 per year income whilst maintaining the area's ecological integrity.*



People collecting cordyceps, Wangchuck Centennial National Park © Tenzin Wangda, Department of Forests and Park Services, Bhutan

**Ecosystem service:** Medicinal plants

**Protected area:** Wangchuck Centennial National Park, Size: 4,921 km<sup>2</sup>, WDPA Code: 555576122, IUCN management category: II

**Adjusted net national income per capita (US\$):** 2,703

### Conservation value

Bhutan has a strong commitment to conservation. Wangchuck Centennial National Park (WCNP) is one of the best examples of the middle Himalayan ecosystems and contains several ecological biomes ranging from blue pine (*Pinus wallichiana*) forest to dry alpine area. It is the largest protected area in Bhutan and home to 43 recorded mammal species, 250 birds and nearly 700 plants.

### Description

*Ophiocordyceps sinensis*, also known as *Cordyceps sinensis*, is a fungus parasitic on a moth caterpillar, highly valued for its medicinal properties and only found above 4,200-5,200 metres in the high Himalayas.<sup>1</sup> Collection was legalized in Bhutan in 2004, under strict conditions, with harvests limited to local families and to certain times of year. Increasing wealth in China and growing popularity in the West has since led to a huge increase in value; in 2019 the total value of the national *Cordyceps* auction was about US\$2.8 million.<sup>2</sup> This has led to social changes; it has raised living standards among communities with access to *Cordyceps*,<sup>3</sup> but yak herding is declining as herders change to collecting.<sup>4</sup> Protected area staff and local communities collaborate in drawing up

management plans, managing the *Cordyceps* harvest and guarding against poaching, with protected area managers often being the ‘middle actors’ between collectors and outside agencies.<sup>5</sup> This has built support for conservation.<sup>6</sup> Managers focus on maintaining the trade at sustainable levels and ensuring profits remain within local communities. However, whether protected area managers have the capacity to manage in conditions of increasing pressure is uncertain; management takes a lot of time and some protected areas are considering a small tax to help defray costs.<sup>7</sup>

In 2019, auction values for *Cordyceps* from the Kazhi, Dangchu and Sephu villages, which fall within WCNP, were approximately US\$130,000, US\$1.3 million and US\$670,000 respectively; US\$2.1 million in total. Across Bhutan 3,294 permits were issued to cordyceps collectors.<sup>8</sup> The three villages in the park were home to 432 households (2,195 people) in 2012; meaning an average annual household income from *Cordyceps* of some US\$4,800.<sup>9</sup>

### Tangible benefits

Income: Local households (mostly living outside the park) can earn on average US\$4,800 from collecting *Cordyceps*.

### References

- 1 Cannon, P.F., Hywel-Jones, N.L., Maczey, N., Norbu, L., Tshitila, Samdup, T. and Lhendup, P. 2009. Steps towards sustainable harvest of *Ophiocordyceps sinensis* in Bhutan. *Biodiversity Conservation* DOI 10.1007/s10531-009-9587-5
- 2 MAF. 2019. *Cordyceps Auction Report 2019*, Department of Agricultural Marketing and Cooperatives (DAMC), Ministry of Agriculture and Forests (MoAF), Royal Government of Bhutan.
- 3 Wangchuk, P. and Tobgay, T. 2015. Contributions of medicinal plants to the Gross National Happiness and Biodiscovery in Bhutan. *Journal of Ethnobiology and Ethnomedicine* 11: 48. DOI 10.1186/s13002-015-0035-1
- 4 Wangchuk, K. and Wangdi, J. 2015. Mountain pastoralism in transition: Consequences of legalising *Cordyceps* collection on yak farming practices in Bhutan. *Pastoralism* DOI 10.1186/s13570-015-0025-x.
- 5 Steele, A.L. 2018. Investigating the global and local in Wangchuk Centennial National Park: A case for the Bhutanese conservation actors in-between. *Consilience: The Journal of Sustainable Development* 19 (1): 69-81.
- 6 Rinzin, C., Vermeulen, W.J.V., Wassen, M.J. and Glassbergen, P. 2009. Nature conservation and human wellbeing in Bhutan: An assessment of local community perceptions. *The Journal of Environment and Development* 18 (2): 177-202. DOI: 10.1177/1070496509334294
- 7 Ministry of Agriculture and Forests. 2016. *Bhutan State of Parks 2016*. Department of Forest and Park Services, Ministry of Agriculture and Forests, Royal Government of Bhutan, Thimphu.
- 8 Anon. 2019. *Cordyceps Collection Increases by 272 Grams*. Business Daily News, 17 September 2019, <https://www.businessbhutan.bt/2019/09/17/cordyceps-collection-increases-by-272-kg/>
- 9 Anon. 2019. *Conservation Management Plan: Wangchuk Centennial Park July 2012 – June 2017*, Department of Forest and Park Services, Ministry of Agriculture and Forests, Royal Government of Bhutan, Thimphu.

## 2.8 Bolivia: Manuripi National Wildlife Reserve

*Sale of Brazil nuts from Manuripi National Wildlife Reserve generates over US\$1.8 million for local communities, private individuals and reserve management.*

**Ecosystem service:** Non-timber forest products

**Protected area:** Manuripi National Wildlife Reserve, Size: 7,463.62 km<sup>2</sup>, WDPa ID: 35, IUCN management category: VI

**Adjusted net national income per capita (US\$):** 2,631

### Conservation value

Manuripi National Wildlife Reserve, in the Pando region, represents the best example of humid tropical Amazon forest biodiversity in Bolivia. The species count includes 150 mammals, over 500 birds, 83 amphibians, 77 reptiles, 112 fish and over 500 species of plants.

### Description

Despite the name, Bolivia is the largest exporter of the Brazil nut producing 56% of global exports,<sup>1</sup> generating US\$221 million annual turnover and employing over 20,000 people (over 18% of northern Bolivia's population).<sup>2,3</sup> The Brazil nut is the seed of *Bertholletia excelsa*, a rainforest tree that can grow to over 50 m tall and live for 400 years,<sup>4</sup> it is also the only globally traded seed harvested from the wild. Collected across the Amazon basin by forest harvesters,<sup>5</sup> it has been celebrated as a posterchild for conservation through sustainable use. This is in part due to its biology; *B. excelsa* cannot produce a seed without specialized pollinators. The trees require natural forest cover to produce nuts and are legally protected from felling; lone trees in illegally deforested areas become 'Brazil nut cemeteries' often dying early or failing to produce fruit.

Brazil nut harvesters inside Manuripi National Wildlife Reserve fall into two categories: ten communities living inside the reserve (approx. 600 families) plus 36 private individuals (Barracas) have rights to extract nuts from parcels of land and effectively function as businesses. Many processors buy nuts from this area including a government-owned company that has agreed to pay community harvesters 10% above market price – of

which the harvesters pay 2% for reserve management. The private individuals in Manuripi extract nuts from approx. 190,000 ha, provide 1,200 jobs and pay an additional fee of US\$0.70/ha to the management of the reserve. The intention is for the private individual and community profits to pay for 50% of reserve management costs (US\$150,000). In 2018, this generated roughly US\$1.7 million for all harvesters and a contribution of US\$140,000 to reserve management.<sup>6</sup>

The Bolivian National Service for Protected Areas (SERNAP) has traditionally relied on international support to cover the other 50% but due to recent withdrawals of cooperation, it has been necessary for SERNAP to use the past savings put aside from harvester fees to pay the total Manuripi management costs, thus harvesters have become a driving force in protected area sustainability.<sup>7</sup> WWF Bolivia has been working with SERNAP to improve labour and environmental standards and achieve organic and site of origin certification to access higher priced markets.

### Tangible benefits

**Income:** In 2018, the Manuripi harvesters generated over US\$1.84 million, of which, they took home US\$1.7 million and put US\$140,000 towards reserve management.

### References

- 1 The Observatory of Economic Complexity (OEC) website. 2020. Available at: <https://oec.world/en/profile/hs92/080120/> (accessed 24/4/2020).
- 2 The Bolivian Institute for Foreign Trade (IBCE). *Bolivia: Export of Brazil nuts*. CIFRAS Bulletin Edition No. 840. Banco Ganadero.
- 3 Charity, S., Dudley, N., Oliveira, D. and Stolton, S. (editors). 2016. *Living Amazon Report 2016: A regional approach to conservation in the Amazon*. WWF Living Amazon Initiative, Brasilia and Quito.
- 4 Evans, M. 2017. *Brazil nuts: Saviour seeds of the Amazon basin? Re-examining the region's cornerstone of conservation*. Forests News. CIFOR, Bogor, Indonesia.
- 5 Guariguata, M.R., Cronkleton, P., Duchelle, A.E. and Zuidema, P.A. 2017. *Revisiting the 'cornerstone of Amazonian conservation': A socioecological assessment of Brazil nut exploitation*. Biodiversity Conservation. Centre for International Forestry Research, Lima, Peru.
- 6 Pers. comm. with Jordi Surkin, Jose Argandoña and Victor García, WWF Bolivia staff members. 24/4/2020.
- 7 *Ibid.*

## 2.9 Brazil: Fernando De Noronha Mpa

*Fisheries generate US\$674,000 annually thanks to spillover from the MPA. Much of this is sold to local restaurants catering to the 70,000 tourists that visit the MPA each year, the rest constitutes an important source of protein for local families.*

**Ecosystem service:** Fisheries

**Protected area:** Fernando de Noronha MPA and World Heritage Site, Size: 109.33 km<sup>2</sup>, WDPA ID: 41087, IUCN management category: II

**Adjusted net national income per capita (US\$):** 8,397

### Conservation value

The Fernando de Noronha Archipelago and Rocas Atoll off the coast of mainland Brazil is made up of the visible parts of a range of submerged mountains in the Southern Atlantic. The area's rich waters are extremely important for the breeding and feeding of tuna, shark, turtle and other marine mammals. The islands are home to the largest concentration of tropical seabirds in the Western Atlantic.

### Description

Each year, 70,000 tourists visit the Fernando de Noronha archipelago, driving a demand for locally caught fish in restaurants and hotels.<sup>1</sup> Local small-scale fisheries, involving about 40 of the 5,000 residents of the Archipelago, meet over 80% of this demand, with more than half of this catch being traded without a middleman.<sup>2</sup> Profitable fishing grounds are found around the edges of no-take zones, indicating the benefits from MPA spillover. Artisanal fishers either practise *hook and line* fishing, pulling in an average of 3.75 kg/hour/fisher (Catch Per Unit Effort – CPUE) or *rod and reel* fishing, catching an average of 3.07 kg/hour/fisher. Annually, fisheries generate around US\$674,000. Fish caught also constitute a major source of protein for local families.<sup>3</sup>

The MPA is divided into two management categories: 70% is a no-take zone and 30% a sustainable use zone. Sardine has historically been used as a bait for pelagic fish fisheries in Fernando de Noronha, however sites inside the no-take zone

are the most viable due to local environmental conditions. Local small-scale fishers were thus allowed to continue to catch sardine inside the no-take MPA. However, in 2000, all conservation units in Brazil began being managed under a specific law that forbade resource extraction in areas classified as no-take zones. This has caused conflict around MPA zone management and regulations, specifically given the MPA was established on the trust that fishers could maintain their fishing traditions.<sup>4</sup>

Many younger fishers from the archipelago have thus begun to take advantage of tourism opportunities to diversify employment becoming full (9.1% of fishing boats) or part-time (27.3%) recreational fishing guides to supplement artisanal fishing income. Fishers can take their recreational catch for their own consumption or sell to local restaurants. Total revenue generated by tourism through recreational activities like fishing trips, scuba diving and entrance tickets to the MPA's no-take zones, amounts to US\$11.64 million per year.<sup>5</sup>

### Tangible benefits

Latest estimates in 2018 indicate fisheries generate US\$674,000 annually.

### References

- 1 Outeiro, L., Rodrigues, J.C., Damásio, L.M.A. and Lopes, P.F.M. 2019. Is it just about the money? A spatial-economic approach to assess ecosystem service tradeoffs in a marine protected area in Brazil. *Ecosystem Services*. **38**, <https://doi.org/10.1016/j.ecoser.2019.100959>
- 2 Lopes, P.F.M., Mendes, L., Fonseca d, V. and Villasante, S. 2017. Tourism as a driver of conflicts and changes in fisheries value chains in Marine Protected Areas. *Journal of Environmental Management* **200**, 123-134, <https://doi.org/10.1016/j.jenvman.2017.05.080>
- 3 Dominguez, P.S.A., Zeineddine, G.C., Rotundo, M.M., Barrella, W. and Ramires, M. 2018. Artisanal fishery off Fernando de Noronha Archipelago (PE). *Bulletin of the Fisheries Institute* **42** (1).
- 4 Lopes et al., *Op. cit.*
- 5 Outeiro et al., *Op. cit.*

## 2.10 Brazil: Reserva Particular Do Patrimônio Natural Reserva Ecológica De Guapiaçu

*The high number of threatened and endemic species attracts scientists, bird watchers and other tourists from all over the world to the reserve, spending on average nearly US\$150,000 annually.*



Researcher at Reserva Particular Do Patrimônio Natural Reserva Ecológica De Guapiaçu, Brazil © Guapiaçu Ecological Reserve (REGUA)

**Ecosystem service:** Research and educational tourism

**Protected area:** Reserva Particular Do Patrimônio Natural Reserva Ecológica De Guapiaçu, Size: 3.02 km<sup>2</sup>, WDPA ID: 555576459, IUCN management category: IV

**Adjusted net national income per capita (US\$):** 8,397

### Conservation value

The Reserva Ecológica de Guapiaçu (REGUA) is a privately protected patch of the Atlantic Forest in the upper Guapiaçu watershed and also the name of a small environmental organization in Rio de Janeiro whose mission is to ensure the long-term conservation of the forest and its biodiversity. Approximately 588 animal and

about 8,000 plant species are endemic to the Atlantic Forest,<sup>1</sup> of which many can be found in REGUA. Additionally, 89 of the plant and animal species that have been registered in REGUA are listed as ‘threatened’ on the IUCN Red List. The conservation of biodiversity and the restoration of degraded ecosystems enhance the flow of various ecosystem services, such as the regulation of air quality and climate, erosion control, carbon storage and sequestration as well as water purification, regulation and supply. Along with the Macacu and Guapimirim rivers, the Guapiaçu river supplies water to more than 2.5 million inhabitants of the municipalities Cachoeiras de Macacu, Guapimirim, Itaboraí, São Gonçalo and Niterói.<sup>2</sup>

## Description

Since the start of its operations in 2001, REGUA has managed to secure 72 km<sup>2</sup> of forest and develop partnerships with the managers of another 45 km<sup>2</sup>, effectively administrating about 25% of the Guapiaçu river catchment. By encouraging former hunters to become forest rangers and providing environmental education to local students, professors and rural workers, REGUA raises awareness among the local communities and ensures the long-term protection of the forest and its biodiversity from human influences. Additionally, REGUA has planted over half a million trees on more than 3 km<sup>2</sup>.

The high number of threatened and endemic species attracts scientists, bird watchers and other tourists from all over the world. Since 2010, REGUA has registered approximately 14,000 bed-nights at the tourist lodge and has received 1,402 researchers and 2,784 students attending 175 courses. For the purpose of enhancing knowledge on species distribution, behaviour and habitat requirements and facilitating monitoring and evaluation of its conservation and restoration activities, REGUA has established research cooperations with 14 universities worldwide, among others the UFRRJ and UFRJ in Rio de Janeiro. At its headquarters, REGUA provides housing and boarding possibilities for nearly 60 scientists and students for a fee of US\$10 per night and offers research and educational

facilities in the form of a seminar room and a laboratory. As of today, 67 research projects have been conducted at REGUA and 78 peer-reviewed papers have been published. The most recently published articles studied the isolation and characterization of trypanosomiasis in bats<sup>3</sup> and the molecular biology and conservation of amphibians in the Atlantic forest.<sup>4</sup>

## Tangible benefits

Between 2011 and 2019, tourists, volunteers and researchers spent on average US\$149,678 per year to study or enjoy the diversity of REGUA's plant and animal species, including expenses for board, accommodation, transport and guides.

## References

- 1 CEPF. 2020. Atlantic Forest – Species. Retrieved from Conservation International: <https://www.cepf.net/our-work/biodiversity-hotspots/atlantic-forest/species> (accessed 3/6/2020).
- 2 Dantas, J.R., Almeida, J.R. and Lins, G.A. 2008. *Impactos ambientais na bacia hidrográfica de Guapi/ Macacu e suas consequências para o abastecimento de água nos municípios do leste da Baía de Guanabara. Série Gestão e Planejamento Ambiental*, CETEM/MCT, Rio de Janeiro, Brazil.
- 3 Rangel, D.A., Lisboa, C.V., Novaes, R.L.M., Silva, B.A., Souza, R.d. F., Jansen, A.M. et al. 2019. Isolation and characterization of trypanosomatids, including *Crithidia mellificae*, in bats from the Atlantic Forest of Rio de Janeiro, Brazil. *PLoS Negl Trop Dis* 13(7): e0007527. <https://doi.org/10.1371/journal.pntd.0007527>
- 4 Amaral, C.R.L., Chaves, A.C.S., Borges Júnior, V.N.T., Pereira, F., Silva, B.M., Silva, D.A., et al. 2019. Amphibians on the hotspot: Molecular biology and conservation in the South American Atlantic Rainforest. *PLoS ONE* 14(10): e0224320. <https://doi.org/10.1371/journal.pone.0224320>

## 2.11 China: Sichuan Giant Panda Sanctuaries

*Giant panda sanctuaries in Sichuan province are increasing household income by US\$140 each year through providing employment opportunities as forest guides and rangers.*



*Giant Panda, China* © Shen You, Chengdu Bird Watching Society

**Ecosystem service:** Employment

**Protected areas:** Sichuan Giant Panda Sanctuaries, Size: 9,245 km<sup>2</sup>, WDPa ID: 902902, IUCN management category: N/A

**Adjusted net national income per capita (US\$):** 6,568

### Conservation value

The six giant panda reserves of the Qionglai panda landscape in Sichuan's mountains represent the largest and most significant habitat of the giant panda (*Ailuropoda melanoleuca*).<sup>1</sup> The sanctuaries are also home to snow leopard (*Panthera uncia*), clouded leopard (*Neofelis nebulosa*), red panda (*Ailurus fulgens*), takin (*Budorcas taxicolor*) and the golden snub-nosed monkey (*Rhinopithecus roxellana*) as well as 30% of the remaining wild giant pandas.<sup>2</sup>

### Description

China has a total of 67 panda nature reserves, including 46 reserves across three major panda landscapes in Sichuan (Minshan, Qionglai and Liangshan-Xiangling).<sup>3</sup> Each nature reserve is divided into a core zone, a surrounding buffer zone and an outermost 'experimental zone'. Communities living within the experimental zone are limited to reserve-compatible activities and infrastructure, they are also subject to crop raiding and other forms of human-wild-life conflict and thus bear significant costs associated with the protection of biodiversity.<sup>4</sup> Communities living in surrounding areas outside the reserves are likely also subjected to some economic and resource use restrictions under conservation policies.<sup>5</sup>

To support local communities and improve attitudes towards conservation, the reserves provide income generation opportunities, ecological compensation mechanisms, development projects, opportunities for ecotourism business, some resource access agreements and reserve-based employment. A 2017 study surveying 927 households of 16 giant panda reserves in Sichuan, found that employment increased mean household income by around US\$140 inside reserves where the average income per capita is US\$930.<sup>6</sup> Sichuan's 46 giant panda reserves employ over 2,800 staff as rangers, guards, etc.<sup>7</sup> At an average of 60 staff per reserve, the six Qionglai reserves employ around 360 staff.

### **Tangible benefits**

Income and jobs: Employment opportunities benefit around 360 staff, increasing their mean household income by US\$140 per year (13.5%), injecting over US\$50,000 into local economies.

### **References**

- 1 Ma, B., Zhao, Z., Ding, H. and Wen, Y. 2017. Household costs and benefits of biodiversity conservation: Case study of Sichuan giant panda reserves in China. *Environment, Development and Sustainability*, **20**(4): 1665-1686.
- 2 UNESCO World Heritage Convention. *Sichuan Giant Panda Sanctuaries – Wolong, Mt Siguniang and Jiayin Mountains*. Available here: <https://whc.unesco.org/en/list/1213/>
- 3 Pers. comm. with Yan Zhang, IUCN staff and Dr. Weihua Xu, Chinese Academy of Sciences/CAS staff. 7/5/2020.
- 4 Ma et al., 2017. *Op. cit.*
- 5 Yan Zhang. *Op. cit.*
- 6 Ma et al., 2017. *Op. cit.*
- 7 Huang, Q., Fei, Yu., Yang, H., Gu, X. and Songer, M. 2020. Giant Panda National Park, a step towards streamlining protected areas and cohesive conservation management in China. *Global Ecology and Conservation*. **22**. <https://doi.org/10.1016/j.gecco.2020.e00947>

## 2.12 Costa Rica: Ostional National Wildlife Refuge

*Revenue from the sustainable collection of marine turtle eggs from Ostional National Wildlife Refuge is valued at nearly US\$1.5 million annually.*

**Ecosystem service:** Marine turtle eggs

**Protected area:** Ostional National Wildlife Refuge, Size: 85.7 km<sup>2</sup> (5.1 km<sup>2</sup> terrestrial and 80.54 km<sup>2</sup> marine), WDPA ID 12244, IUCN management category: IV

**Adjusted net national income per capita (US\$):** 10,327

### Conservation value

Ostional National Wildlife Refuge has one of the densest concentrations of olive ridley turtles (*Lepidochelys olivacea*) in the world, with tens or hundreds of thousands of nesting females arriving each year. This mainly takes place in massive and synchronized nesting events known as *arribadas* for a few days a month, which occur only on Ostional beach, one of the four beaches in the refuge.

### Description

The refuge is managed by the National System of Conservation Areas (SINAC) and a local council (CIMACO) made up of representatives from local communities, local government, fishing bodies and the nearby university. Three local communities live within the borders of the refuge. The community around Ostional organizes tourism to the beach, especially during *arribadas*, and the sustainable use of turtle eggs by the Ostional Integral Development Association (ADIO). There are restrictions on the management of the beach, especially for *arribadas* tourism; for instance, visits to the site can only be made with accredited community guides. In addition, the community, through ADIO, assumes a series of responsibilities and commitments of an environmental, social and economic nature that contribute to the management of the refuge and to community development. For the other communities in the refuge, Pelada and Guiones, the economic activities are focused on tourism and artisanal fishing.

Given the huge numbers of nesting turtles at Ostional beach, and the fact that early season

nests tend to be destroyed during later nesting, a managed off-take of turtle eggs has been permitted over an 800 m length of beach since 1987, the value of which exceeds income from tourism.<sup>1</sup> The commercialization of the eggs is allowed by the Latin American Organization for Fisheries Development (OLDEPESCA in Spanish), as long as ADIO presents an annual plan for use that is approved by OLDEPESCA.<sup>2</sup> All eggs are collected,<sup>3</sup> inventoried and certified for legal sale.<sup>4</sup> Periodic studies have also taken place to judge the sustainability of the harvest.<sup>5,6,7</sup>

### Tangible benefits

**Income and jobs:** Gross revenue from the consumptive use of olive ridley eggs benefiting villagers, intermediaries and market salesmen was estimated at over US\$1 million per year in 2000 (nearly US\$1.5 million at 2020 values).<sup>8</sup>

### References

- 1 Hunt, C.A. and Vargas, E. 2018. Turtles, ticos and tourists: Protected areas and marine turtle conservation in Costa Rica. *Journal of Park and Recreation Administration* 36: 101-114.
- 2 Inter-American Convention for the Protection and Conservation of Sea Turtle Costa Rica Annual Report 2018; <http://www.iacseaturtle.org/eng-docs/informes-anuales/2018/2018%20Costa%20Rica%20Annual%20Report.pdf> (accessed 17/5/2020).
- 3 Ballestero, J., Arauz, R.M. and Rojas, R. 2000. Management, conservation, and sustained use of olive ridley sea turtle eggs (*Lepidochelys olivacea*) in the Ostional Wildlife Refuge, Costa Rica: An 11 year review. In: *Proceedings of the 18<sup>th</sup> Annual Symposium on Sea Turtle Biology and Conservation* (eds) F.A. Abreu-Grobois, R. Brisenõ-Duenãs, R. Márquez-Millán and L. Sarti-Martínez, 4-5. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-SEFSC-436.
- 4 <https://costa-rica-guide.com/nature/wildlife/turtle-egg-harvest/> (accessed 14/1/2020).
- 5 For example, Campbell, L.M., Haalboom, B.J. and Trow, J. 2007. Sustainability of community-based conservation: Sea turtle egg harvesting in Ostional (Costa Rica) ten years later. *Environmental Conservation* 34: 122-131.
- 6 Ballestero et al. *Op. cit.*
- 7 Valverde, R.A., Orrego, C.M., Tordoir, M.T., Gómez, F.M., Solís, D.S., Hernández, R.A., Gómez, G.B., Brenes, L.M., Baltodano, J.P., Fonseca, L.G. and Spotila, J.R. 2012. Olive Ridley Mass Nesting Ecology and Egg Harvest at Ostional Beach, Costa Rica. *Chelonian Conservation and Biology* 11 (1): 1-11.
- 8 Troëng, S. and Drews, C. 2004. *Money Talks: Economic Aspects of Marine Turtle Use and Conservation*, WWF-International, Gland.

## 2.13 Costa Rica: Monte Alto Protected Zone

---

*The Monte Alto Foundation attracts 2,200 visitors a year, generating revenues to employ five full-time staff and pay over US\$10,000 annually to local communities for hospitality and infrastructure services whilst supporting many local tourism businesses.*

**Ecosystem service:** Tourism

**Protected area:** Monte Alto Protected Zone,  
Size: 9.03 km<sup>2</sup>, WDPA ID: 108153, IUCN  
management category: Not reported

**Adjusted net national income per capita (US\$):** 10,327

### Conservation value

Monte Alto protects the headwaters of the Nosara river, the entire basin of which supplies water year-round to over 4,000 residents of Hojancha town in the Guanacaste region.<sup>1</sup> The area's tropical forests are home to 205 bird species, 56 mammals, 167 trees and 80 orchids as well as an endemic shrub (*Tabernaemontana hanna*) and rare blue umbrella-shaped mushroom (*Entoloma* sp).

### Description

Between the 1930s and 1960s, the Guanacaste province on the Northern Pacific coast of Costa Rica suffered severe and large-scale deforestation driven by cattle ranching, commercial logging, grain farming and coffee and sugarcane plantations.<sup>2</sup> By 1992, heavy deforestation in the area surrounding the Nosara river headwaters had resulted in a 90% flow reduction – devastating the small, economically depressed downstream town of Hojancha and causing an out-migration of more than half the population.<sup>3</sup>

To combat this, in 1993, a group of twelve Hojancha farmers incorporated the Monte Alto Foundation (MAF), with the mandate to acquire and reforest land at the head of the river, promoting sustainable livelihoods, ultimately restoring ecological function to the area. By 1994, with support from municipal government and the Ministry of Environment and Energy, the community had established the Monte Alto Protected Zone.

Soon, MAF was receiving requests to visit the zone from schools, universities, research institutes, scientists and tourists. By maintaining a policy to source all labour and materials locally, in addition to MAF's five full-time staff members, MAF employs many part-time maids, cooks, guides, etc. from the 500 strong local community of Pilangosta. Food, hospitality and building services from the local community generate an income of around US\$10,500 annually. The Monte Alto Protected Zone now attracts an average of 2,200 tourists per year. In the years since MAF's establishment, forest cover has increased by 56%, biodiversity has improved and water levels have recovered.<sup>4</sup>

### Tangible benefits

Income and jobs: tourism helps fund five full-time staff and pays US\$10,500 a year to local people for food, hospitality and infrastructure services.

### References

- 1 <https://www.equatorinitiative.org/2017/05/28/fundacion-pro-reserva-forestal-monte-alto-fundacion-for-monte-alto-forest-reserve/> (accessed 19/3/2020).
- 2 United Nations Development Programme. 2012. *Foundation for Monte Alto Forest Reserve, Costa Rica*. Equator Initiative Case Study Series. New York, NY.
- 3 The Global Partnership on Forest and Landscape Restoration case study report. One hectare at a time: Restoration of a model forest in Costa Rica. Available at: <http://www.forestlandscaperestoration.org/one-hectare-time-restoration-model-forest-costa-rica> (accessed 19/3/2020).
- 4 *Ibid.*

## 2.14 Fiji: Vueti Navakavu Locally Managed Marine Area

*Fisheries from the Vueti Navakavu Locally Managed Marine Area generate over US\$475,000 per year, plus an additional 86,000 kg of protein consumed locally.*

**Ecosystem service:** Fisheries

**Protected area:** Vueti Navakavu Locally Managed Marine Area (LMMA), Size: 18.71 km<sup>2</sup>, WDPA Code: 555547791, IUCN management category: N/A

**Adjusted net national income per capita (US\$):** 5,137

### Conservation value

The Muaivuso peninsula is surrounded by a fringing coral reef, mangroves and remnants of coastal littoral forest providing important habitat for biodiversity, including many species important for local fisheries. The mangrove and reefs also provide coastal protection against storm surges and erosion; a significant indirect use value in an area where cyclones and tropical storms occur frequently.<sup>1</sup>

### Description

The Navakavu LMMA is the traditional fishing ground (or *qoliqoli*) for four villages: Nabaka, Nammakala, Muaivuso and Waiqanake,<sup>2</sup> and whilst Fiji is one of the more affluent countries of the South Pacific, these four villages are relatively poor (in 2007 the average income here was less than half the Fijian average).<sup>3</sup> Muaivuso households rely heavily on fishing for both sustenance and income; roughly 40% of the fish caught provide nutrition for Navakavu households, the remaining 60% are sold in the market.<sup>4</sup>

In 2002, responding to declines in catches, the communities set up a 'no-take zone' with support from the Fiji LMMA network and the University for the South Pacific. Here, all fishing and other extractive activities are prohibited, but the spill-over effects of the MPA now replenish fish stocks in the surrounding traditional fishing grounds (for which the four villages have exclusive use rights). For example, during the four years after the establishment of the no-take zone, community finfish catches increased by 3%.<sup>5</sup>

The proportion of male fishers to female is roughly 50%, each household has an average of two fishers, and these make around 80 fishing trips per year to the fishing grounds bringing in just over 215,000 kg of seasonal and non-seasonal catch each year. The 60% that is sold, generates just over US\$475,000 for the communities each year – on average this comes to just under US\$4,300 per household.<sup>6</sup>

### Tangible benefits

Income: Households generate US\$4,300 each year through the 60% of catch sold in markets, households also save just under US\$2,900 each year through not having to purchase protein.

### References

- 1 O'Garra, T. 2007. *Estimating the Total Economic Value (TEV) of the Navakavu LMMA (Locally Managed Marine Area) in Vitu Levu Island (Fiji)*. CRISP (Coral Reef InitiativeS for the Pacific), Final Report.
- 2 IUCN. 2009. *Navakavu Locally Managed Marine Area, Viti Levu Island, Fiji*. Marine Protected Area Case Studies.
- 3 Beukering, P.J.H., et al. 2007. Case Study 1: Yavusa Navakavu Locally Managed Marine Area (Fiji). Nature's Investment Bank. Report 58.
- 4 O'Garra, T. 2012. Economic valuation of a traditional fishing ground on the coral coast in Fiji. *Ocean and Coastal Management*. **56**, 44-55.
- 5 IUCN. 2009. *Op. cit.*
- 6 O'Garra, T. 2012. *Op. cit.*

## 2.15 Finland: Pallas-Yllästunturi National Park

*Understanding the local economic benefits of national parks helped persuade the Finnish government to continue investing in its protected areas; Pallas-Yllästunturi National Park contributed US\$42 million to the local economy in 2019.*

**Ecosystem service:** Tourism

**Protected area:** Pallas-Yllästunturi National Park, Size: 1,021.48 km<sup>2</sup>, WDPA ID 655, IUCN management category: II

**Adjusted net national income per capita (US\$):** 41,120

### Conservation value

Pallas-Yllästunturi National Park is dominated by fells, pristine forests and bogs. Many southern plant and bird species live on the northernmost limits of their range and the brown bear (*Ursus arctos*) and lynx (*Lynx lynx*) are permanent residents. The region has been inhabited since the Stone Age, mainly by the indigenous Sámi, and reindeer husbandry plays an important role in the National Park.

### Description

Faced with the threat of major budget cuts, Metsähallitus Parks & Wildlife Finland, the Finnish protected area agency, undertook the first study of the economic benefits of its protected area system over 10 years ago.<sup>1</sup> The study focused on Total Economic Value, which assesses the local economic impacts of visitor spending, to demonstrate immediate benefits to local economies. It considered direct and total income and employment effects using a simple analytical tool, based on the Money Generation Model (MGM2) originally developed for the US National Park Service.<sup>2</sup> Estimates have been made annually since 2010 for each national park, and at a cumulative, state-level, through visitor monitoring.<sup>3,4</sup> Total visitor spending is subdivided to identify when visitors come solely or mainly because there was a protected area. In 2019, there were some 3.22 million visits to Finnish national parks and the impact of visitor spending contributed over US\$247 million to local communities.<sup>5</sup> The research has helped make the case for continued

public investment, showing that money spent on protected areas' management comes back ten-fold to local economies.<sup>6</sup>

Immediate benefits to local economies are largest in the northern parks, where there are fewer alternative job opportunities. Pallas-Yllästunturi National Park, located in Western Lapland, is Finland's most popular national park. The park received 561,200 visitors in 2019.<sup>7</sup> The economic impact of visitors whose only or major target was the national park was calculated at over US\$50 million and resulted in the employment of 326 people.<sup>8</sup>

### Tangible benefits

Tourism accounted for US\$50 million and 326 jobs in 2019.<sup>9</sup>

### References

- 1 Kajala, L. 2012. *Estimating economic benefits of protected areas in Finland*. In: Kettunen, M., Vihervaara, P., Kinnunen, S., D'Amato, D., Badura, T., Argimon, M. and Ten Brink, P. (Eds.) *Socio-economic importance of ecosystem services in the Nordic Countries. Synthesis in the context of The Economics of Ecosystems and Biodiversity (TEEB)*. TemaNord 2012: 559-255-259.
- 2 Huhtala, M. Kajala, L. and Vatanen, E. 2010. *Local economic impacts of national park visitors' spending in Finland: The development process of an estimation method*. Working Papers of the Finnish Forest Research Institute. 149.
- 3 <http://www.metsa.fi/web/en/economicbenefitsofnationalparks> (accessed 7/6/2020).
- 4 Kajala, L., Almik, A., Dahl, R., Dikšaitė, L., Erkkonen, J., Fredman, P., Jensen, F., Søndergaard, Karoles, K., Sievänen, T., Skov-Petersen, H., Vistad, O.I. and Wallsten, P. 2007. *Visitor monitoring in nature areas – a manual based on experiences from the Nordic and Baltic countries*. TemaNord, Bromma, Sweden.
- 5 <https://julkaisut.metsa.fi/assets/pdf/lp/Asarja/a232.pdf> (accessed 7/6/2020).
- 6 <https://www.metsa.fi/web/en/economicbenefitsofnationalparks> (accessed 7/6/2020).
- 7 [https://www.metsa.fi/wp-content/uploads/2020/06/visitationnumbers\\_2019.pdf](https://www.metsa.fi/wp-content/uploads/2020/06/visitationnumbers_2019.pdf) (accessed 9/3/2021).
- 8 [https://www.metsa.fi/wp-content/uploads/2020/06/Localeconomyimpacts\\_2019.pdf](https://www.metsa.fi/wp-content/uploads/2020/06/Localeconomyimpacts_2019.pdf) (accessed 9/3/2021).
- 9 <http://www.metsa.fi/web/en/economicbenefitsofnationalparks> (accessed 7/6/2020).

## 2.16 Germany: Schaalsee Biosphere Reserve

*Despite being one of Germany's smaller biosphere reserves, Schaalsee is developing a multi-million dollar tourist enterprise with strong identification to the biosphere brand.*

**Ecosystem service:** Tourism

**Protected area:** Schaalsee Biosphere Reserve, Size:<sup>1</sup> 310.00 km<sup>2</sup>, core area 19.00 km<sup>2</sup>, buffer zone 89.60 km<sup>2</sup> and transition zone 201.40 km<sup>2</sup>, WDPA Code: 198341, IUCN management category: not applicable.

**Adjusted net national income per capita (US\$):** 40,265

### Conservation value

Schaalsee is one of the deepest lakes in Germany; characterized by islands, bays, Baltic beech forest and extensive reed beds that are important for migratory birds. The area supports rare swamp and aquatic birds like Eurasian crane (*Grus grus*) and osprey (*Pandion haliaetus*). It provides habitat for otter (*Lutra lutra*) and for threatened plants like the fen orchid (*Liparis loeselii*), flea sedge (*Carex pulicaris*), Rannoch rush (*Scheuchzeria palustris*) and various marsh orchids.

### Description

Germany has 18 biosphere reserves covering over 20,000 km<sup>2</sup>. These have been the subject of a long-term study of economic benefits, mainly focused on ecotourism.<sup>2</sup> Total tourism in German biosphere reserves amounted to 65.3 million visitors, and US\$3.40 billion gross tourist spending. Most tourists interviewed knew that they were visiting a biosphere reserve. A relatively small number of 4.21 million visitor days (6.5% of tourism demand) were visitors with a high biosphere reserve affinity, who chose to visit explicitly because the site is a biosphere reserve and who spent around US\$200 million.<sup>3</sup>

Schaalsee is in the north of Germany. For many years the area was controlled by the military and little visited, in consequence it redeveloped many natural characteristics. The reserve is fairly small and has relatively low gross tourist spending

of around US\$13.4 million/year but this has increased from almost no tourism before German reunification.<sup>4</sup> Furthermore, Schaalsee has a far larger than average proportion of visitors with a high biosphere reserve affinity (21.5%) due to strong marketing of the reserve and its values and amenities; including the 150 km of hiking trails.<sup>5</sup> A visitor centre attracts around 40,000 visitors a year, spending US\$1.5 million and an eight-day a year market selling food and other products from the biosphere has a turnover of between US\$17,000-30,000 per market day (almost half the people attending do so explicitly because the food is from the biosphere reserve).<sup>6</sup>

### Tangible benefits

Income specifically from local food production sales from the annual eight-day market makes from US\$136,000 to US\$240,000 per year; overall the biosphere reserve has gross tourist spending of around US\$13.4 million annually and accounts for 336 job equivalents.

### References

- 1 Job, H., Engelbauer, M. and Engels, B. 2019. Das Portfolio deutscher Biosphärenreservate im Lichte der Sustainable Development Goals. *Raumforschung und Raumordnung* 77: 57-79.
- 2 Kraus, F., Merlin, C. and Job, H. 2014. Biosphere reserves and their contribution to sustainable development. *Zeitschrift für Wirtschaftsgeographie* 58: 164-180.
- 3 Job, H., Kraus, F., Merlin, C. and Woltering, M. 2013. Wirtschaftliche Effekte des Tourismus in Biosphärenreservaten Deutschlands, *Naturschutz und biologische Vielfalt* 134, Bundesamt für Naturschutz, Bonn, Germany (see: [https://www.bfn.de/fileadmin/BfN/sportundtourismus/Dokumente/Summary\\_economicimpactsBR.pdf](https://www.bfn.de/fileadmin/BfN/sportundtourismus/Dokumente/Summary_economicimpactsBR.pdf))
- 4 Engelbauer, M., Majewski, L. and Job, H. 2018. Regional economic impact of tourism in German biosphere reserves. *9th International Conference on Monitoring and Management of Visitors in Recreational and Protected Areas*. Bordeaux, France. pp. 313-314.
- 5 Dannebaum, M. 2011. *Biosphere Reserves in Germany: In touch with nature*. Europarc Deutschland, Berlin.
- 6 Kraus, F. and Job, H. 2013. Economic impacts of tourism in German biosphere reserves. Presentation from University of Würzburg.

## 2.17 India: Ranthambore Tiger Reserve

*Tiger viewing is increasing in popularity amongst both local and foreign tourists in India; in Ranthambore tourism contributes about US\$18 million to the local economy annually.*



Tourists at Ranthambore Tiger Reserve, India © Equilibrium Research

**Ecosystem service:** Tourism

**Protected area:** Ranthambore Tiger Reserve, Size: 282 km<sup>2</sup>, WDPA ID: 1808, IUCN management category: II

**Adjusted net national income per capita (US\$):** 1,678

### Conservation value

Ranthambore Tiger Reserve was India's first designated tiger (*Panthera tigris*) reserve, in an area of dry forest in Rajasthan. The park's deciduous forests protect a wide range of fauna in addition to tigers, including leopard (*P. pardus*), nilgai (*Boselaphus tragocamelus*), sambar (*Rusa unicolor*), sloth bear (*Melursus ursinus*), rhesus macaque (*Macaca mulatta*), mugger crocodile (*Crocodylus palustris*) and chital (*Axis axis*) to name a few. The park is home to a wide variety of trees, plants, birds and reptiles, as well as one of the largest banyan trees (*Ficus benghalensis*) in India.

### Description

The role of tigers in tourism is very important across the tiger range, although benefits are often unevenly distributed.<sup>1</sup> Ranthambore was India's highest earning protected area in 2016-17 according to government figures, with a revenue of around US\$3 million.<sup>2</sup> Tigers are the major attraction; close to half a million people visited the park in 2016/17, 68% of which were domestic tourists.

Ranthambore's popularity has a major impact on the local economy, over 2,000 staff are employed full-time by the park, of which 70% are from the local district and 21% are from the state. The surrounding area supports some 3,000 tourist beds along with guiding activities and other tourism associated employment. Just under 70% of all accommodation is owned by local people. Benefits include direct employment, on average one person for every room, and contributions

to the local economy; a 2016 survey found 34% of all lodges donate money or contribute in kind to local schools and 24% support health care initiatives. Revenue estimated from small business enterprises in local villages with tourism infrastructure is estimated at US\$161,000 annually, four times higher than non-tourism villages. It has been estimated that tourism and associated services in and around the park generate over US\$33 annually, of which over 55% (approximately US\$18 million) goes back to the local economy.<sup>3</sup>

Other ecosystem services identified in India's tiger reserves include water, carbon storage, disaster risk reduction, medicinal plants, fodder, fish stocks and biological control.<sup>4</sup> An economic analysis of Indian tiger reserves identified benefits, including annual water services at US\$1.6 million and carbon storage at US\$936,000;<sup>5</sup> however these benefits do not accrue to the protected area or local community at present.

### Tangible benefits

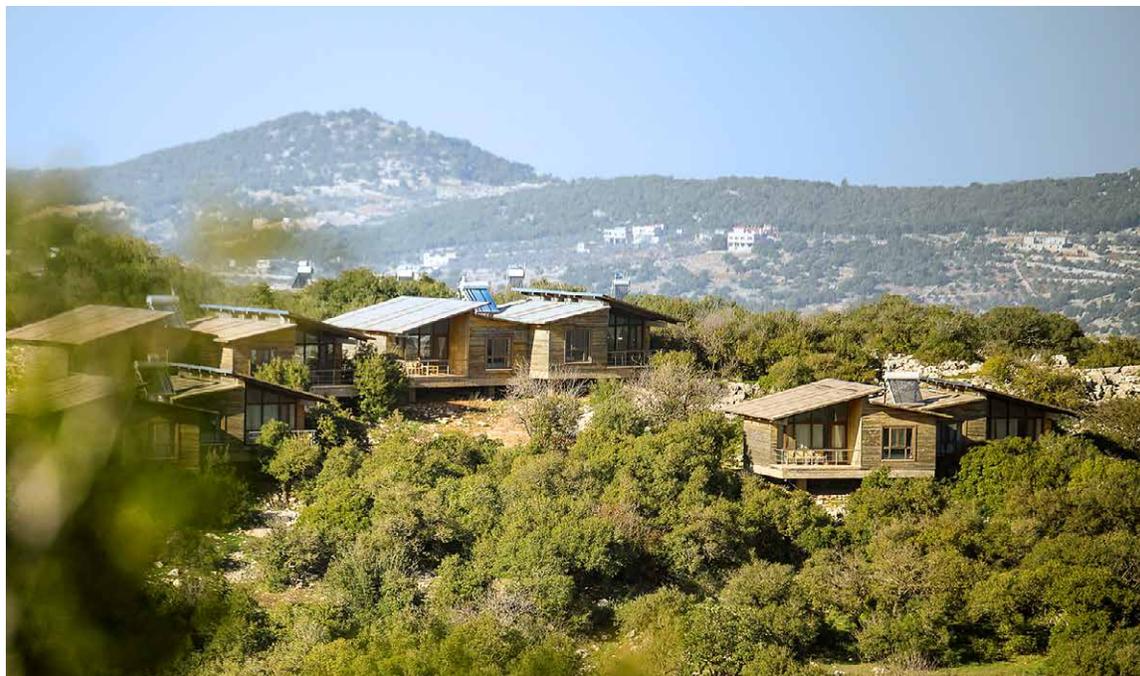
Jobs and tourism-related income: the benefits from this highly visited park are multiple; contributing around US\$18 million to the area's economy.

### References

- 1 Reddy, C.S. and Yosef, R. 2016. Living on the Edge: Attitudes of Rural Communities toward Bengal Tigers (*Panthera tigris*) in Central India, *Anthrozoös*, **29**: 2, 311-322, DOI: 10.1080/08927936.2016.1152763
- 2 Ranthambore National Park website: <https://ranthamborenationalpark.in/blog/ranthambore-tiger-reserve-becomes-indias-highest-earning-wildlife-park-in-2016-17/> (accessed 12/3/2020).
- 3 Raju, U. 2018. *The value of Wildlife Tourism around Ranthambhore Tiger Reserve in Rajasthan for Wildlife Conservation and Local Communities*, TOFTigers and Bagh AAP Aur Van (BAAVAN) Trust, India.
- 4 WWF. 2017. *Beyond the Stripes: Save tigers, save so much more*. WWF International, Gland, Switzerland.
- 5 Verma, M., Negandhi, D., Khanna, C., Edgaonkar, A., David, A., Kadekodi, G., Costanza, R. and Singh, R. 2015. *Economic Valuation of Tiger Reserves in India: A Value+ Approach*. Indian Institute of Forest Management. Bhopal, India.

## 2.18 Jordan: Ajloun Forest Reserve

*A cooperative of ten women generate US\$200,000 annually through the sale of herbal, 100% locally sourced soap bars produced using plant extracts, essential oils and olive oil from the reserve and adjacent organic farm.*



Orjan Soap House © Othman Tawalbeh, RSCN

**Ecosystem service:** Non-timber forest products

**Protected area:** Ajloun Forest Reserve,  
Size: 6.78 km<sup>2</sup>, WDPA ID: 17231, IUCN  
management category: IV

**Adjusted net national income per capita (US\$):** 3,711

### Conservation value

The reserve in the Ajloun highlands protects rich fertile land dominated by open woodlands of evergreen oak, pine, carob, wild pistachio, wild strawberry trees and olive trees. The rich flora attracts an equally rich bird life and in 2000, Ajloun was designated an Important Bird Area. Among the more unusual mammals are the striped hyena (*Hyaena hyaena*), crested porcupine (*Hystrix indica*) and stone marten (*Martes foina*). The reserve also has a captive breeding programme that is reintroducing the locally extinct roe deer (*Capreolus capreolus*).<sup>1</sup>

### Description

Communities in the reserve have been using herbs and fruits from the forest medicinally for centuries and now a cooperative of ten local women is continuing this tradition by making herbal soaps with 100% locally sourced ingredients.<sup>2</sup>

Oil is pressed from olives sourced within the reserve and buffer zones, this pure oil forms 90% of the soap bar.<sup>3</sup> Plant extracts from lavender, geranium, mint and pomegranate, among other species sourced either within the reserve or from an adjacent organic farm, form the remaining ingredients – adding fragrance and more medicinal qualities. Both the farm and the reserve are managed by the Royal Society for the Conservation of Nature (RSCN) and the soap enterprise is supported by Wild Jordan – the socio-economic development and ecotourism branch of RSCN.

In the remote mountain village of Um Alyanabee, 10 km north-west of the reserve, RSCN also manages the Royal Academy for the Conservation of Nature – where the Orjan Soap House has been situated since its move from Orjan village, for which it is named.<sup>4,5</sup> The Academy functions as an ecotourism centre where visitors can watch soap making and purchase the products (approximately US\$4 per soap bar).

### **Tangible benefits**

Income: Orjan soaps generate an annual revenue of over US\$200,000<sup>6</sup> in purchases from visitors to the Academy and exports to companies and buyers around the world and provides direct income for ten women, indirectly benefiting at least thirty community members.

### **References**

- 1 Ajloun Reserve. RSCN website. Available at: <https://www.rscn.org.jo/content/ajloun-forest-reserve-1> (accessed 19/03/2020).
- 2 Meet the Women. Wild Jordan website. Available at: <https://www.wildjordan.com/meet> (accessed 19/03/2020).
- 3 Ajloun Forest Reserve. Wild Jordan website. Available at: <https://www.wildjordan.com/content/ajloun-forest-reserve-1> (accessed 19/03/2020).
- 4 Grover, A. 2009. On the Path of Righteousness in Jordan. *The Independent*. London, UK.
- 5 Pers. comm. with Hussam Alawaidat, RSCN staff member. 13.02.20.
- 6 *Ibid.*

## 2.19 Kenya: Biliqo-Bulesa Community Conservancy

*In Kenya's arid north, the Borana people are sustainably utilizing healthy grasslands within conservancies to graze livestock, and benefit from conservation-linked enterprise which generated over US\$170,000 for pastoralists in livestock sales in 2019.*



Community involvement in Biliqo-Bulesa Community Conservancy © Rufo Roba, NRT

### **Ecosystem service: Grazing**

**Protected area:** Biliqo-Bulesa Community Conservancy, Size: 3,784.82 km<sup>2</sup>, WDPA Code: 55555520, IUCN management category: not reported

**Adjusted net national income per capita (US\$):** 1,321

### **Conservation value**

The conservancy is an important corridor and dispersal area for wildlife including elephant, lion, cheetah, buffalo, leopard, lesser kudu (*Tragelaphus imberbis*), gerenuk (*Litocranius walleri*) and other smaller mammals.

### **Description**

Livestock is the cultural and economic cornerstone of Kenya's arid North, and Biliqo-Bulesa Conservancy (BBC) of Isiolo county is no exception. BBC supports a population of some

5,800 people and 57% of these are dependent on incomes derived from goats, sheep, cattle and camels.<sup>1</sup> The Borana people are well adapted to a semi-nomadic, pastoralist lifestyle – dividing their herds to reduce risk from attacks, droughts, cattle theft, etc. and moving for hundreds of kilometres in search of water and pasture.

This way of life is wholly dependent on rangelands and the grasses they support. As such, the entire conservancy is managed as an integrated livestock and wildlife range – there are no areas where livestock are excluded year-round and maintaining fair market prices for cattle and grazing management plans have been crucial in reinforcing the link between healthy rangelands and healthy livestock.

The Northern Rangelands Trust Trading (NRTT) is a social enterprise established to build sustainable businesses and resilient commercial activity

in Northern Kenya; providing revenues for community conservancies.<sup>2</sup> NRTT initiated its Livestock-To-Markets (LTM) business in 2006, purchasing livestock from pastoralists in conservancies and selling to markets in Nairobi. In 2019, LTM purchased 404 cattle from BBC at US\$178,400, of this US\$10,150 was invested back into the conservancy.<sup>3</sup> Over the course of 2019, NRTT purchased a total of 1,532 cattle from twelve conservancies, generating US\$620,000 for pastoralists.

### **Tangible benefits**

Income: Sale of livestock to NRTT earned over US\$170,000 in 2019; the semi-nomadic, pastoralist communities of Biliqo-Bulesa Conservancy are reliant on livestock for 57% of their incomes and manage the conservancy to optimize livestock and wildlife grazing.

### **References**

- 1 *Biliqo-Bulesa Community Conservancy: Management and Community Development Plan (2017-2021)*. Biliqo-Bulesa Community Conservation and NRT. Available at: [https://static1.squarespace.com/static/5af1629f12b13f5ce97ca0b5/t/5b63604970a6ade63938b5a2/1533239431604/CMP\\_BILIQO+BELESA\\_LowRes\\_SinglePages.pdf](https://static1.squarespace.com/static/5af1629f12b13f5ce97ca0b5/t/5b63604970a6ade63938b5a2/1533239431604/CMP_BILIQO+BELESA_LowRes_SinglePages.pdf) (accessed 17/3/2020).
- 2 Northern Rangelands Trust website. Available at: <https://www.nrt-kenya.org/nrt-trading> (accessed 17/3/2020).
- 3 Business materials gathered from NRTT. 17/3/2020.

## 2.20 Lebanon: Shouf Biosphere Reserve

*Sale of cultural goods produced using raw materials from the reserve, such as jams, honey and herbs, along with livestock meat, milk and skins generates just under US\$1.2 million annually for local communities and the Al-Shouf Cedar Society.*



Shouf Biosphere Reserve © Equilibrium Research

**Ecosystem service:** Agriculture and non-timber forest products

**Protected area:** Shouf Biosphere Reserve, Size: 156.47 km<sup>2</sup>, WDPA ID: 902497, IUCN management category: N/A

**Adjusted net national income per capita (US\$):** 6,318

### Conservation value

Covering 5% of Lebanon, the Shouf Biosphere Reserve (SBR) is the largest protected area in the country and is home to a quarter of Lebanon's remaining cedar forests, some of which are estimated to be 2,000 years old, as well as juniper and oak forests. The reserve has 32 mammals including mountain gazelle (*Gazella gazella*), golden jackal (*Canis aureus*) and the reintroduced Nubian ibex (*Capra nubiana*) and 200 species of birds, of which 19 are considered rare at the national level.

### Description

SBR is managed by the Lebanese Ministry of Environment in collaboration with Al-Shouf Cedar Society (ACS), an NGO established in 1994.<sup>1</sup> As of 2009, ACS was supporting 40 families in local cottage industries by establishing three production workshops that meet international standards and marketing local products using the SBR label and marketing outlets at SBR entrances. Many of the 82 commodities on offer are produced using raw materials from SBR including cedar honey, jams, compote, syrups, distilled water, vinegars, olives. Others are collected wild directly from the reserve itself, these include herbs, pine nuts, nettles and sumac. Revenues from the sale of these products between 2010 and 2014 reached just under US\$520,000, peaking in 2012 at US\$165,000 over the course of the year.<sup>2</sup>

There are also 3,000 community-owned beehives in the 24 villages surrounding SBR, these produce an average of 5 kg more honey annually than beehives in other regions, this is attributed to the availability of high-quality, pesticide-free pastures in the reserve. At US\$30 per kg, this additional honey production amounts to US\$450,000 a year more than an equivalent number of hives far from SBR.<sup>3</sup>

In addition, SBR generates approx. US\$600,000 a year in meat, milk and skins through its use as pastureland by 12,500 livestock,<sup>4</sup> US\$500,000 in reserve entrance fees and US\$2 million from the local tourism industry (including hotels and restaurants).<sup>5</sup>

### **Tangible benefits**

Income: most recent estimates are an average of US\$130,000 annually from a range of local products, plus approx. US\$1 million from bee and livestock products.

### **References**

- 1 Abdallah, P., Hani, N., Daher, W.A., Assi, K.A. and Abu-Izzeddin, F. 2010. *Shouf Biosphere Reserve: Marketing and Business Plan for Shouf Biosphere Reserve Rural Products*. Restoration of income generation affected by the war to support conservation of Shouf Biosphere Reserve, project report.
- 2 El-Jisr, K., Rayan, O.A. and Chabarekh, C. 2015. *Enhancing Sustainable Livelihood and Promoting Community Management of Shouf Biosphere Reserve*. The Economic Value of the Shouf Biosphere Reserve. Ecodit. Available at: [http://shoufcedar.org/wp/wp-content/uploads/2017/05/Economic\\_value\\_study\\_Shouf\\_Biosphere\\_Rserve\\_Final\\_low\\_res\\_717778\\_201554000\\_97960253-1.pdf](http://shoufcedar.org/wp/wp-content/uploads/2017/05/Economic_value_study_Shouf_Biosphere_Rserve_Final_low_res_717778_201554000_97960253-1.pdf)
- 3 El-Jisr et al. *Op. cit.*
- 4 El-Jisr et al. *Op. cit.*
- 5 Pers. comm. with Nizar Hani, Director of the UNESCO Shouf Biosphere Reserve. 23/4/2020.

## 2.21 Madagascar: Makira Natural Park

*Over US\$3.8 million was generated between 2005 and 2017 through the sale of carbon credits from avoided deforestation and its associated 1.2 million annual tCO<sub>2</sub>.*

**Ecosystem service:** Carbon saving

**Protected area:** Makira Natural Park, Size: 3,601.91 km<sup>2</sup>, WDPA Code: 352249, IUCN management category: II

**Adjusted net national income per capita (US\$):** 405

### Conservation value

Makira Natural Park (MNP) is Madagascar's largest category II protected area and features the largest remaining contiguous tract of low and mid-altitude rainforest in eastern Madagascar – the only habitat in the world where all five families of lemur are represented, four species of which are critically endangered. MNP also provides habitat for over 120 species of birds, 200 reptiles and amphibians and 450 species of plants.

### Description

Whilst MNP is a state-owned protected area, it is managed by the Wildlife Conservation Society (WCS). The area has historically suffered severe deforestation from slash-and-burn agriculture and illegal logging for charcoal; losing an estimated 15,000 ha between 1995 and 2005.<sup>1</sup> Since then, WCS and local stakeholders have cut deforestation rates by half and saved almost 6,000 ha of forest.<sup>2</sup> In 2008, the Makira Carbon Company (MCC), a WCS subsidiary, was appointed by the government as the exclusive agent for the sale of Makira carbon credits. Four years later, Verified Carbon Units (VCUs) were retroactively certified to be sold on international carbon markets.<sup>3</sup> By the end of 2017, the sale of carbon credits had generated over US\$3.8 million<sup>4</sup> and the project continues to avoid approx. 1.2 million tCO<sub>2</sub> each year.<sup>5</sup>

Half of the carbon credit sale proceeds are distributed to 75 community management associations that have established contracts with

the government to sustainably manage the park's buffer zone.<sup>6</sup> These proceeds are used to pay biodiversity patrol teams and implement socio-economic development projects such as training communities in natural resource management and alternative livelihoods in ecotourism and the production of sustainable cash crops including vanilla, cloves, raffia and cacao.<sup>7</sup> The remaining half of the proceeds is divided between the government of Madagascar (20%) for REDD+ programme training, WCS (20%) for the management of the park and up to 10% is reinvested into the financial management of community funds, marketing and carbon certification fees.<sup>8</sup>

### Tangible benefits

**Income:** The avoidance of 1.2 million tCO<sub>2</sub> in emissions from deforestation allows for the sale of over US\$300,000 of carbon credits each year – US\$150,000 of which is invested into sustainable livelihoods for communities.

### References

- 1 Makira Carbon Initiative. Wildlife Conservation Society, Madagascar. Available at: <https://madagascar.wcs.org/Makira-Carbon.aspx#>
- 2 The Makira Carbon Project: Conservation through Avoided Deforestation in Makira Natural Park. Makira Carbon Factsheet. WCS Madagascar. Available at: [https://madagascar.wcs.org/Portals/120/Factsheets/WCS\\_Mada-factsheet-makira-carbon.pdf?ver=2018-07-29-190453-053](https://madagascar.wcs.org/Portals/120/Factsheets/WCS_Mada-factsheet-makira-carbon.pdf?ver=2018-07-29-190453-053)
- 3 *Ibid.*
- 4 World Bank Group. 2019. *Benefit Sharing at Scale: Good Practices for Results-Based Land Use Programs*. World Bank, Washington, DC. ©World Bank. <https://openknowledge.worldbank.org/handle/10986/32765> License: CC BY 3.0 IGO.
- 5 Natural Capital Partners. Project Overview: Makira REDD+, Madagascar. Available at: <https://www.naturalcapitalpartners.com/projects/project/madagascar-makira-redd>
- 6 World Bank Group. *Op. cit.*
- 7 Natural Capital Partners. *Op. cit.*
- 8 The Makira Carbon Project. *Op. cit.*

## 2.22 Madagascar: Velondriake Paysage Harmonieux Protégé

*By implementing sustainable use agreements for octopus fisheries, Malagasy fishers have increased average weight of octopus landed and doubled average village income from octopus fishing.*



Andavadoaka, Velondriake Paysage Harmonieux Protégé, Madagascar © Louise Jasper, Blue Ventures

**Ecosystem service:** Fisheries

**Protected area:** Velondriake Paysage Harmonieux Protégé, Size: 683 km<sup>2</sup>, WDPA ID: 555512161, IUCN management category: V

**Adjusted net national income per capita (US\$):** 405

### Conservation value

Velondriake, meaning ‘to live with the sea’ in the local Malagasy language, supports one of the largest and most biologically diverse coral reef systems in the western Indian Ocean.

### Description

Most of the approximately 7,500 people living in Velondriake Locally Managed Marine Area (LMMA) are Vezo, a semi-nomadic people heavily dependent on the marine environment for food, transport, income and cultural identity.<sup>1</sup>

The small-scale fisheries sector employs 87% of the adult population, generates an average of 82% of all household income, and provides the sole protein source in 99% of all household meals.<sup>2</sup>

Since 2004, local fishers have been managing octopus fisheries through contemporary adaptation of customary laws known as *dina*.<sup>3</sup> The LMMA’s management plan includes strategic, short-term bans on fishing in specific reef areas (rotational temporary closures) allowing the population and the reef ecosystem to regenerate.<sup>4</sup> As a fast-growing species, bans from between two and seven months across one fifth of a village’s fishing area, allow octopus populations to recover. Results from this management are impressive. An analysis in 2015 of the impacts on fisheries of 36 closures within Velondriake over eight years showed that the average weight of octopus landed

per fisher per day increased by 87%, from 2.4 kg in the month prior to the closure to, 4.4 kg in the month after a reopening.<sup>5</sup> In the same timeframe, total landings for each village increased by up to 718% and average village-level income from octopus fishing doubled, from US\$597 to US\$1,407.<sup>6</sup> The average return on investment was 81% (i.e. US\$1 worth of octopus left in closure sites grew to US\$1.81 by the end of the closure period).<sup>7</sup> The opening period is also an important source of income for women because it happens during neap tide, which means that women can catch octopus by gleaning in shallow water (men usually fish for octopus in deeper water using boats). The amount of fish harvested in closure sites generates more revenue than the amount of fish that would be harvested assuming continued open fishing at that site, so the opportunity costs of foregone catch are covered by increased profits following temporary closures.<sup>8</sup> Involvement in these closures has also led to non-fisheries benefits including community interest in broader resource management, community member empowerment through involvement in decision making and improved local governance.<sup>9</sup>

### Tangible benefits

Increased production from fisheries: 87% increase in average weight of octopus landed per fisher per day in the month after the reopening of a fishing closure, doubling average village income from octopus fishing.

### References

- 1 Harris, A. 2007. To live with the Sea: Development of the Velondriake Community-Managed Protected Area Network, Southwest Madagascar. *Madagascar Conservation & Development*. 2 (1): 43-49.
- 2 Barnes-Mauthe, M., Oleson, K.L.L. and Zafindrasilivonona, B. 2013. The total economic value of small-scale fisheries with a characterization of post-landing trends: An application in Madagascar with global relevance. *Fisheries Research*, 147(C), 175-185.
- 3 MIHARI Madagascar Locally Managed Marine Area Network FAQs and Resources page. Available at: <https://mihari-network.org/how/> (accessed 30/4/2020).
- 4 Iyer, V., Mathias, K., Meyers, D., Victorine, R. and Walsh, M. 2018. *Finance Tools for Coral Reef Conservation: A Guide*. 50 Reefs, WCS and CFA.
- 5 Oliver, T.A., Oleson, K.L.L., Ratsimbazafy, H., Raberinary, D., Benbow, S. and Harris, A. 2015. Positive Catch and Economic Benefits of Periodic Octopus Fishery Closures: Do Effective, Narrowly Targeted Actions 'Catalyze' Broader Management? *PLoS ONE* 10(6): e0129075. <https://doi.org/10.1371/journal.pone.0129075>
- 6 *Ibid.*
- 7 *Ibid.*
- 8 Blue Ventures website. Available at: <https://discover.blueventures.org/marine-management-pays/#11> (accessed 30/4/2020).
- 9 Gardner, C.J., Cripps, G., Day, L.P., Dewar, K., Gough, C., Peabody, S., Tahindraza, G. and Harris, A., 2020. A decade and a half of learning from Madagascar's first locally managed marine area. *Conservation Science and Practice*, 2(12), p.e298.

## 2.23 Malawi: Majete Wildlife Reserve

*African Parks Malawi has restored a once ecologically impoverished park into a successful tourism enterprise benefiting people through over 170 jobs and US\$500,000 annual revenue, much of which is reinvested into both the reserve and local communities through infrastructure and scholarships.*

**Ecosystem service:** Ecotourism

**Protected area:** Majete Wildlife Reserve,  
Size: 704.7 km<sup>2</sup>, WDPA ID: 2319, IUCN  
management category: IV

**Adjusted net national income per capita (US\$):** 243

### Conservation value

The reserve includes savannah and woodland ecosystems, including riparian forest. Majete became Malawi's first big five game reserve in 2012 with populations of African buffalo (*Syncerus caffer*), African elephants (*Loxodonta africana*), African leopards (*Panthera pardus*), lions (*P. leo*) and rhinoceros (*Diceros bicornis*).

### Description

Decades of poaching and neglect had left Majete Wildlife Reserve a desolate wasteland by the 1990s with just a few remaining species of antelope, twelve employees and no tourists.<sup>1</sup> In 2003, this all changed when African Parks Malawi (APM – the local legal entity set up by African Parks, a non-profit organization aiming to save, restore and protect Africa's wild places) assumed management of the reserve.<sup>2</sup> APM has since worked with local communities and the Malawi government to introduce over 15 species including lion, leopard and cheetah – reviving the park into a popular 'Big Five' tourist destination. Over this period, effective law enforcement and developing community trust and collaboration has resulted in zero incidents of rhino or elephant poaching. Since 2019, eight pangolins (famously the world's most trafficked mammal)<sup>3</sup> have been carefully rescued by villagers and returned to the reserve.<sup>4,5</sup>

The reserve now drives the economy of the area; in 2019, over 11,000 tourists visited the park

(50% were Malawian nationals) generating in excess of US\$500,000 in direct revenue and nearly US\$4,000 from the sale of local products such as honey and artwork.<sup>6</sup> 171 full-time staff are employed to manage the reserve and tourism facilities,<sup>7</sup> many coming from local communities around the reserve – historically one of the poorest areas of Malawi.<sup>8</sup> In 2016, the Majete Scholarship Programme, managed by APM, paid around US\$15,000 in school fees for four university students and 100 school students and in 2017, APM built the Chiguma Primary School, housing 180 students. Over the years, APM have also built boreholes, clinics, community tourism camps and teacher accommodation.

### Tangible benefits

Income and jobs: In 2019, 171 people were employed full-time and over 200 casually (many of whom are local); over US\$500,000 was generated from tourism spending. Much of these revenues are reinvested back into the community through infrastructure and scholarships.

### References

- 1 Maravi Post. 2019. *Malawi: The Warm Heart of Africa*. Travel and Tourism. Available at: <https://www.maravipost.com/malawi-the-warm-heart-of-africa/> (accessed 1/6/2020).
- 2 African Parks site. Majete page. Available At: <https://www.africanparks.org/the-parks/majete> (accessed 1/6/2020).
- 3 Briggs, H. 2019. *Pangolins: Rare insight into the world's most trafficked mammal*. BBC News, Science and Environment. Available at: <https://www.bbc.com/news/science-environment-47200816> (accessed 1/6/2020).
- 4 Pers. comm. with Sophie Vossenaar and John Adendorff, African Parks staff members. 07.04.20.
- 5 African Parks. 2018. *Rare Pangolin Finds Sanctuary in Majete, Malawi*. Available at: <https://www.africanparks.org/rare-pangolin-finds-sanctuary-majete-malawi> (accessed 1/6/2020).
- 6 Vossenaar, S. and Adendorff, J. *Op. cit.*
- 7 *Ibid.*
- 8 Snyman, S. and Spenceley, A. 2019. *Private sector tourism in conservation areas in Africa*. CABI, Boston, USA.

## 2.24 Malaysia: Greater Ulu Muda Forest

*Malay honey hunters scale 80 m tualang trees at night to collect honey; one honey season can generate over US\$70,000 divided between local villages.*

**Ecosystem service:** Non-timber forest products

**Protected area:** Greater Ulu Muda Forest,  
Size: 1,620 km<sup>2</sup>, WDPA code: 3624 and 10101,  
IUCN management category: not reported<sup>1</sup>

**Adjusted net national income per capita (US\$):** 7,804

### Conservation value

Greater Ulu Muda area consists of multiple protection and production forests;<sup>2</sup> rivers from its forest provide as much as 96% of Kedah's and 80% of Penang's water supply, irrigating Kedah's rice fields which produce 40% of Malaysia's rice supply.<sup>3</sup>

### Description

Malaysia's tualang honey is some of the most expensive in the world and nowhere is more famous for both the quality of the tualang and the fearlessness of the honey hunters than the Ulu Muda Forest. Tualang honey has been used in traditional medicine for thousands of years; with recent pharmacological studies finding the medicinal qualities exceed even those of New Zealand's famous manuka honey.<sup>4</sup>

The honey is produced by the rock bee (*Apis dorsata*). It is named after the tualang tree (*Koompassia excelsa*) in which the bees nest and is produced from the nectar of some 180 species of flowers.<sup>5</sup> The forest is, however, under pressure; the number of bees appears to have fallen in recent years, with some blaming the destruction of their natural habitat.<sup>6</sup> The area was first proposed as a wildlife reserve in the 1960s<sup>7</sup> and although still not fully protected, the government's intention is for the whole area to be protected.<sup>8</sup>

At up to 83.8 m, the tualang is one of the tallest recorded rainforest tree in the world; its hard, heavy wood can support more than 80 of the 40 kg *A. dorsata* hives, each housing up to 70,000

bees. The trees also support the area's unique Malay honey gathering traditions; during the three-month honey-collecting season, bands of gatherers wait for moonless nights to evade the bee stings. Targeting only their allocated trees, they construct makeshift ladders and scale the distance to the combs in the darkness. Around 70 bands of collectors, each made up of seven men, can harvest 43 kg in one night which they sell for US\$50 per kg.<sup>9</sup> In one season, the average income per individual in a honey harvesting band is just under US\$150.<sup>10,11</sup>

### Tangible benefits

Income: each honey collector can make approx. US\$150 in a honey season. If an average season has 490 collectors, an estimated US\$73,500 can be injected into local economies – usually these sums are divided among villagers.

### References

- 1 Note: Malaysian protected area data on the WDPA is currently being updated.
- 2 Ministry of Water, Land and Natural Resources. 2019. *A Master List of Protected Areas in Malaysia – A Tool for National Biodiversity Conservation Management and Planning*. Unpublished. Putrajaya, Malaysia.
- 3 WWF website. Ulu Muda Project. Good Future Needs Good Water. Available at: [https://www.wwf.org.my/about\\_wwf/what\\_we\\_do/forests\\_main/forest\\_protect/protect\\_projects/ulu\\_muda/](https://www.wwf.org.my/about_wwf/what_we_do/forests_main/forest_protect/protect_projects/ulu_muda/) (accessed 5/5/2020).
- 4 Sulaiman, S.A. and Mohamed, M. 2014. Health benefits and safety profiles of Tualang honey AgroMas Malaysia: A review. *PharmaNutrition* 2(3): 108.
- 5 Stolton, S. and Dudley, N. 2010. *Vital Sites: The contribution of protected areas to human health*. Research report by WWF and Equilibrium Research. WWF. ISBN: 978-2-940443-02-4
- 6 Anon. 2018. Malaysia's honey hunters defy angry bees to harvest treetop treasure. *New Straits Times*. 13/3/2018. Available at: <http://www.straitstimes.com/asia/se-asia/malysias-honey-hunters-defy-angry-bees-to-harvest-treetop-treasure> (accessed 5/5/2020).
- 7 Suksuwan, S. 2008. Ulu Muda: The hidden realm of the Malaysian Rainforest. WWF Malaysia, Petaling Jaya.
- 8 Pers. comm. with Surin Suksuwan. 5/5/2020.
- 9 Anon. 2018. *Op. cit.*
- 10 Shahwahid. 2012. Unpublished WWF-Malaysia study.
- 11 Pers. comm. with Surin Suksuwan. 5/5/2020.

## 2.25 Montenegro: Skadarsko Jezero National Park

*Fishing in the Skadarsko National Park provides a livelihood for 400 people providing around US\$2.1 million annually.*



*Fishing in Skadarsko Jezero National Park, Montenegro © Equilibrium Research*

**Ecosystem service:** Fisheries

**Protected area:** Skadarsko Jezero National Park, Size: 200 km<sup>2</sup>, WDPA ID 134952, IUCN management category: not reported

**Adjusted net national income per capita (US\$):** 6,962

### Conservation value

The Lake Skadar system is a well-known hotspot of freshwater biodiversity; it is one of the largest bird reserves in Europe, with some 270 bird species, including some of the last pelicans (*Pelecanus onocrotalus*) in Europe. It is abundant in fish, with 34 native fish species, seven of which are endemic to Lake Skadar.

### Description

Lake Skadar is the largest lake in the Balkans. Straddling Montenegro and Albania, management of the lake involves extensive cooperation between Skadarsko Jezero National Park in

Montenegro and the Albania half which is also all within a national park.<sup>1</sup> Many ecosystem services are recognized although not all have been quantified in economic terms. The lake provides much of the water supply for coastal Montenegro and a new aqueduct brings water to the coast at a rate of 1,500 l/s.<sup>2</sup> Honey production in the region of the lake involves around 7,500 hives and produces approximately 80 tons of honey a year, calculated at a value of almost US\$1 million a year.<sup>3</sup>

Fish production is very important, at about 80 kg/ha/year it represents 90% of the freshwater fish harvest in Montenegro. Fishing in the lake supports about 400 fishers, 300 catch bleak (*Alburnus* spp.), operating for 95 days a year with a total annual catch of 456 tons; another 100 catch carp (*Cyprinus carpio*), operating for 190 days a year and catching 95 tons. At a market price of €3/kg for bleak and €5/kg for carp, this works out at around US\$2.1 million a year. In

addition, some of the catch are used for value-added products, mainly canned, smoked fish with a production value of US\$1.6 million a year.<sup>4</sup> 300 families are estimated to depend indirectly on the fishing catch.<sup>5</sup> 60 families make all or most of their income through cruise tourism on the lake,<sup>6</sup> and there are many hotels and restaurants close to and within the national park; these benefits have not been quantified.

### **Tangible benefits**

Focusing on just fish production, fishers in the national park receive US\$2.1 million annually from fisheries. These values omit ecotourism and local values are likely dwarfed by the total value of water to the country.

### **References**

- 1 Vujović, A., Krivokapić, Z., Stefanović, M., Pešić, V. and Jovanović, J. 2018. Integrated lake basin management for Lake Skadar/Shkodra. In *The Handbook of Environmental Chemistry*. [https://link.springer.com/chapter/10.1007/698\\_2018\\_264](https://link.springer.com/chapter/10.1007/698_2018_264)
- 2 Selulić, G., Ivanić, K.Z. and Porej, D. 2017. *Protected Areas Benefits Assessment (PA-BAT) in Montenegro*. WWF Adria, Zagreb.
- 3 UNDP and GEF. 2011. *The Economic Value of Protected Areas in Montenegro*, quoted in Kettunen, M. and ten Brink, P. (eds.) *Social and Economic Benefits of Protected Areas: An assessment guide*. Earthscan, London.
- 4 *Ibid.*
- 5 Mrdak, D. 2009. Environmental risk assessment of the Morača river canyon and Skadar Lake. WWF MedPo and Green Home, Podgorica.
- 6 Selulić et al. *Op. Cit.*

## 2.26 Morocco: Al-Hoceima National Park

*Artisanal fishing communities earn an average of US\$90,000 annually thanks to careful management of resources, stimulating secondary economies like fishing gear and clothing manufacturers and ultimately reducing poverty in the area by 30%.*

**Ecosystem service:** Fisheries

**Protected area:** Al-Hoceima National Park,  
Size: 484.60 km<sup>2</sup>, WDPA ID: 555547509, IUCN  
management category: not reported

**Adjusted net national income per capita (US\$):** 2,617

### Conservation value

Bordered on the north by the Mediterranean coast, Al-Hoceima protects some of the most unspoilt coast in Morocco, as well as high cliffs and a mountainous interior. Its marine waters are home to three species of dolphin; over a hundred species of fish; loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*) and green (*Chelonia mydas*) turtles and the rare giant ribbed Mediterranean limpet (*Patella ferruginea*).

### Description

Established in 2004, Al-Hoceima National Park (AHNP) extends along more than 50% of the 72 km Al-Hoceima province coastline and is Morocco's only terrestrial-marine national park on the Mediterranean coast.<sup>1</sup> The area supports 2,200 small-scale fishers.<sup>2</sup> In 2008, local community members came together to establish the Integrated Resource Management Association (AGIR), financed by the Millennium Challenge,<sup>3</sup> with the aim of protecting marine resources by strengthening the artisanal fishing community to monitor and combat illegal fishing in AHNP. Prior to this, the province's artisanal fishers were threatened by dynamite fishing, drift nets and bottom-trawling indiscriminately killing whole schools of fish and occasionally protected marine mammals. These practices were decimating fish stocks and exacerbating poverty levels (24% among fishing communities). Osprey nest poaching was also rife, causing rapid population decline.<sup>4</sup>

Of AHNP's 15,000 inhabitants, 2,000 participated in the planning of AHNP's 190 km<sup>2</sup> Marine Protected Area, including the 20 km<sup>2</sup> no-take zone. In the eight years following these improvements to AHNP's management, bottom-trawling and dynamite fishing have been eradicated.<sup>5</sup> As a result, over this period, marine resources have increased by 20-30%, generating a revenue of US\$720,000 and alleviating poverty by 30% for 1,200 artisanal fishers.<sup>6</sup> The increased revenue for the area also stimulated new economies; for example, the female-led craft cooperative Med Nasses producing and selling sustainable fishing gear and clothing. Over a period of six months, Med Nasses sold 342 fishing traps, making US\$7,800 in profits. Secondary economies like Med Nasses create resiliency in households by providing an extra income stream during periods of 'biological rest' when fishers have agreed to prohibit fishing activities.

### Tangible benefits

Income: fisheries generate an average of US\$90,000 annually and have stimulated other economies.

### References

- 1 United Nations Development Programme. 2016. *Association de Gestion Intégrée des Ressources (AGIR), Morocco*. Equator Initiative Case Study Series. New York, NY.
- 2 Pers. comm. with Atef Limam, UNEP/MAP Regional Activity Center for Specially Protected Areas staff member. 07.05.20.
- 3 AGIR website. Available at: <https://agir-env.org/au-port-dal-hoceima-les-nasses-seraient-elles-une-alternative/> (accessed 19/03/2020).
- 4 Monti, F., Nibani, H., Dominici, J., Idrissi, H.R., Thévenet, M. and Beaubrun, P. The vulnerable osprey breeding population of the Al Hoceima National Park, Morocco: Present status and threats. *Ostrich*. **84** (3): 199-204. DOI: [10.2989/00306525.2013.865280](https://doi.org/10.2989/00306525.2013.865280)
- 5 PANORAMA website. Available at: <https://panoramatest.tbodev.de/en/solution/sustainable-management-moroccos-marine-resources> (accessed 19/03/2020).
- 6 United Nations Development Programme. *Op. cit.*

## 2.27 Namibia: Bwabwata National Park

*The Khwe people of Bwabwata National Park collect Devil's claw root known for its natural pain-relief and anti-inflammatory properties; the root has a high value on international pharmaceutical markets and the harvest brings in over US\$22,000 revenue annually.*

**Ecosystem service:** Non-timber forest products

**Protected area:** Bwabwata National Park,  
Size: 6,277 km<sup>2</sup>, WDPA ID: 303692, IUCN  
management category: Not reported

**Adjusted net national income per capita (US\$):** 4,724

### Conservation value

Bwabata National Park, a core protected area in the Kavango-Zambezi Transfrontier Conservation Area, protects Kalahari woodland and includes the Okavango river in the west and Kwando river in the east. Large concentrations of elephant, buffalo, sable (*Hippotragus niger*) and roan antelope (*H. equinus*) occur in the park. Main predators include lion, leopard, cheetah (*Acinonyx jubatus*) and hyaena (*Crocuta crocuta*).

### Description

Devil's claw (*Harpagophytum spp.*) is a genus of plants in the sesame family, native to southern Africa. Named for its spiky fruits, it is found throughout Namibia and has been commercialized since the 1960s to treat arthritis as its roots contain anti-inflammatory and pain-relieving compounds.<sup>1</sup> In 2014, it was estimated that Namibia was earning between US\$1.3 and US\$1.9 million annually from the export of the root.<sup>2</sup> However, despite this commercialization, Devil's claw continues to be harvested predominantly from the wild by indigenous peoples and only a small portion of the trade is from cultivated crops.

There are approximately 5,500 people living in the Bwabata National Park, 80% of which are Khwe, the minority San ethnic group, who rely on wild-harvested foods for 75% of their diet.<sup>3</sup> In 2005, the park residents established the

Kyaramachan Association (KA), a legal entity to manage income from tourism, trophy hunting and Devil's claw trade and to co-manage the park with Namibia's Ministry of Environment and Tourism.<sup>4</sup> Through a partnership with WWF and Integrated Rural Development and Nature Conservation (IRDNC), KA achieved organic certification of its Devil's claw, opening access to higher value, niche, international markets.<sup>5</sup> In 2009, KA harvested 18 tonnes of the plant and in 2010, earned around US\$19,000 (over US\$22,000 when updated to 2020 values) from the sales,<sup>6</sup> the majority of this is received by the collectors, two-thirds of whom are women.

### Tangible benefits

Income: In 2014, 1,740 Khwe people from the KA collected organic Devil's claw from the park. In 2010, KA earned US\$19,000 from the sale of the plant; equivalent to over US\$22,000 in 2020.

### References

- 1 Cole, D. 2014. *Indigenous Plant Products in Namibia*. Venture Publications, Windhoek, Namibia.
- 2 <http://www.nbri.org.na/sections/economic-botany/INP/sectors/Devils-claw>
- 3 Massyn, P., Humphrey, E., Everett, M. and Wassenaar, T. 2009. *Tourism Development Plan: Bwabwata, Mudumu, and Mamilia National Parks*. Windhoek, Namibia: Ministry of Environment and Tourism.
- 4 Thiem, M. and Muduva, T. 2015. *Commercialisation of Land in Namibia's Communal Land Areas: A critical look at potential irrigation projects in Kavango East and Zambezi regions*. Institute for Poverty, Land and Agrarian Studies, School of Government, Faculty of Economic and Management Sciences, University of the Western Cape, Cape Town, South Africa.
- 5 MacLennan, A. 2016. *Devil's claw an organic remedy to economic hardship*. Washington, DC, WWF US.
- 6 Shigwedha, A. 2011. *San people earn big from Devil's claw sales*. The Namibian. <https://www.namibian.com.na/77152/archive-read/San-people-earn-big-from-devils-claw-sales>

## 2.28 Rwanda: Parc National Des Volcans

*Building ecotourism based around mountain gorillas is now the largest source of foreign exchange in Rwanda, contributing over US\$400 million annually, and is changing perceptions of the country after the tragic civil war.*

**Ecosystem service:** Ecotourism

**Protected area:** Parc National des Volcans, Size: 160 km<sup>2</sup>, WDPA Code: 5190, IUCN management category: II

**Adjusted net national income per capita (US\$):** 598

### Conservation value

Parc National des Volcans has a large altitudinal range resulting in a diversity of habitat, from lower montane forest to the five volcano tops. Best known for the mountain gorilla (*Gorilla beringei beringei*), other mammals include golden monkey (*Cercopithecus mitis kandti*), black-fronted duiker (*Cephalophus niger*) and some 178 recorded bird species.

### Description

Between 1990 and 1994, Rwanda had a catastrophic civil war which culminated in a genocide with over a million people being killed;<sup>1</sup> the country has struggled to rebuild its economy, society and global standing. Although small and crowded, with most land given over to agriculture, the Rwandan government has prioritized its national park system as a vehicle for protecting ecosystem services such as soil stability and flood control, and for attracting foreign tourists. Gorilla tourism has occurred since the late 1970s,<sup>2</sup> but virtually disappeared during the war and subsequent instability. Since then, however, it has boomed. By 2008, there were 20,000 protected area visits of which 17,000 were for gorilla viewing.<sup>3</sup> Growth has continued, rising 30% between 2014 and 2016, and tourism earned Rwanda US\$400 million in 2016<sup>4</sup> and US\$438 million in 2017,<sup>5</sup> making it the largest earner of foreign exchange.

The country is intentionally targeting high-end tourism. Ten mountain gorilla groups are habituated in Parc National des Volcans; permits cost US\$1,500 for one hour of gorilla watching (over twice the cost per permit of neighbouring Uganda), although discounts are available for those staying longer in protected areas and those attending conferences.<sup>6</sup> Ecotourism is generating very important economic benefits but can be susceptible to downturns due to civil conflict, disease outbreaks and pandemics, and economic

declines. Research also suggests that economic benefits have not substantially trickled down to the local communities and tensions (including poaching) remain.<sup>7</sup> A tourism revenue sharing strategy exists, which reinvests 10% of earnings back to local communities, but this only represents a small amount per household and seems to miss many of the poorest communities.<sup>8</sup> Supported infrastructure projects like water tanks and buffalo walls (to protect against crop damage) are perceived as more successful than income generating projects.<sup>9,10</sup> Local people get no discount on gorilla watching, although the new pricing structure allows for complimentary or promotional gorilla tourism in the low season.

### Tangible benefits

Income: Ecotourism earned US\$438 million in 2017; Parc National des Volcans is the most visited protected area, although the share of the national ecotourism revenue from this protected area has not been disaggregated.

### References

- 1 Republic of Rwanda website. National Commission for the Fight against Genocide. Available at <https://cnlg.gov.rw/index.php?id=80> (accessed 22/3/2020).
- 2 Butynski, T. and Kalina, J. 1998. Gorilla tourism: A critical look. In: Milner-Gulland, E.J. and Mace, R. (eds.) *Conservation of Biological Resources*. Blackwell.
- 3 Nielsen, H. and Spenceley, A. 2010. *The success of tourism in Rwanda – Gorillas and more*. Paper for the World Bank and SNV.
- 4 <https://www.bloomberg.com/news/features/2017-09-28/how-rwanda-became-the-unlikeliest-tourism-destination-in-africa> (accessed 22/3/2020).
- 5 <https://allafrica.com/stories/201808290251.html> (accessed 22/3/2020).
- 6 <https://www.volcanoesnationalparkrwanda.com/blog/rwanda-has-double-gorilla-permits-fees.html> (accessed 24/4/2020).
- 7 Sabuhoro, E., Wright, B., Munanura, I.E., Nyonza Nyakabwa, I. and Nibigira, C. 2017. The potential of ecotourism to generate support for mountain gorilla conservation among local communities neighbouring Volcanoes National Park, Rwanda. *Journal of Ecotourism* DOI: 10.1080/14724049.2017.1280043.
- 8 Munanura, I.E., Backman, K.F., Hallo, J.C. and Powell, R.B. 2016. Perceptions of tourism revenue sharing impacts on Volcanoes National Park, Rwanda: A Sustainable Livelihoods Framework. *Journal of Sustainable Tourism* <http://dx.doi.org/10.1080/09669582.2016.1145228>.
- 9 Bush, G.K., Ikirezi, M., Daconto, G., Gray, M. and Fawcett, K. 2010. *Assessing impacts from community conservation interventions around Parc National des Volcans, Rwanda*. Dian Fossey Gorilla Fund International, CARE International and International Gorilla Conservation Programme.
- 10 <https://www.volcanoesnationalparkrwanda.com/all-about-volcanoes-national-park/community-projects.html> (accessed 24/4/2020).

## 2.29 Seychelles: Vallée De Mai Nature Reserve

*Sale of the coco de mer nut is an important source of revenue for the Seychelles Islands Foundation, raising over US\$60,000 in sales per year. The Vallée de Mai site also contributes approximately US\$2.7 million annually in tourism revenues.*



Coco de mer seeds, Vallée de Mai Nature Reserve and World Heritage Site, Seychelles © Equilibrium Research

**Ecosystem service:** Non-timber forest products and tourism revenue

**Protected area:** Vallée de Mai Nature Reserve and World Heritage Site, Size: 0.2 km<sup>2</sup>, WDPa ID: 5185, IUCN management category: not reported

**Adjusted net national income per capita (US\$):** 11,667

### Conservation value

Vallée de Mai protects a remnant of ancient Praslin island palm forests and is one of the Seychelles' largest intact habitats of the endemic

coco de mer palm (*Lodoicea maldivica*).<sup>1</sup>

Also protected are endemic and globally important species, including the Seychelles black parrot (*Coracopsis barklyi*) and the golden panchax (*Pachypanchax playfairi*), the only freshwater fish endemic to the Seychelles.

### Description

The coco de mer palm bears the world's largest seed, weighing up to 17 kg; the seed has become a popular souvenir for tourists and has historically been heavily exploited. Despite its endangered status<sup>2</sup> and recognition in CITES Appendix III,

exploitation has increased since the 1990s as the kernel has gained popularity in South East Asia for medicinal purposes. In 2010, it was estimated that >95% of seeds were being unsustainably harvested and a 2018 census found only approximately 8,000 mature palms remained.<sup>3</sup> 14% of populations are female palms, these typically produce one seed per year, totalling a potential annual production of 1,120 nuts. The trade in seeds is now strictly regulated under Seychelles law.<sup>4</sup>

The Seychelles Islands Foundation (SIF) non-profit organization manages the Vallée de Mai (VM) and, along with other licensed sellers, sells seeds certified by the Department of Environment which recommends 20% of seeds produced are replanted to stabilize and increase population growth. Around 900 seeds are sustainably harvested each year, these certified seeds can be purchased for between US\$365 and US\$440<sup>5</sup> depending on size and symmetry, while the edible kernel reaches around US\$250 per kg.<sup>6</sup> In total, sales generate a minimum revenue of US\$328,500, of which SIF makes around US\$67,000 annually.<sup>7</sup>

In addition, the VM itself is a source of tourism revenue. In 2019, just under 109,000 tourists visited the reserve,<sup>8</sup> entrance fees were US\$25, thus generating approximately US\$2.7 million that year, much of which was re-invested into SIF's management, protection and research activities of both VM and the other Seychelles' World Heritage site – Aldabra Atoll. SIF employs 78 full-time staff and VM employs 44 staff.<sup>9</sup>

## Tangible benefits

Income and jobs: Annually, the site makes US\$2.7 million from tourism and SIF generates some US\$67,000 from seed and kernel sales.

## References

- 1 Rist, L., Kaiser-Bunbury, C.N., Fleischer-Dogley, F., Edwards, P., Bunbury, N. and Ghazoul, J. 2010. Sustainable harvesting of coco de mer, *Lodoicea maldivica*, in the Vallée de Mai, Seychelles. *Forest Ecology and Management*. **260**(12): 2224–2231.
- 2 Fleischer-Dogley, F., Huber, M.J. and Ismail, S. 2011. *Lodoicea maldivica*. *The IUCN Red List of Threatened Species 2011*: e.T38602A10136618. <http://dx.doi.org/10.2305/IUCN.UK.2011-2.RLTS.T38602A10136618.en>.
- 3 Ernesta, S. 2018. *After census, Seychelles is armed with more info to amend coco de mer decree*. Seychelles News Agency. Victoria, Seychelles.
- 4 Coco-de-Mer (Management) Decree. 1994. The Coco-de-Mer (Management) Decree, revised edition. Available at: <https://seylia.org/sc/legislation/consolidated-act/37>
- 5 Pers. comm. with Frauke Fleischer-Dogley, SIF staff member. 7/4/2020.
- 6 Malbrook, J. and Uranie, S. 2015. *Tougher penalties to tackle poaching of Seychelles endemic nuts as revised legislation comes into force*. Seychelles News Agency. Victoria, Seychelles.
- 7 Fleischer-Dogley, F. *Op. cit.*
- 8 *Ibid.*
- 9 Seychelles Islands Foundation (SIF) website. Available at: <http://www.sif.sc/vdm> (accessed 7/4/2020).

## 2.30 Sierra Leone: Gola Rainforest National Park

The protection of the Gola Rainforest is allowing local forest edge communities to gain substantial income from chocolate retailed on the global premium market, which combined with the revenues from the voluntary carbon market, generated upward of US\$90,000 in 2019.



Cocoa farmers getting ready for export, Gola, Sierra Leone © Bjorn Hogarth

**Ecosystem service:** Non-timber forest products

**Protected area:** Gola Rainforest National Park, Size: 710.7 km<sup>2</sup>, WDPA ID: 555542335, IUCN management category: II

**Adjusted net national income per capita (US\$):** 408

### Conservation value

The upper Guinean tropical rainforests of Gola are home to more than 330 species of birds, 14 of which are threatened, over 650 species of butterfly and 49 species of mammals, including a population of 300+ chimpanzees (*Pan troglodytes*), pygmy hippopotamuses (*Choeropsis liberiensis*)

and forest elephant (*Loxodonta cyclotis*). Divided into two blocks connectivity is a crucial issue for effective conservation.

### Description

The Gola area links Liberia and Sierra Leone, ranked 7<sup>th</sup> and 11<sup>th</sup> respectively by Global Finance for lowest GDPs in 2019.<sup>1</sup> Between 1988 and 2007, the region lost 23,000 km<sup>2</sup> of forests to cocoa clearance. Farmers have grown cocoa trees in the rainforest for the local market for generations, but until recently bulk commodity supply chains were leaving the people disenfranchised and the forests degraded.<sup>2</sup> The conservation of

the Gola Forest transboundary protected area, a Peace Park which unites the Gola Rainforest National Park of Sierra Leone with the Gola Forest National Park in Liberia, is protecting and connecting the largest intact remnants of the ancient upper Guinean tropical rainforest.<sup>3</sup> Farmers in Gola practise agroforestry; shade-grown cocoa trees support connectivity efforts and form a critical buffer zone for the different blocks of the national park, providing contiguous habitat for birds and 60 critically endangered species, including pygmy hippopotamus and forest elephants.<sup>4</sup>

Forest-friendly farming practices are helping to develop a transparent, gender-inclusive cocoa value chain which is now seeing premium Fairtrade chocolate retailed in Europe, the USA and even Japan. In collaboration with Gola Rainforest Conservation (GRC), who manage the Gola Rainforest National Park, local NGOs and premium chocolate companies, the farmers have set up new buying centres and farmer associations to ensure local ownership but also transparent and fair trading of their cocoa. With support from GRC, three Farmer Associations have formed a Cocoa Farmers Union Producer (CFUP), which exports the cocoa to the USA, EU and UK. From 2016 to 2019, in addition to sales to other producers, 1,800 farmers sold 56 metric tonnes of organic cocoa through the CFUP. At US\$2,900 per metric tonne, these sales leveraged just over US\$160,000, 60% was received by the farmers as income (US\$96,000), the remainder was invested in the development of the CFUP. Over the last year, an increase in farmers participating has brought the total number to 2,000 farmers benefiting from the cocoa work, these support another 17,000 people through additional household income.<sup>5</sup> The 2019-2020 harvest season generated over US\$90,000.

## Tangible benefits

Income and livelihoods: Since 2016, over 15,300 people have benefited from cocoa farming, including the 1,800 farmers that generated US\$160,000 through the CFUP in addition to sales to other producers.

## References

- 1 Ventura, A. 2019. *Poorest Countries in the World 2019*. Global Finance. Available at: <https://www.gfmag.com/global-data/economic-data/the-poorest-countries-in-the-world> (accessed 22/3/2020).
- 2 Sims, K. 2018. *Eat chocolate, save a rainforest – the Gola Cocoa Project tells you how*. Birdlife International.
- 3 <https://www.africa-eu-partnership.org/en/success-stories/trans-boundary-peace-park-sierra-leone-and-liberia> (accessed 22/3/2020).
- 4 Baker, A. 2019. The ethical chocolate companies proving that cacao farms and precious wildlife can co-exist. *The Telegraph*. <https://www.telegraph.co.uk/food-and-drink/features/ethical-chocolate-companies-proving-cacao-farms-precious-wildlife/> (accessed 22/3/2020).
- 5 Pers. comm. with Richard Dixon and Andrew Brock-Doyle, RSPB staff members. 29/04/2020.

## 2.31 Switzerland: Entlebuch Unesco Biosphere Reserve

---

*Under the established brand Echt Entlebuch, products produced within Entlebuch Biosphere Reserve generate almost US\$6 million annually.*

**Ecosystem service:** Agriculture and forestry

**Protected area:** Entlebuch Biosphere Reserve site, Size: 396.59 km<sup>2</sup>, WDPA Code: 900544, IUCN management category: N/A

**Adjusted net national income per capita (US\$):** 64,307

---

### Conservation value

The Entlebuch Biosphere Reserve (BRE) in the Lucerne region is a mixed landscape of high peatlands, subalpine, riverine and alluvial forests, meadows and karst mountains with cave systems. Over 2,000 people work in the primary sector (dominated by agriculture and forestry) and over 1,500 work in the secondary sector (mostly dairy and forest products), and thus are highly reliant on the ecosystem services of BRE.<sup>1</sup>

### Description

The BRE was established in 2001 through a highly participative approach led by local communities living in the area with the aim of conserving ecosystem services, promoting sustainable regional products, cultivating natural resources and developing ecotourism.<sup>2</sup> Once BRE was set up, the management team launched the product label 'Echt Entlebuch' to promote the sales of regionally produced products.

Over the next 13 years, BRE management built up the regulations, identity, credibility and market connections of Echt Entlebuch. To qualify for the label, 80% of goods (processed and unprocessed) need to originate from within BRE and two-thirds of the added value of the product (i.e. salaries, investments in infrastructure developments, etc.) must be generated in the region.<sup>3</sup> In 2013, the company Biosphäre Markt<sup>4</sup> was set up by the producers of Echt Entlebuch products and BRE management, as a cooperative, to advertise, sell and distribute the produce. By 2020, 50 organizations were making more than 500

Echt Entlebuch-labelled products, including cheeses, cold cuts, preserves, pasta, baked goods, beverages and also wooden doors.<sup>5</sup> As a result of the growing number of products and increased professionalization through Biosphäre Markt, demand for Echt Entlebuch products grew and, with it, distribution reach. Since its establishment, the net turnover has been increased three-fold.<sup>6</sup> In 2014, Echt Entlebuch products generated a gross added value of US\$5.8 million (twice the annual BRE management budget).<sup>7</sup>

### Tangible benefits

Income: US\$5.8 million is generated annually from the sale of Echt Entlebuch-labelled products.

### References

- 1 Knaus, F., Bonnelame, L.K. and Siegrist, D. 2017. The Economic Impact of Labeled Regional Products: The Experience of the UNESCO Biosphere Reserve Entlebuch, *Mountain Research and Development*, 37(1): 121-130. <http://dx.doi.org/10.1659/MRD-JOURNAL-D-16-00067.1>
- 2 MAB Biosphere Reserves Directory. <http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?code=SWI+02&mode=all> (accessed 7/5/2020).
- 3 Knaus et al. *Op. Cit.*
- 4 <http://www.biosphaeremarkt.ch/> (accessed 7/5/2020).
- 5 Pers. comm. with Florian Knaus, ETH Zürich Dept. of Environmental Systems Science staff. 11.05.20.
- 6 *Ibid.*
- 7 Knaus et al. *Op. Cit.*

## 2.32 The Philippines: Puerto-Princesa Subterranean River Natural Park

*The Sabang Mangrove Paddle-Boat Tour Guides Association, Inc., a community-owned conservation enterprise guiding tourists, has 19 local community members and generates over US\$150,000 per year, 40% of which is used to supplement the income of participating members.*

**Ecosystem service:** Tourism

**Protected area:** Puerto-Princesa Subterranean River National Park and World Heritage Site, Size: 222.02 km<sup>2</sup>, WDP ID: 7289, IUCN management category: III

**Adjusted net national income per capita (US\$):** 3,289

### Conservation value

Puerto-Princesa Subterranean River National Park (PPSRNP) contains one of the world's longest navigable underground river systems. Along its whole mountain-to-sea ecosystem the park supports 165 bird species, 30 mammals, 19 reptiles, 10 amphibians and over 800 plants.

### Description

During peak season, the PPSRNP underground river can attract up to 1,200 visitors per day,<sup>1</sup> but the ecosystems protected by the park remain under threat particularly from encroachment and conversion to aquaculture and agriculture.<sup>2</sup> The Sabang Mangrove Paddle-Boat Tour Guides Association, Inc. (SMPBTGAI), a community-based ecotourism enterprise located in Sabang village, began operations in 2001 as part of Conservation International's strategy to protect the old-growth mangroves along the Cabayugan river, 2.5 km west of the underground river mouth.<sup>3</sup> SMPBTGAI aims to place a value on this forest for communities, increase awareness and serve as an informal patrol system to protect wildlife.

SMPBTGAI has 19 community members that take turns to operate the boats and serve as guides on 45-minute boat rides that educate tourists on mangrove conservation. At the end of each week, the participating members (mostly

women) divide 40% of the revenues between them to supplement their other income streams. The remainder is divided as follows: 20% to housing, education and health care of members; 20% is paid into a trust for boat maintenance and operations; 5% to members' social welfare services contributions; 5% will go to a fund pool dedicated to providing separation and retirement benefits to members as well as a donation fund for those seeking financial help from the organization; 9% goes to the organizational savings; while the remaining 1% goes to the community-level governance unit as a voluntary royalty share.<sup>4</sup>

In 2017, SMPBTGAI generated just under US\$75,000 from trips offered at US\$5 per person, this grew to over US\$145,000 in 2018.<sup>5</sup>

### Tangible benefits

Income and jobs: most recent estimates suggest that SMPBTGAI is making approx. US\$150,000 per year, of which US\$60,000 is used to supplement participating member income streams. If divided equally this amounts to just over US\$3,150 per member.

### References

- 1 Pers. comm. with Elizabeth Maclang and Elmer Badilla, Puerto Princesa Subterranean River National Park staff. 17/5/2020.
- 2 Wildlife Friendly Enterprise Network. *Enterprises that Protect Water Monitor Lizards*. Available at: <http://wildlifefriendly.org/specie/palawan-water-monitor-lizard/>
- 3 Acero, L. 2020. *Management by objectives: The Puerto Princesa Underground River, Palawan Philippines*. IOP Conference Series: Earth and Environmental Science, 424, p.012008.
- 4 Maclang, E. and Badilla, E. 2020. *Op. cit.*
- 5 Maclang, E. 2019. *Keeping the balance of transformative tourism and ecological integrity in Puerto Princesa Subterranean River National Park, Philippines*. Protected Area Superintendent presentation. Unpublished.

## 2.33 Uganda: Bwindi Impenetrable National Park

Cooperatives generate around US\$48,000 a year selling baskets, made from locally, sustainably sourced materials, and other handicrafts to tourists visiting Bwindi, much of which is reinvested locally.



Looking towards Bwindi Impenetrable National Park and World Heritage site, Uganda © Equilibrium Research

**Ecosystem service:** Non-timber forest products

**Protected area:** Bwindi Impenetrable National Park and World Heritage Site, Size: 327 km<sup>2</sup>, WDPA ID: 18437, IUCN management category: II

**Adjusted net national income per capita (US\$):** 428

### Conservation value

The eastern Afromontane forests of Bwindi Impenetrable National Park (BINP) are home to 459 mountain gorillas (*Gorilla beringei beringei*) – 43% of the world's population, along with chimpanzees (*Pan troglodytes*), black and white colobus monkeys (*Colobus polykomos*) and forest elephants (*Loxodonta cyclotis*).

### Description

On average, around 20,000 tourists visit the BINP every year, paying US\$600 to track gorillas plus park entry fees; local communities receive US\$10 per gorilla permit sold plus 20% of the US\$40 park entry fees in recognition of the importance of their support for conservation. Extensive research in 2014 revealed that most tourists were arriving late on day one, gorilla trekking on day two and leaving early day three; few were venturing into local villages and those that did found little on offer to their taste or standards.<sup>1</sup> During this time, the highest income households were making from the sale of products to tourists was estimated at around US\$100 per annum.<sup>2</sup> Limited alternative livelihood options as a result of park

gazettement was leading to resentment of the park and the conservation bodies managing it – undermining the goals of ecotourism.

The International Institute for Environment and Development (IIED), working with Responsible Tourism Partnership, International Gorilla Conservation Programme (IGCP), Institute for Tropical Forest Conservation (ITFC) and Mbarara University of Science and Technology (MUST), implemented a project from 2016-2019 to combat these issues.<sup>3</sup> They surveyed tourists to understand the market gaps better and began a range of initiatives to train over 400 local people living within a 2 km radius of the park.<sup>4</sup> Training workshops and marketing support helped people develop enterprises in walking trail tourism, honey harvesting, the cultivation of produce for tourism facilities and the production of hand-craft baskets.<sup>5</sup> Ugandan artist Sanaa Gateja conducted the workshops making baskets which are produced using raw materials (fibre, plant-based dyes, etc.) collected sustainably and locally.<sup>6</sup> On average, the number of tourists visiting these enterprises increased by a factor of ten over the life of the project. Some handicraft cooperatives now make over US\$350 an hour selling baskets to groups of tourists – a sum they would previously have taken a month to make<sup>7</sup> and the 100 weavers working in the cooperatives are making approx. US\$40 per month – a 170% increase from their earnings before the workshops.<sup>8</sup> The women are using this additional income to pay for school fees, purchase solar lamps so that their children can do homework at night and reinvest into their businesses.

## Tangible benefits

Income and community spending: 100 weavers make approx. US\$40 per month amounting to US\$48,000 in total per year.

## References

- 1 Twinamatsiko, M., Nizette, P., Baker, J., Mutabaazi, H., Behm Masozera, A. and Roe, D. 2019. *Beyond gorillas: Local economic development through tourism at Bwindi Impenetrable National Park*. IIED, London. Available at: <https://pubs.iied.org/pdfs/17648IIED.pdf>
- 2 Bitariho, R., Sheil, D. and Eilu, G. 2016. Tangible benefits or token gestures: Does Bwindi impenetrable National Park's long established multiple use programme benefit the poor? *Forests, Trees and Livelihoods*. 25:1, <https://doi.org/10.1080/14728028.2015.1074624>
- 3 Pers. comm. with Dilys Roe, IIED staff member and Medard Twinamatsiko, MUST staff member. 28/5/2020.
- 4 Twinamatsiko et al. 2019. *Op. cit.*
- 5 Roe, D. 2019. *Bwindi: Bees, baskets and brilliant guided walks*. IIED. London. Available at: <https://www.iied.org/bwindi-bees-baskets-brilliant-guided-walks>
- 6 Mutu, K. 2017. *Gateja revives the arts among Uganda's Batwa*. The East African. Available at: <https://www.theeastafrican.co.ke/magazine/Gateja-revives-arts-among-Batwa/434746-3974406-gfcw9s/index.html>
- 7 Roe, D. 2019. *Op. cit.*
- 8 Pers. comm. with Tina Chigo, Change a Life Bwindi staff member. 27/05/2020.

## 2.34 Scotland, Uk: Abernethy National Nature Reserve

Viewing areas for nesting ospreys attract thousands of people every year to Loch Garten, contributing around US\$3.3 million to surrounding communities and significant local employment.



Loch Garten, Abernethy National Nature Reserve, Scotland, UK © Equilibrium Research

**Ecosystem service:** Tourism and employment

**Protected area:** Abernethy National Nature Reserve, Size: 140 km<sup>2</sup>, WDPa ID: 135918, IUCN management category: IV

**Adjusted net national income per capita (US\$):** 34,171

### Conservation value

Abernethy National Nature Reserve (NNR) is a privately protected area owned and managed by the Royal Society for the Protection of Birds. Around a third of the reserve is Caledonian pine (*Pinus sylvestris*) forest, the largest remnant of old-growth pine forest in the UK. The reserve also supports around 5,000 species, 20% of which are rare or scarce.

### Description

Loch Garten is part of Abernethy NNR and is the site where in the 1950s ospreys (*Pandion haliaetus*) first returned to the UK to breed after a period of extinction. Ospreys still breed at the site today. Although one of the commonest birds of prey worldwide, the osprey attracted intense interest in the UK and nesting pairs have become a popular visitor attraction in various places around the country.

Loch Garten Nature Centre attracts around 22,000 visitors a year. It supports 12.2 (expressed as full-time employment equivalents) jobs directly on the site (wardens/stalkers, scientific researchers, shop staff, information staff, gate attendants, forestry workers and hospitality staff) and an

estimated 76 more through increased tourism locally.<sup>1</sup> Other sources of employment connected with the site include various local contractors working on maintenance, and local timber and venison dealers. Woodland management is shared between reserve staff, locals employed on winter contracts and larger forestry companies. To support the diversification of the local economy, the reserve produces, processes and markets goods, including forestry products and venison.<sup>2</sup>

Overall value from osprey nesting sites in protected areas in the UK was estimated to be US\$4.6 million a year in 2006; estimates in Loch Garten vary from US\$1.8 million in 2002 and US\$2.5 million in 2004 (\$3.3 million today assuming 2% annual inflation);<sup>3,4</sup> and has likely increased since then. A refurbished nature centre due to open shortly is expected to increase visitor experiences and understanding of the forest, the ospreys and the conservation work that takes place at the site; it is expected to help increase visitor numbers and income for the reserve.

### Tangible benefits

Income and jobs: estimates are US\$2.5 million in 2004 (about US\$3.3 million today), with a total of 87 direct and associated jobs through management and increased tourism.

### References

- 1 McMorran, R. and Glass, J. 2013. Buying nature: A review of environmental NGO landownership. In: Glass, J., Price, M.F., Warren, C. and Scott, A. (eds.) *Lairds, Land and Sustainability: Scottish Perspectives on Upland Management*. Edinburgh University Press, pp. 173-188.
- 2 Centre for Mountain Studies. 2013. *Evidence for Scotland's Land Reform Policy Review (2012-2014). The socioeconomic benefits of the ownership and management of land by environmental non-governmental organisations (NGOs)*, Centre for Mountain Studies, Perth College, University of the Highlands and Islands.
- 3 Dickie, I., Hughes, J. and Esteban, A. 2006. *Watched Like Never Before... The local economic benefits of spectacular bird species*. RSPB, Sandy, Beds.
- 4 Poole, A.F. 2019. *Ospreys: The Revival of a Global Raptor*, John Hopkins University Press, USA.

## 2.35 USA: Great Smoky Mountains National Park

*Tourism spending supports the local economies of a handful of park gateway communities to the tune of US\$1 billion a year, reducing unemployment rates and fuelling job growth exceeding national and state averages.*

**Ecosystem service:** Tourism

**Protected area:** Great Smoky Mountains National Park, Size: 2,098.24 km<sup>2</sup>, WDPA Code: 369223, IUCN management category: II

**Adjusted net national income per capita (US\$):** 51,485

### Conservation value

Stretching across the Southern Appalachian Mountains, the relatively untouched Great Smoky Mountains National Park (GSMNP) is home to not only around 1,500 of the emblematic black bear (*Ursus americanus*), but also 3,500 plant species including the largest remaining block of red spruce (*Picea rubens*), and many endangered wildlife species including the world's greatest variety of salamanders.

### Description

It is estimated that for every dollar invested into the National Park Service by American taxpayers, US\$10 are returned to local economies.<sup>1</sup> This is certainly the case for GSMNP which attracts 11 million visitors each year to the park gateway city of Gatlinburg, Tennessee.<sup>2</sup> The park has long been one of the nation's most visited protected areas<sup>3</sup> and in 2018, visitors spent a total of US\$953 million locally at camping facilities, hotels, restaurants, transport and fuel, recreation businesses, retail and groceries (in order of largest to smallest).<sup>4</sup> In 2019, GSMNP experienced a 10% increase in visitor numbers on 2018.<sup>5</sup> Extrapolating from the above figures, 2019 tourist spending would have been in excess of US\$1 billion.

Over 45% of this spending is used to pay salaries for the 13.7 thousand jobs created by GSMNP tourism locally; almost 66% of the Gatlinburg working population are employed in industries

dependent on the tourism generated by GSMNP.<sup>6</sup> This economic activity puts Gatlinburg's job growth over the last year (2%) ahead of the national average (1.6%) and with an unemployment rate (3.3%) below both national (3.7%) and state (Tennessee – 4.3% and North Carolina – 3.9%) averages.<sup>7</sup>

### Tangible benefits

Income: 11 million tourists visiting GSMNP each year generates around US\$1 billion for the local economy, directly funding 13.7 thousand jobs.

### References

- 1 Soehn, D. 2019. *Park Tourism Generates \$953 Million in Visitor Spending*. Great Smoky Mountain Association. Available at: <https://www.smokiesinformation.org/news/park-tourism-generates-953-million-in-visitor-spending.html> (accessed 6/4/2020).
- 2 ESRI. Undated. *The Economic Impacts of National Parks on Local Communities*. A Story Map. Available at: <https://www.arcgis.com/apps/MapJournal/index.html?appid=cae2eb100a2c47e3bbfbec1e9c6eb3fb> (accessed 6/4/2020).
- 3 Peeples, G. 2012. *Economic benefits of Great Smoky Mountains National Park*. U.S Fish and Wildlife Service. Available at: <https://www.fws.gov/southeast/podcasts/2012/02/economic-benefits-of-great-smoky-mountains-national-park/>
- 4 Cullinane Thomas, C., Koontz, L. and Cornachione, E. 2019. 2018 national park visitor spending effects: Economic contributions to local communities, states, and the nation. *Natural Resource Report NPS/NRSS/EQD/NRR—2019/1922*. National Park Service, Fort Collins, Colorado. Available at: <https://www.nps.gov/subjects/socialscience/vse.htm>
- 5 Chávez, K. 2020. Great Smoky Mountains National Park hits record number of visitors, boosts local economy. *The Citizen-Times*. Available at: <https://www.citizen-times.com/story/news/2020/02/13/great-smoky-mountains-national-park-ashville-economy/4742672002/>
- 6 ESRI. Undated. *Op. cit.*
- 7 Economy in Gatlinburg, Tennessee and North Carolina. *Best Places*. Available at: <https://www.bestplaces.net/> (accessed 6/4/2020).

## 2.36 USA: Yellowstone National Park

---

*Visitor spending in and around Yellowstone supports 7,350 jobs and contributes US\$630 million to local economies; a figure amplified by the park's contribution to the regional economy thanks to its 'amenity value'.*

**Ecosystem service:** Tourism

**Protected area:** Yellowstone National Park,  
Size: 8,906 km<sup>2</sup>, WDPA ID: 377207; IUCN  
management category: II

**Adjusted net national income per capita (US\$):** 51,485

### Conservation value

The centrepiece of the Greater Yellowstone Ecosystem, the largest remaining continuous stretch of mostly undeveloped land in the contiguous United States, the national park is considered the world's largest intact ecosystem in the northern temperate zone. Species include 60 mammals and over 300 birds, over 1,700 species of trees and other vascular plants are native to the park.

### Description

Yellowstone National Park was established in 1872 and was the first 'national park' designated in the world. It spans the states of Montana and Wyoming and is the sixth most visited national park in the United States, receiving 4.1 million recreational visits in 2017, 99.5% of which were from outside the local region.<sup>1</sup>

In 2017, visitors spent almost US\$500 million in and around Yellowstone National Park, supporting 7,350 jobs, contributing US\$220 million in labour income, and US\$355 million to gross domestic product, resulting in a total economic output of US\$630 million.<sup>2</sup>

Rural regions of the western United States with protected public lands like Yellowstone and other national parks have also been shown to benefit from enhanced economic performance because the protected areas attract people to move to the regions to live and work. This phenomenon is known as 'amenity migration'. Studies have shown that, on average, counties with national parks, wilderness, and other forms of protected public lands in the rural U.S. West benefit from increased economic performance, including higher per capita income and income and investment growth.<sup>3</sup>

### Tangible benefits

Jobs: 7,350 tourism-related jobs contributing US\$220 million in labour income to the area.

### References

- 1 Cullinane Thomas, C., Koontz, L. and Cornachione, E. 2018. *2017 national park visitor spending effects: Economic contributions to local communities, states, and the nation*. Natural Resource Report NPS/NRSS/EQD/NRR—2018/1616. National Park Service, Fort Collins, Colorado.
- 2 *Ibid.*
- 3 Rasker, R., Gude, P.H. and Delorey, M. 2013. The effect of protected federal lands on economic prosperity in the Non-metropolitan West. *Journal of Regional Analysis & Policy* 43(2): 110-122.



Secretariat of the Convention on Biological Diversity

World Trade Centre  
413 St. Jacques Street, Suite 800  
Montreal, Quebec, Canada H2Y 1N9

Phone: +1 514 288 2220  
Fax: +1 514 288 6588  
E-mail: [secretariat@cbd.int](mailto:secretariat@cbd.int)  
Website: [www.cbd.int](http://www.cbd.int)