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

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## 2020

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Convention on Biological Diversity



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105 Pg. 6: Elizabeth Maruma Mrema. ....

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## CBD foreword

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To come from Elizabeth Maruma Mrema  
Executive Secretary  
Convention on Biological Diversity

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## 116 Foreword from IUCN WCPA Specialist Group of Natural Solutions

117

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

125

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

135

136 In all this work, the focus of “values” has remained broad, embracing subsistence values, contributions to human  
 137 wellbeing, economic values including poverty reduction,<sup>10</sup> and cultural or spiritual values.<sup>11</sup> In the current report, we  
 138 are trying something different, and have narrowed the focus to immediate economic values generated by protected  
 139 areas. This is by no means a new idea and we made an initial investigation as part of The Economics of Ecosystems and  
 140 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  
 141 the most detailed attempt to date to identify direct economic benefits through a set of case studies.

142

143 Even within economic valuation we are looking at a narrow sub-set. We are not assessing total economic value, with  
 144 more theoretical values such as the potential value of wild species as sources of food and medicines. Instead, we look  
 145 at a subset of cases which link real money “in your hands” to protected areas; in our experience these are the values  
 146 that carry political weight with governments and help influence policies. The most commonly discussed value here is  
 147 associated with tourism; we include some tourism case studies and could have filled the volume with examples. But  
 148 one important theme is that there are a wider range of direct economic benefits from protected areas than generally  
 149 assumed or recognised.

150

151 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  
 152 there are dangers in so doing. Decisions about land and water are seldom made solely on economic grounds, economic  
 153 valuation can backfire if counterarguments emerge showing that development creates more income than conservation,  
 154 and many economic values are inherently unstable. We are finishing this during the COVID pandemic when a collapse in  
 155 tourist income has left many protected areas desperately short of funds.<sup>15</sup> We respect and acknowledge critical views.

156

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

163

164

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

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## 249 **Abbreviations**

250 CBD: Convention on Biological Diversity

251 SCBD: Secretariat of the Convention on Biological Diversity

252

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## 307 Preface

308

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

- 311 1. Develop a technical report (technical series document for the Convention on Biological Diversity) for launching at  
312 the fifteenth meeting of the CBD Conference of Parties, by compiling and analysing case studies of economic  
313 valuation<sup>1</sup> and benefits from protected areas. These studies need to be readily relatable to Governments, decision-  
314 makers, companies and communities, to help build the case for long-term, sustainable protected and conserved  
315 areas.
- 316 2. To demonstrate some of the ways in which protected and conserved areas can support a range of the UN  
317 Sustainable Development Goals.
- 318 3. To respond to various paragraphs of decision XIII/2 on protected areas, in particular paragraph 5(a-e), as well as  
319 paragraph 10 of decision XI/24 which *'Requests the Executive Secretary, in partnership with relevant organizations,*  
320 *subject to available funding, to continue supporting implementation of national action plans for the programme of*  
321 *work and progress towards achieving Aichi Biodiversity Target 11 and other related targets at the national, sub-*  
322 *regional and regional levels'*, by making a case for Parties to speed up implementation of their national priority  
323 actions and commitments and donors to explore opportunities to align their on-going and future bilateral projects  
324 with the various national commitments and help facilitate the implementation of these actions to achieve Aichi  
325 Biodiversity Target 11, and thereby contribute to the Post 2020 Global Biodiversity Targets, and the Sustainable  
326 Development Goals.
- 327 4. To make the case for a strong post-2020 commitment to targets that retain existing natural ecosystems as vital  
328 contributors to aspirations of a just and sustainable human society, such as the calls for 30 per cent of the world's  
329 ecosystems to be included within networks of protected and conserved areas.

330

## 331 Process

332 The project was developed by:

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

340

## 341 Audience

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

350

## 351 Framework of the report

352 The report is in two main sections.

---

<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**.

- 353 1. An overview essay, which introduces the concepts of ecosystem services, provides an overview of the case studies  
354 reported here and concludes with a major section on lessons learned. Our results show that there are  
355 opportunities for some protected areas to create opportunities for economic returns, both for resident and local  
356 communities and to help support the work of protected areas. We however found that there is no single business  
357 model, reflecting the uniqueness of the world's global protected area network, and that success is far from  
358 guaranteed, requiring extensive analysis, planning and adaptive management.
- 359 2. Short case studies from around the world highlighting a range of benefits and mechanisms for delivering those  
360 benefits from many different biomes.
- 361

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

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## SECTION 1: UNDERSTANDING THE ECONOMIC RETURN FROM PROTECTED AREAS

### Primer for policymakers: key findings

This study looks at the actual and potential 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 gains from protected areas globally and draw on these to make some key policy recommendations.

Not all protected areas supply economic returns. Many were set up because natural resources had declined due to mismanagement or over-exploitation, others, inter alia, because the areas are important for biodiversity or for ecosystem services. Their success should not necessarily be measured narrowly in economic terms. Furthermore, economic valuation of such areas is complex, and in many cases, there is also lack of appropriate valuation techniques and / or standard methods. However, we also know that those protected areas can often be compatible with and contribute to successful conservation and sustainable resource use.

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

- Build a stronger constituency for conservation and sustainable development, by highlighting the economic value of biodiversity and other economic services.
- Justify the establishment and management costs of individual protected areas to governments and private donors by showcasing the returns from such investments.
- Publicise existing and potential economic benefits for communities living in or close to protected areas.

The 36 case studies from around the world provide evidence supporting expansion of the global network of protected and conserved areas in the post-2020 biodiversity targets. 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 the case studies we provide an overview of the issues, challenges and lessons learned in terms of linking economic benefits with conservation objectives in protected areas.

Section 1 ends with six overall lessons learnt and 18 recommendations for making conservation work and pay; these include enabling conditions, good practices and reporting success. A summary of these recommendations is included here:

#### Lessons

- 1 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.
- 2 A three-way link between communities, protected area managers and businesses is the most successful model.
- 3 Sustainable management is at the heart of successful business models and needs to be carefully monitored and maintained.
- 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 fail.

413 Recommendations

- 414 1. There must be something to sell – but it can be a product, ecosystem service or experience.
- 415 2. It is important to ensure there is adequate market demand and honest, reliable supply chains.
- 416 3. A stable and supportive legal and political environment will greatly improve the chances of success.
- 417 4. Security of tenure over resources is similarly important in providing insurance that an enterprise can be sustainable
- 418 and stakeholders feel safe to invest.
- 419 5. Seed funding and institutional support are both sometimes important in driving forward new projects, but long-
- 420 term donor support can be counterproductive.
- 421 6. Commercial expertise is needed and will be absent from many remote communities, meaning that some initial
- 422 training and capacity building can be important.
- 423 7. Local enthusiasm is key, and projects imposed in areas where there is resistance will seldom work.
- 424 8. Clear conservation objectives are also needed so that the economic activities support rather than undermine the
- 425 central aims of nature conservation.
- 426 9. Conservation enterprises need to be nested in an overall conservation strategy and to work together to reduce
- 427 threats and achieve conservation objectives.
- 428 10. Monitoring and adaptive management are both essential; projects seldom work perfectly to begin with and will
- 429 need to be adjusted as workers learn more, and as conditions change and develop in the market.
- 430 11. Enterprises linked to a protected area need local relevance and to be appropriately matched to, and ideally build
- 431 upon, local cultures, belief systems, traditional knowledge, and practices.
- 432 12. Socially and environmentally responsible private sector partners are often needed, companies with good business
- 433 sense but also in tune with the wider social and environmental aims of any project.
- 434 13. Legally recognised community partners are vital with appropriate governance structures and rights over the natural
- 435 resources required for products and services.
- 436 14. Transparent benefit-sharing arrangements usually include agreed contributions to wider community development
- 437 (schools, health clinics etc).
- 438 15. Local coordination with other enterprises, particularly if also associated with the protected area, can help to
- 439 maximise gains – such as local food producers linking with ecotourism companies.
- 440 16. Sound financial planning which should aligned with GAAP (generally accepted accounting principles) and
- 441 international accounting and reporting frameworks.
- 442 17. Clarity on reporting economic benefits is important, both for internal purposes and to build evidence of wider
- 443 benefits from protected and conserved areas.
- 444 18. More reporting of successful examples, finally many more protected areas should be encouraged to report on their
- 445 methods and innovations to produce economic benefits where this is applicable given the area’s conservation
- 446 objectives.

447

448 The cases collected here show that protected areas can contribute in very measurable ways to many of the UN

449 Sustainable Development Goals, and to local and often national economic development. In doing so, we provide

450 important additional arguments for ambitious targets for protected and conserved areas to be included in the CBD

451 post-2020 global biodiversity framework’s targets for area-based conservation measures.

452

453 **1.2 Multiple benefits from natural ecosystems in protected and conserved areas**

454 Natural ecosystems support a very wide range of the ecosystem services essential for human life and wellbeing.

455 Protected and conserved areas provide the most effective way yet identified to retain ecosystems and their associated

456 services. All the key ecosystem services identified by the Millennium Ecosystem Assessment<sup>16</sup> can and do come from

457 protected and conserved areas (see figure 1):

458

459

460

461

462



Figure 1: Ecosystem services adapted from the Millennium Ecosystem Assessment<sup>17</sup>

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 from healthy populations (particularly fish) into areas where they can be harvested;<sup>18</sup> through the conservation of crop<sup>19</sup> and livestock wild relatives<sup>20</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>21</sup> Many other plant and animals-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, 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:** from our perspective here, some of the services that can be most readily translated into economic values – at least in theory – are the regulating services and many are subject to Payment for Ecosystem Service (PES) schemes.<sup>22</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 industrialised watersheds and thus water purification charges are radically reduced, a benefit that a growing number of municipalities around the world are recognising.<sup>23</sup> Perhaps even more important, natural ecosystems store vast amounts of carbon and today this is recognised as a critical function, bringing a new group of stakeholders into the debate about area-based conservation.<sup>24</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>25</sup> along with the wider mental<sup>26</sup> and physical<sup>27</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>28</sup>

**Cultural services:** are incredibly important although many are difficult to assign an economic value – indeed part of their value is that they are *not* economic. 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 the 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>29</sup> which paradoxically is often the easiest value of all to calculate.

498 **Supporting services:** such as soil, primary production and nutrient cycling are critically important, but under current  
499 economic systems are generally regarded as free goods. This is short-sighted. Total economic valuation studies of  
500 natural ecosystems have been helpful in bringing attention to these core services, but it is still virtually impossible to  
501 identify concrete cases of communities making money as a result.

502  
503 These values are not optional extras but are essential to the continuation of life on the planet. Maintaining and  
504 improving the global store of ecosystem services, along with the closely related issue of reducing the speed and severity  
505 of climate change, are the greatest challenges facing humanity as we draw towards the end of the first quarter of the  
506 21<sup>st</sup> century.

507  
508

### 509 **1.3 The value of biodiversity**

510 As increasingly large land and sea areas have been set aside for “nature conservation”, the need to pay for their  
511 management, and sometimes to compensate for other values foregone, have both become increasingly important. At  
512 the same time the related need of justifying conservation to decision-makers and policy influencers, and perhaps to an  
513 even greater extent to the communities living in or around protected areas, as well as the need to provide evidence of  
514 the potential benefits of protection to landowners/title holders, has also grown more important.

515  
516 We already know quite a lot about the value of ecosystems services. In 1997, a seminal paper<sup>30</sup> estimated the total  
517 global value of ecological systems and natural capital as being between US\$16-54 trillion a year as a minimum, using  
518 1995 data. This and subsequent papers<sup>31</sup> explored both global and national values. Recalculating these figures some  
519 years later, the authors revised estimates upwards to US\$125-145 trillion.<sup>32</sup> Many more detailed studies have been  
520 done of particular biomes, sites, countries and services. For example, a conservative estimate for the mental health  
521 benefits of protected areas around the world was given as US\$6 trillion a year in 2019.<sup>33</sup> Importantly though, much of  
522 this value is outside the market and best considered as non-tradable public benefits, highlighting the need for better  
523 accounting for public goods and services.<sup>34</sup> The need for new approaches and new thinking from government is still  
524 very evident twenty years or more after these issues first came into widespread public debate.<sup>35</sup>

525  
526 In turn, these studies led to a rapid expansion of the evaluation of natural capital, and most significantly, to the  
527 establishment of The Economics of Ecosystems and Biodiversity (TEEB) initiative.<sup>36</sup> TEEB emerged in response to a  
528 proposal from the environment ministers from the G8+5 countries meeting in Potsdam, Germany to analyse the global  
529 economic benefit of biological diversity, the costs of the loss of biodiversity and the failure to take protective measures  
530 versus the costs of effective conservation.<sup>37</sup> The TEEB process continues and has also been applied at national and  
531 regional scales.<sup>38</sup>

532  
533 Whilst fully supporting these analyses and the implications, they have as yet failed to stimulate changes on the scale  
534 needed. Benefits “for future generations” or outside the market are easy for government to ignore when they are  
535 looking at tax breaks to help win the next election. It is still proving challenging to encourage significant investment in  
536 the long-term value of nature and at the moment, with a handful of exceptions, trends are going in the opposite  
537 direction.

538  
539 To a major extent, these issues are a matter of political and socio-cultural choice. The costs of nature conservation,  
540 even if we take the most generous estimates of what might be required, are for example a fraction of what countries  
541 routinely spend on their armed forces.<sup>39</sup> But the political reality is that the conservation budgets are increasingly  
542 challenged within governments and by industry and are often under threat. At the same time, there has been serious  
543 and sometimes justifiable resistance from people who have lost out socially and economically because protected areas  
544 have been declared in or close to their traditional homelands. However, to add to the complexity, there are also a  
545 growing cohort of land/water owners or people/organisations with long-term management agreements looking for

546 more sustainable ways to manage land is a way that brings in at least some returns but which contributes to  
 547 conservation objectives.

548

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

552

553 Demands for this kind of valuation of protected areas, therefore come from three different needs:

554

- 555 • To build a stronger constituency for conservation and sustainable development at a global or national scale, by  
 556 highlighting the economic value of biodiversity and other economic services
- 557 • To justify the establishment and management costs of individual protected areas to the government, treasury  
 558 department, or to private donors
- 559 • To publicise existing economic benefits to communities living in or close to protected areas, and to identify  
 560 potential benefits that could be realised in the future.

561

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

563

564 **Building a constituency for conservation:** A key incentive for economic valuation of nature is to provide arguments for  
 565 conservation in a language understood by people outside the conservation field, and who may be uninterested or even  
 566 resistant to a conservation message. Global, national, or sometimes subnational values of ecosystem services involve  
 567 complex economic assessment and modelling. As noted above, a major attempt to assess the Earth's natural capital  
 568 stocks and the ecosystem services they supply has been undertaken. At the time the entire biosphere was valued at  
 569 between US\$16-54 trillion per year in 1997, compared with the global gross national product at the time of around  
 570 US\$18 trillion per year.<sup>40</sup>

571

572 In parallel, with global studies, a number of other methodologies have been developed to assess benefits at national or  
 573 sub-national levels.<sup>41</sup> These cover a wide range of methods and philosophies, from top-down approaches that draw on  
 574 global data sets, such as Co\$ting Nature,<sup>42</sup> to bottom-up processes that ask local opinion and often include qualitative  
 575 opinions, such as the Protected Area Benefits Assessment Tool.<sup>43</sup> Some approaches try to combine both, including  
 576 InVEST from the Natural Capital project<sup>44</sup> and TESSA, originally developed by BirdLife International.<sup>45</sup> All are attempting  
 577 to look at realisable values and many are implemented directly in collaboration with government agencies, linking  
 578 findings with sustainable development strategies.

579

580 **Justifying management costs:** Protected areas are still, at least by area, overwhelmingly supported by public money:  
 581 state governments and, in developing countries, national and international donor agencies.<sup>46</sup> Non-governmental  
 582 organisations also carry an increasing proportion of the load. All these sources are demanding increases in efficiency  
 583 and cost effectiveness, with a focus initially on management effectiveness,<sup>47</sup> and latterly also increasing demands for  
 584 proof of economic values.

585

586 The assessment of natural capital, or more narrowly of the economic benefits from protected areas, has been carried  
 587 out for individual protected areas and protected area systems around the world. This kind of assessment is often first  
 588 done on a national scale, as is the case in recent studies in Iceland<sup>48</sup>. Canada provides an example. In 2017, 10.6 percent  
 589 of Canada's land and inland waters was in protected areas, covering over one million km<sup>2</sup>. A 2011 study of the  
 590 economic impact<sup>49</sup> found that in 2008/09, the government spent CDN\$0.8 billion on parks and visitors spent CDN\$4.4  
 591 billion, making a CDN\$4.6 billion contribution to Canada's Gross Domestic Product. This also supported 64,000 full time  
 592 equivalent jobs, many in rural communities with limited employment options. The study found that 44 per cent of  
 593 government investment was eventually returned in taxes. Similarly, in the United States the US National Parks Service  
 594 (USNPS) manages 417 areas, covering about 34 million hectares. The USNPS offers a publicly accessible web-based

595 interactive tool providing year by year and trend data on visitor spending, jobs, labour income, value added and  
596 economic output information by sector for national, regional and local economies.<sup>50</sup> In 2017, over 300 million visitors  
597 travelled to USNPS sites and spent approximately US\$18.2 billion in local gateway regions (defined as within 60 miles of  
598 a park).<sup>51</sup> This spending supported 306 thousand jobs, and contributed US\$11.9 billion in employment income, US\$20.3  
599 billion in value added (contribution to Gross Domestic Product), and US\$35.8 billion in economic output. The lodging  
600 and restaurant and bar sectors saw the highest direct contributions to local gateway economies with US\$5.5 billion and  
601 US\$3.7 billion in economic output respectively.<sup>52</sup>

602  
603 Governments with a poor record on conservation can have their policies swayed if it is shown that a national park  
604 system generates important economic benefits for local communities. Working out the dollar value of the penguins  
605 that swam ashore every evening along the Great Coast Road in southern Victoria, drawing a nightly crowd of sightseers,  
606 helped secure the needed conservation funds for Parks Victoria. Showing the additional income provided by visitors to  
607 biosphere reserves in Germany, described in detail later, helped encourage larger areas to be set aside for conservation  
608 in former East Germany after reunification. The most successful valuation studies from the perspective of advocating  
609 for conservation are those that provide an instantly relatable figure; in Australia the total value of “penguin-related  
610 tourism” was divided by the number of penguins in the colony giving an “economic value per penguin”. Simplistic  
611 though such a figure may be, it is something that a politician or civil servant can instantly understand and relate to.

612  
613 And it is important to note here that it is not just the total benefits but also where they are found: protected areas are  
614 often in rural areas with few other economic options, where supplying a few jobs has a disproportionate impact on the  
615 local economy; with knock-on effects for local traders, schools and so on.

616  
617 **Identifying economic benefits to resident or local communities:** Much of the resistance to protected areas comes if  
618 and when adjacent communities lose out, or believe they are losing out, on the economic activities that would be  
619 available in the absence of a park, reserve, etc. Many of these frustrations can be real, if global values for nature and  
620 ecosystem services are supplied without considering the implications for the people living in the areas being conserved.  
621 Addressing the economic needs of people living in or near protected areas has become an increasingly important facet  
622 of management. Despite the popular conception of protected areas as pristine areas empty of people, many have  
623 people living inside, some contain large cultural landscapes, and even many national parks or wilderness areas in more  
624 pristine ecosystems are open to agreed uses by local people. Demonstrating that many protected areas are not just  
625 about protecting nature, but also helping to protect the livelihoods of indigenous people or other local communities is a  
626 really important message in these circumstances.

627  
628 The emerging debates about the implications of biodiversity conservation on local communities have led to important  
629 changes in perspective over the last few years, with conservation organizations increasingly emphasizing the need to  
630 stimulate flows of economic revenues from protected areas to people living in these areas or in neighbouring  
631 communities, who shoulder a disproportionate amount of the costs of conservation.<sup>53,54</sup> This has in turn stimulated a  
632 range of initiatives focusing on economic benefits; some of these have been highly successful while some either failed  
633 outright or fallen foul of changes in conservation laws, because resources have been over-exploited or because of social  
634 and economic changes in communities over time.

635  
636 At their best, these economic studies/projects provide forceful arguments for investment, or continued investment, in  
637 protected areas. They have helped, at least in part, develop and progress markets for ecosystem service (such as clean  
638 water and carbon storage) which have resulted in some conservation gains. And in a few cases, they have been the  
639 impetus behind conservation initiatives in the first place. At their worst they have raised expectations of a mass of  
640 unrealised benefits and started a trend in the aim to put a value to all sorts of benefits of conservation which should  
641 not be linked to market forces the rigidly utilitarian “pay-to-stay” concept. So, economic valuations can be useful but  
642 also need to be treated with considerable caution.

643

644 **1.4 Some background: the places and the benefits being assessed**

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

647  
648 **Protected areas and other types of area-based conservation:** We look here at protected areas in the sense defined by  
649 the CBD and by IUCN, in other words for the CBD: "*a geographically defined area which is designated or regulated and*  
650 *managed to achieve specific conservation objectives.*" Or in IUCN's closely related definition: "*A clearly defined*  
651 *geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-*  
652 *term conservation of nature with associated ecosystem services and cultural values*".<sup>55</sup>

653  
654 Protected areas are not monolithic management regimes, but occur in a very large variety of shapes, sizes and  
655 management structures. The CBD and IUCN both recognize six main management categories and four governance types  
656 as outlined in tables 1 and 2 below.

657

658 Table 1: IUCN and the CBD recognise 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.

659

660 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.

Type	Details
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.

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More recently, the CBD has also recognised 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>56</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 it should be noted that 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>57</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>58</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>59</sup> While ecosystems services from protected areas do help reduce poverty,<sup>60</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>61</sup>

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

This report focuses on protected areas as one of the main strategies for the conservation of nature. The case study areas are all (at least in part) listed on the World Database of Protected Areas<sup>62</sup> and thus all adhere to the IUCN and CBD definitions of a protected area.<sup>63</sup> The IUCN definition is clarified by a series of principles, the most relevant when considering the link between conservation and economic gain being: "for IUCN, only those areas where the main

705 *objective is conserving nature can be considered protected areas; this can include many areas with other goals as well,*  
706 *at the same level, but in the case of conflict, nature conservation will be the priority".* Many protected areas will  
707 therefore have other management priorities – cultural, tourist-related etc – but to be a protected area recognised by  
708 IUCN, conservation needs to take priority.<sup>64</sup> Balancing economic activities against this imperative is therefore tricky.

709  
710 However, it is clear from the CBD and IUCN definitions of a protected area, and the management regimes that take  
711 place inside protected areas, that resource use is an accepted part of management in many protected areas. No global  
712 survey has taken place, but it is estimated that tens of millions of people currently use resources within protected  
713 areas;<sup>65</sup> although often in ways not sanctioned by the protected area managers.<sup>66,67</sup> This is a difficult area. Illegal and  
714 damaging use of natural resources within protected areas is one of the greatest threats facing conservation, leading for  
715 example to the “empty forests” syndrome,<sup>68</sup> where conserved areas of forest have been stripped of all their largest  
716 animals and any valuable plants. Many protected areas have been set up precisely because natural resources were  
717 declining due to mismanagement or over-exploitation.

718  
719 As the concept of protected areas has evolved, there has been an increasing understanding that sustainable resource  
720 use is often compatible with, and in some cases can even contribute, to conservation objectives. Analysis shows that  
721 protected areas can and do contribute to all the UN Sustainable Development Goals and play a key role in the  
722 attainment of several of these.<sup>69</sup> In addition to protecting life on land and in the ocean, particular links are with SDGs  
723 relating to zero hunger, clean water and sanitation, climate action, good health and wellbeing, sustainable cities and  
724 communities, and peace, justice and strong institutions.<sup>70</sup>

725  
726 Getting the right balance may be difficult and involves not just agreeing on what is hoped to be a sustainable offtake  
727 which does not impact conservation objectives but also monitoring this over time, adjusting if necessary, and policing  
728 to make sure that everyone sticks to agreements. National laws and policies can both help and hinder. Sometimes,  
729 where use by local people is deemed harmless but national laws do not allow any use, managers turn a blind eye. In  
730 other cases, strict protection in one area can have a neutral or even beneficial impact on resource use outside of the  
731 strict protection zone; exemplified in monitoring the impacts of marine protected areas on fisheries.<sup>71,72,73,74,75</sup> When  
732 looking beyond state-managed protected areas, many Indigenous Protected Areas, or ICCAs – Territories for Life, are  
733 predicated on sustainable use, although a large proportion of this may well be subsistence with only indirect economic  
734 value. Similarly, many privately protected areas are set-up and managed to ensure economic benefits cover  
735 management costs and, in some case like tourism, provide profits often used to support wider community needs.<sup>76</sup>  
736 Over the past couple of decades, even some apparently strictly protected areas have been increasingly opening their  
737 borders to sustainable use by local or traditional communities; for example, Bwindi National Park in Uganda allows the  
738 collection of some material from the park (see case study). The decision to allow native Americans to collect traditional  
739 medicinal and other herbs in national parks<sup>77</sup> is a powerful symbol of this new attitude.

740  
741 The need to ensure and maintain sustainable resource use can provide the incentive for protection and conservation  
742 efforts and generate much-needed revenue to finance protected areas. Examples of such resource use within protected  
743 areas can be found around the world.<sup>78</sup> But like all broad social changes, the re-opening of many protected areas to  
744 traditional uses has supporters and opponents, successful examples, and failures. Managers point to examples of  
745 opening areas to fishing and seeing a dramatic reduction in fish populations as communities reap a sudden bonanza.  
746 Laboriously agreed sustainable use plans can be undermined by one or two people in a community not prepared to  
747 follow the rules. Schemes that have been carefully set up over many years can fall victim to chance, accident, or sudden  
748 changes in policy. Later in Section 1 we describe several schemes that were once highly successful and identified for  
749 inclusion in this study but had to be rejected because something had gone wrong.

750  
751 While it is certainly possible to combine conservation and economic development, and a successful mingling is usually a  
752 way of ensuring support for conservation, achieving a successful and sustainable balance is far from easy. We are still to  
753 some extent feeling our way. Some much-publicised opportunities have been slow to develop, including the carbon

754 market, still waiting for final agreement after more than a decade (which has by no means stopped all progress but has  
 755 certainly hampered the level of uptake). Other excellent examples are so specific to a particular place that they will  
 756 likely not be possible to replicate elsewhere (case studies on the benefits from collecting crocodile eggs in Australia and  
 757 marine turtle eggs from Costa Rica in section 2 exemplify this). Moving from individual projects to mainstream  
 758 acceptance is always challenging, perhaps particularly so in conservation.<sup>79</sup>

759  
 760 Furthermore, not all protected areas can supply useful economic benefits, and we remain wary of linking success too  
 761 closely with these measures. Many sites that are essential for the conservation of biodiversity, or for global ecosystem  
 762 services like climatic stability or the control of land degradation, will not produce “benefits” in a form that is suitable for  
 763 standard economic exploitation, or in a form that can easily support management costs or compensation schemes.  
 764 Such areas are extremely important and not infrequently irreplaceable. Collective effort, usually in the form of state  
 765 support, will remain important here and the arguments marshalled together in this study are in no way supposed to  
 766 imply that these areas are “less valuable” than those producing a measurable economic income.

767

768

### 769 1.6 Why this study: aims and challenges

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

775

776 The key elements we were looking for:

- 777 1. **The economic gain must be real/tangible and quantified.** Many studies of total economic value rely heavily on  
 778 theoretical or assumed values. For example, over 90 per cent of the provisioning value of tropical forests in some  
 779 of the most rigorous studies of total economic value is for presumed medicinal value of species growing there;<sup>80</sup>  
 780 this may be true but is seldom enough to convince a government to leave a forest standing. So, whilst recognising  
 781 and supporting the concept of total economic value, in the current study we have chosen a narrower focus.
- 782 2. **The economic benefit should not undermine the areas conservation objective.** In most of the case studies the  
 783 conservations outcomes are very clear, but from the many potential cases studies rejected for this report this is  
 784 unfortunately not always the case.
- 785 3. **The protected area must be recognised on the World Database on Protected Areas**, in other words be a fully  
 786 developed and recognised protected area. There are two partial exceptions: in the case study from Sierra Leone we  
 787 focused on the area between two blocks of Gola National Park where connectivity is essential as part of an overall  
 788 transboundary conservation project. In the Malaysia case study, the site is due to be fully protected, but data in the  
 789 WDPA is currently being update.
- 790 4. **The study aims for a wide geographic spread of examples**, the cases explored are not limited to particular  
 791 economic systems, levels of development or ecosystems and we sought to include a variety of biomes (see figure  
 792 2).
- 793 5. **Areas that include many different stakeholders and co-producers**, who might be residents in the protected area,  
 794 people living nearby, protected area employees, visitors, and also sometimes more distant communities. Income  
 795 from a combination of natural and human-driven resources is sometimes known as “co-production” and we  
 796 examine cases of co-production here.<sup>81,82,83</sup> The aim was to present case studies where local governance and equity  
 797 where also key feature – although there are a couple of case studies were clearly more could be done to ensure  
 798 equitable benefit sharing.
- 799 6. **Areas highlighting a variety of benefits.** While tourist income is critically important to many protected areas it is  
 800 not open to all and is inherently volatile. A single event, like a terrorist attack, can undermine tourism in a  
 801 particular country, while the 2020 pandemic halted tourism everywhere and created huge problems for many  
 802 protected areas. Here we aim to explore a much wider range (see figure 4) of types of benefit.



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Figure 2: Location and biome of each case study (note this map has been created using google maps, designers will redesign and make key clearer)

**Key:**

- Dark green = tropical forests
- Olive green = deciduous forest
- Black = boreal forest
- Light green = savannah/grasslands
- Grey = mountain/alpine
- Dark blue = marine and coastal

**Box 1: COVID-19.** This is being written while the pandemic is 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 per cent had lost more than 75 per cent in bookings and many had none at all,<sup>84</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>85</sup> The economy of entire towns like Hoedspruit next to Kruger National Park in South Africa – virtually came to a standstill.<sup>86</sup> The dangers of relying on international tourism to sustain conservation have been recognised for a long time,<sup>87</sup> but those protected areas relying heavily on tourist dollars are at present facing an uncertain future.<sup>88</sup>

We aimed to focused 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 done for CBD a decade ago)<sup>89</sup> although we have previously studied the links between poverty and protected areas<sup>90</sup> and recognise the importance of the links. These issues are discussed in slightly 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>91</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 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 is 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>92</sup> but in some cases can be hard to regulate or susceptible to over-commoditization and changes in policy. Changes in government attitudes, as for example has happened dramatically in Brazil,<sup>93</sup> means that some previously successful cases no longer work effectively.

In retrospect, we should perhaps have predicted some of the data problems. Similar challenges were found in getting reporting data for Aichi targets and in previous systematic reviews, for example of evidence for the impacts on human well-being 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 well-being.<sup>94</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.

## 862 1.7 Overview of case studies

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

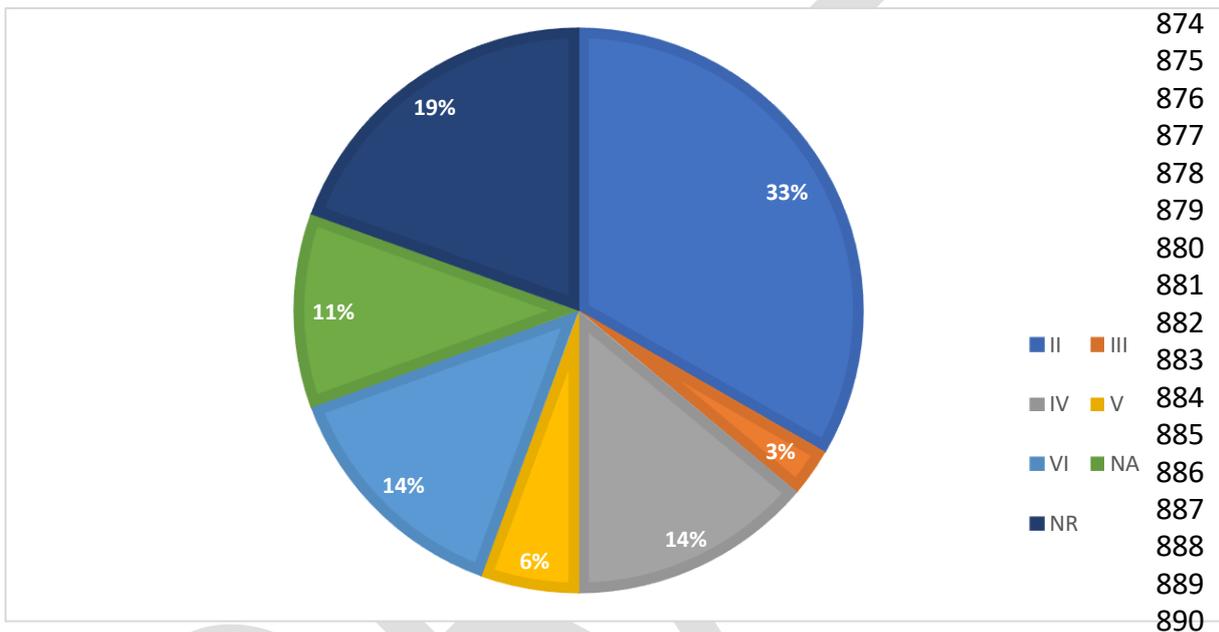
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865 In terms of management aims, most of the examples are either in IUCN category II (national park although note that  
866 not all places called “national park” fall into this category) for those focused on tourism, or IUCN categories V and VI  
867 (protected landscape/seascape and sustainable use or extractive reserves) for those where sustainable agriculture,  
868 grazing and collection of resources such as non-timber forest products is important. This also suggests that the most  
869 strictly protected areas (IUCN categories Ia and Ib) will be likely to have fewer economic values, which might be  
870 expected; these areas deliberately have less tourism and stricter levels of protection (see figure 3).

871

872

873



891 Figure 3: Percentage of case studies presented falling into IUCN categories (II, III, IV, V and VI). Some protected areas  
892 did not have the category recorded (NR), while others such as World Heritage sites are not assigned a category (NA).  
893

894

895

896 There will however be exceptions; some indigenous people use wilderness areas for activities like fur trapping (as for  
897 example in the Arctic National Wildlife Refuge),<sup>95</sup> which may have an important economic value, and any protected  
898 area can supply ecosystems services such as disaster risk reduction.<sup>96</sup> The latter is under-represented in the current  
899 study because most of these values accrue to governments in terms of money not spent in disaster relief, or in some  
900 cases in avoided expenditure in engineered disaster prevention strategies: both these are important but slightly too  
901 many steps removed from immediate beneficiaries for inclusion here.

902

903 Although all the case studies offer very different examples of the type, development and, often, management of  
904 benefits, for ease of discussion we characterised six main themes for the type of benefits producing economic gain (see  
905 figure 4):

906

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

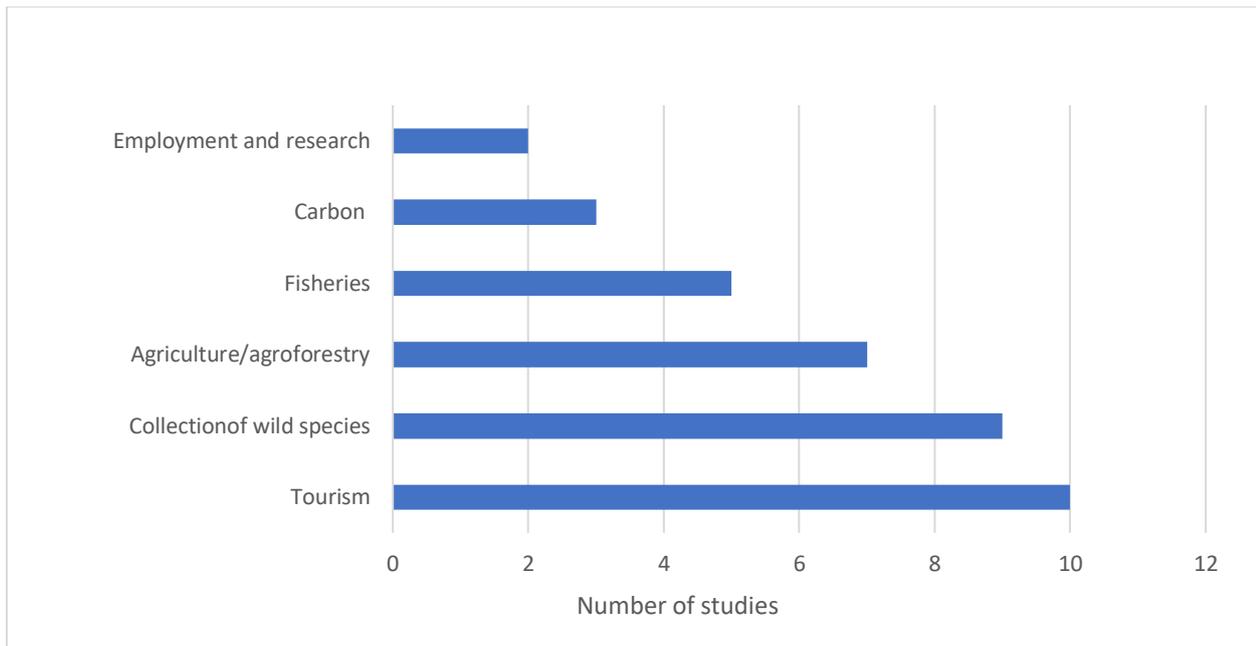


Figure 4: The six main categories of values identified in the case studies

911  
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 913  
 914  
 915 **Tourism or ecotourism** is important in ten of the case studies; this is by far the commonest subject for economic  
 916 analysis in protected areas and in some countries it is difficult to find information about anything else. Tourism remains  
 917 critically important.<sup>97</sup> Tourism values are not all the same though; some accrue fairly widely amongst local communities  
 918 and small-scale entrepreneurs,<sup>98</sup> while in other cases the bulk of the benefits flow to just a few people and local people  
 919 still remain largely disenfranchised. These tensions were mentioned in Rwanda for instance, despite tourism being the  
 920 largest earner of foreign exchange. Similarly, some tourist values come mainly from domestic visitors, with examples in  
 921 India, Germany and Finland both falling into this category, while United States national parks have a mix of foreign  
 922 visitors alongside Americans, and protected areas in Malawi and Costa Rica will be overwhelmingly catering to foreign  
 923 visitors. In Scotland, the arrival of a single pair of rare (for Scotland) migratory birds has spawned a whole cottage  
 924 industry of hotels, guest houses and seasonal workers. Associated industries are also important, such as the handicrafts  
 925 that are sold at the entrance to many protected areas and provide a valuable lifeline for local communities, illustrated  
 926 here from Uganda and Jordan. In a time when long-haul leisure travel is increasingly challenged because of its impact  
 927 on climate change,<sup>99</sup> reliance on foreign visitors may be increasingly risky and building a domestic market may be a key  
 928 step in survival in the medium term. Countries like South Korea, where the large majority of national park tourism is  
 929 domestic, are more likely to maintain benefits during periods of economic downturn or other disincentives to travel,  
 930 such as currently experienced due to COVID 19. Community ownership of the tourism operation ensures maximum  
 931 profits stay local, as in the example from The Philippines and Costa Rica (Monte Alto Protected Zone).

932  
 933 **Collection and sale of wild products:** The second main category was the collection of wild plant and animal products  
 934 (excluding fisheries which are a significant category in themselves) from protected areas and the sale of these in  
 935 processed or unprocessed form. This can simply be the direct and sustainable collection of wild foods, such as betel nut  
 936 in Bangladesh, honey in Malaysia, Brazil nuts in Bolivia and turtle eggs in Costa Rica. Or wild resources for specific  
 937 markets such as crocodile eggs from Australia and coco de mer palm seeds from the Seychelles. These benefits are only  
 938 possible when a valuable product – usually a fruit or a renewable resource like honey – can be collected from a natural  
 939 ecosystem and compete on the open market with more intensive forms of production. Wild-collected medicinal herbs  
 940 can be a major source of income, as demonstrated by the collection of Cordyceps fungi in Bhutan, a key product from  
 941 all Bhutan's more mountainous protected areas, and Devil's Claw in Namibia.

942

943 **Sustainable agriculture, grazing and agroforestry:** Although agriculture and livestock grazing are not popularly  
 944 considered to be part of protected area management, they remain major land-uses in many category V protected  
 945 areas, in initiatives such as *Satoyama* in Japan and, increasingly, in conservancies in Africa. Experience shows that  
 946 domestic livestock and wild animals can co-exist in the long term and that this can be a more equitable and sustainable  
 947 option than trying to separate the two and creating social tensions. (It should be noted that there are also many cases  
 948 where mixing livestock and wildlife has proven disastrous for the latter; co-existence only works if it is carefully planned  
 949 and monitored.) We present cases of grazing in Kenya and Argentina, and mixed traditional farming in Switzerland.  
 950 There is also some processing of wild or sustainably produced products from protected areas, to make chocolate in  
 951 Sierra Leone and Belize, and a range of products sold to tourist in Lebanon and Jordan.

952  
 953 **Fisheries:** Freshwater and marine protected areas (MPAs) can provide a range of economic benefits. Fisheries can be  
 954 substantially enhanced by conservation inside protected areas leading to increased fish density and size in surrounding  
 955 waters due to the spillover (the movement of fish from protected to unprotected areas)<sup>100</sup> and nursery effect (where  
 956 protected areas act as fish spawning and nursery grounds).<sup>101</sup> Careful management of fisheries, usually by small-scale  
 957 artisanal fishermen can benefit from higher yields than in non-protected waters,<sup>102,103</sup> as shown by the examples from  
 958 Velondriake Locally Managed Marine Area (LMMA) in Madagascar and Vueti Navakavu LLMA in Fiji. Fisheries can also  
 959 provide economic benefits to local communities through an increase of tourism, as in the freshwater fish from Lake  
 960 Skadar in Montenegro. The Morocco case study and Fernando de Noronha MPA in Brazil, provides an example of how  
 961 using the full range of these options has increased fisheries income and have stimulated other economies to develop.

962  
 963 **Payment for ecosystem services, particularly carbon:** There are a set of options under the general title of Payment for  
 964 Ecosystem Services. This has for years been touted as the likely saviour of protected areas in terms of funding, although  
 965 we found it quite hard to find concrete projects with reportable profits. To some extent this is because some successful  
 966 schemes do not release figures. But there are also many schemes still in the process of development, with expected  
 967 figures, or projected figures, which are often designed to attract investors and therefore possibly rather optimistic. We  
 968 have cases from Madagascar and Australia but would have liked to include a broader spectrum of results.

969  
 970 **Employment and research:** In two case studies we specifically focussed on the wider values of research and  
 971 employment. In one private reserve in Brazil, regular visits from research scientists, who use local accommodation and  
 972 bring money into the area. The direct role of protected areas in supplying employment is also significant, particularly in  
 973 rural communities where other opportunities may not exist. This was for instance identified as a main value in the  
 974 Panda Reserves in China, and also a key element in many of the other case studies in section 2.

975  
 976 We draw on these case studies in the following section to make some preliminary observations about economic values  
 977 from protected areas and what does and does not work in terms of their development.

978

979

## 980 **1.8 Livelihoods and conservation: a developing field**

981 For many decades conservation initiatives have tried to balance the needs of biodiversity with the importance of  
 982 reducing poverty and for conservation to contribute to the UN's Sustainable Development Goals (SDGs).<sup>104</sup> Two  
 983 overarching strategies have evolved:

984

- 985 1. **Alternative livelihood projects** (Alt-livelihoods) are characterised as those where conservation objectives are met  
 986 by substituting a livelihood strategy that is causing harm to a biodiversity target, for example, through  
 987 unsustainable use, with one that has a lesser, or negligible, impact on the same target. Examples of alternative  
 988 livelihoods include ecotourism, craft making or beekeeping as substitutes for expanding subsistence agriculture  
 989 around protected areas, or seaweed farming as an alternative to artisanal fishing. Alternative livelihood projects  
 990 have been, and continue to be, at the root of many conservation responses to pressures on protected areas.

991 Amongst the case studies collected here, the tourism enterprises are examples, particularly in developing  
 992 countries, along with such initiatives as handicrafts in Uganda and the production of herbal soaps in Jordan.

993  
 994 2. **Community-based natural resource management** (CBNRM) defines an approach that combines conservation  
 995 objectives with the generation of economic benefits for rural communities.<sup>105</sup> It is based around a set of rules,  
 996 drawn up and agreed by an identified community (a village, ethnic grouping or group of resource users) relating to  
 997 the management of natural resources and aimed to sustain these resources over time. In the case of CBNRM in or  
 998 around protected areas the managing body would also be part of the agreement (this might be the community  
 999 itself in the case of an ICCA). CBNRM aims to create the right incentives and conditions for an identified group of  
 1000 resource users to use natural resources sustainably within defined areas. Amongst our cases, grazing management  
 1001 in Argentina and Kenya are classic examples of CBNRM.

1002  
 1003 CBNRM is generally a collective response, involving a whole community in one way or another, and aimed at overall  
 1004 management of a habitat or system. Alt-livelihoods, by contrast, may or may not involve everyone within a community  
 1005 and tends to focus on specific projects some of which, like tourism, are only indirectly related to management of  
 1006 natural resources. In practice, the distinction between the two is sometimes rather tenuous and overlap occurs.

1007  
 1008 The effectiveness of both Alt-livelihoods<sup>106</sup> and CBNRM<sup>107</sup> have been questioned, with plenty of examples of failed  
 1009 schemes amongst both. However, evidence to date does not suggest that the approaches are inherently flawed, but  
 1010 rather that they have in many cases been poorly thought through, and if monitoring has taken place at all it has not  
 1011 been rigorous enough to draw concrete conclusions. The lack of any theory of change, detailed background research  
 1012 about needs and attitudes, or follow up monitoring were all identified as important gaps in many schemes.<sup>108</sup>

1013  
 1014 In addition to this focus on poverty alleviation and development of sustainable livelihoods a new emphasis has evolved  
 1015 to capture the potential of market-based instruments to create commodities whose trade can benefit local people, and  
 1016 particularly address income poverty, along with supporting conservation objectives. Again, two overarching strategies  
 1017 have evolved, both of which overlap with CBNRM and Alt-livelihoods:

1018  
 1019 1. **Conservation enterprises** are defined as businesses that generate economic, and ideally social benefits, in ways  
 1020 that help meet conservation objectives; they incentivize biodiversity conservation by providing benefits to  
 1021 stakeholders who engage in a business for the production and sale of related goods and services. Enterprises range  
 1022 from ecotourism services and beekeeping to handicrafts or timber and non-timber forest products.<sup>109</sup> Often,  
 1023 conservation enterprises can charge higher prices than more destructive or 'business-as-usual' competitors, due to  
 1024 a proportion of consumers being willing to pay a premium for biodiversity-friendly products or services, or for  
 1025 products/services associated with specific areas known for their conservation activities. However, conservation  
 1026 enterprises which do not have clear social policies and safeguards can result in elite capture of benefits, with little  
 1027 social or truly effective conservation benefits. Managed collection of crocodile eggs in Australia and marine turtle  
 1028 eggs in Costa Rica, described in the case studies below, are both classic conservation enterprises.

1029  
 1030 2. **Outcomes-based payments** for conservation are primarily linked to PES (payments for ecosystem services),  
 1031 biodiversity offsets and carbon credits. The latter are generally part of the REDD+ process, "reducing emissions  
 1032 from deforestation and forest degradation", involving forest conservation and sustainable management and  
 1033 enhancement of forest carbon stocks in developing countries. These schemes usually limit harmful activities, e.g.  
 1034 PES schemes that focus on stopping forest loss to protect water resources, or carbon credits providing impetus to  
 1035 stop deforestation, using funds offsetting greenhouse gas emissions elsewhere. Similar initiatives based on positive  
 1036 management include impact investment bonds and wildlife credits. These can all be categorised under the concept  
 1037 of biodiversity credits or 'biocredits', defined as units of biodiversity emerging from pre-agreed management that  
 1038 improves biodiversity against a baseline (for example its quantity, value, or composition). An independent  
 1039 standards body issues credits to authorise a project, which is independently verified. Credits may be bought and

1040 sold in a market transaction or through direct deals.<sup>110</sup> The REDD+ schemes in Australia and Madagascar described  
 1041 in below rely on outcome-based payment.

1042  
 1043 Virtually all these concepts are still under development. New ideas, new business models and new initiatives are  
 1044 emerging all the time. Nothing is perfect; the long lead time in agreeing the details of a global REDD+ scheme has  
 1045 slowed uptake and undermined business confidence. None of the community-based approaches are perfect, nor can  
 1046 they ever guarantee success. But on the other hand, the huge burst of interest in such CBNRM, alt-livelihoods,  
 1047 conservation enterprises and outcome-based payments is attracting a lot of smart thinkers. These are found at  
 1048 community-level within rural societies facing rapid change, and in sectors of both alternative and mainstream business,  
 1049 where people are increasingly prepared to look seriously at sustainability options and implications for contemporary  
 1050 business models.

1051  
 1052 Below, we use the case studies in the report plus other evidence to review what we know about what is and what is not  
 1053 likely to work.

### 1054 **1.9 Drivers of conservation and development: a starting point or retrofitting?**

1055  
 1056 Linking successful conservation with local development can be the driver for conservation, when the traditional  
 1057 owners, private land/water holders, users or co-producers of an area see the benefits of conservation as a strategy for  
 1058 increasing local development, economic and social security. Alternatively, one or more of the approaches outlined  
 1059 above can be “retrofitted” into an area where conservation has for some time been the sole driver of management but  
 1060 where new opportunities for linking conservation with development have been noted. This is the case, for example, of  
 1061 carbon markets and other PES schemes, or for the recognition of natural ecosystems in disaster risk reduction. It can  
 1062 also be used in places where it is recognised that protected areas have increased or exacerbated poverty; where  
 1063 national, and even sometime regional/international, policies have left local communities with few livelihood options  
 1064 (for example where rural depopulation or domestic conflict have left few employment opportunities); or where  
 1065 resources have been depleted or their quality has so declined that developing sustainable resource use in conservation  
 1066 areas becomes an economic reality.

1067  
 1068  
 1069 The first option has been termed as ‘conservation from the inside-out’,<sup>111</sup> and is often the driver for the development of  
 1070 privately protected areas, indigenous and community conserved areas, conservancies etc. Examples of this approach  
 1071 included in the case studies include biosphere management in Switzerland and locally-managed marine areas (LMAAs)  
 1072 in Fiji and Madagascar.

1073  
 1074 The more traditional approach to the development of protected areas is driven by outside agencies, either nationally or  
 1075 internationally that advocate for and set up protected areas. In these models, one common outcome is that any  
 1076 economic benefits from the protected area is not generated by the area’s traditional owners or local communities, but  
 1077 rather by outside businesses such as ecotourism companies, water companies, and so on. In these areas the three-way  
 1078 link between local communities, protected area and business must often be rebuilt. If local communities feel  
 1079 disenfranchised and resentful, this can be challenging, although successful examples exist, and it is important that we  
 1080 learn from these. In Uganda, there has been long-term resentment about Bwindi National Park, in part because it is on  
 1081 rich volcanic soils that could be used for farming, and also because some of the local Batwa people were dispossessed.  
 1082 Rebuilding community trust is in this case a long-term enterprise.

1083  
 1084 Figure 5 explores the different types of relationships that can develop between protected areas, business and local  
 1085 communities. The figure outlines five scenarios for characterising these relationships:

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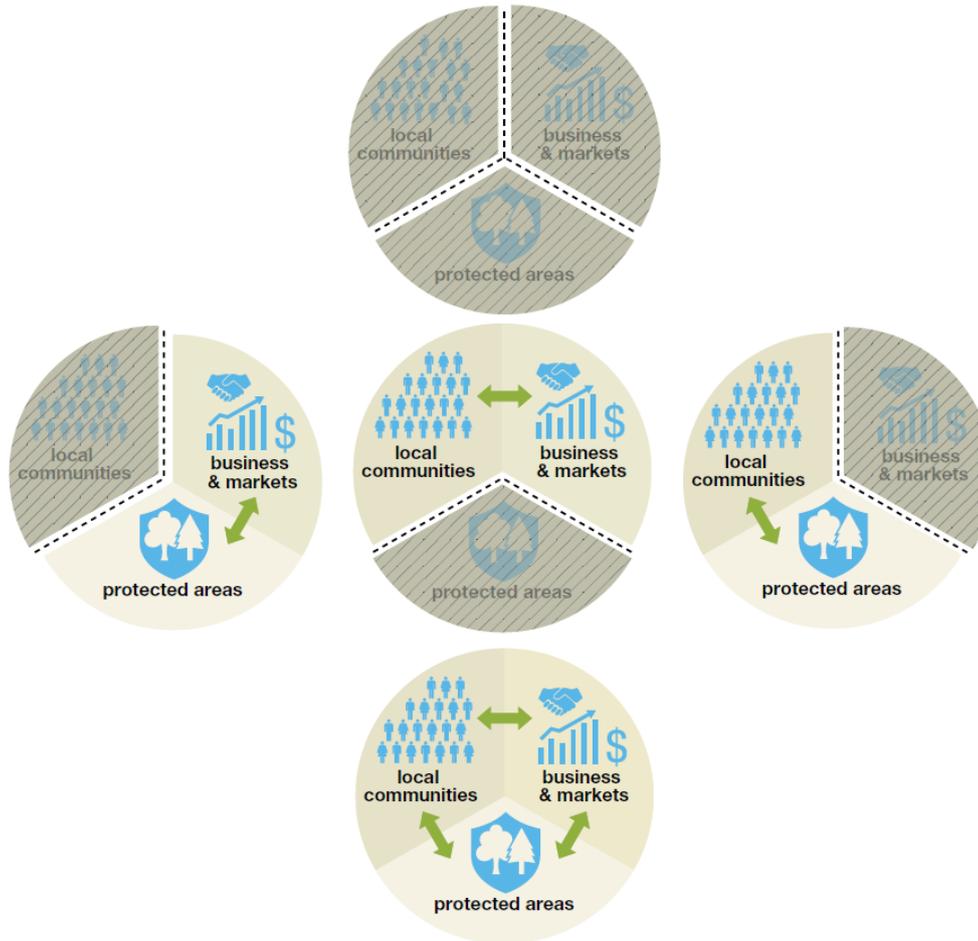


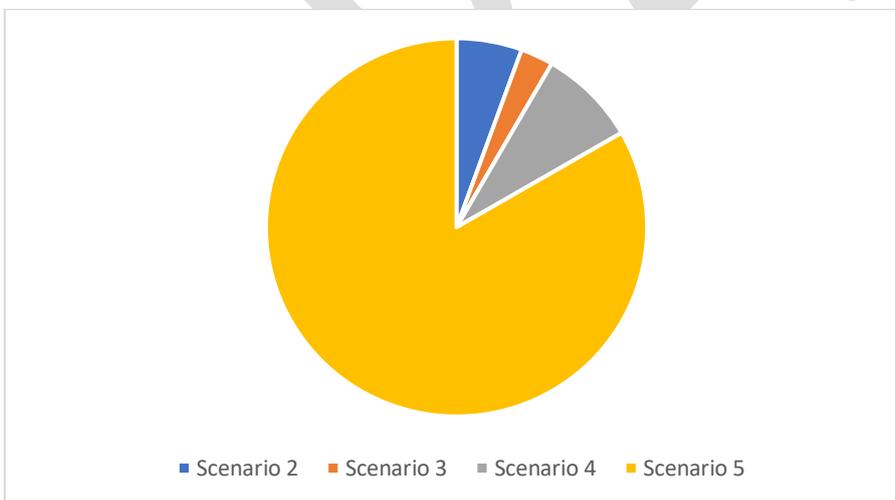
Figure 5: Linking benefits from protected areas, businesses and local communities<sup>112</sup>

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, tend to be uneven and 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 does not capitalise 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 recognise the extent to which they are reliant on the natural resources from protected areas.

- 1136 3. **Protected areas are working with local communities**, but there is little link to business and markets. In this case  
 1137 protected areas, or projects working within protected areas, work closely with local communities to share benefits,  
 1138 create and enhance income generation through sustainable resource use etc. However, the links to business and  
 1139 available markets for local products may not be present, hampering a fully effective and equitable flow of all the  
 1140 potential benefits and positive results available.
- 1141
- 1142 4. **Business and protected areas are directly linked**, but no direct link to local communities. In this option official or  
 1143 unofficial management agreements between the protected area and beneficiary businesses usually mean the  
 1144 protected area is supported, either financially or in kind. A classic example here is concessions for tourism related  
 1145 activities. Local communities can be beneficiaries through, for example, employment by the business or  
 1146 development projects funded by local businesses, but they are not directly linked to the benefits or fully aware of  
 1147 the benefits provided by the protected area.
- 1148
- 1149 5. **A three-way direct link between protected areas, business and local communities**. In this ideal option there are  
 1150 direct links between all three entities. For example, a business which relies on resources from the protected area  
 1151 has a memorandum of understanding with the protected area and either directly employs local people or provides  
 1152 support for local development (e.g. financial support or training related to business management) with full  
 1153 engagement and participation of local people (e.g. through involvement in management structures or other  
 1154 decision making bodies). All parties are engaged in the management and governance of the benefit. This option is  
 1155 likely to produce the most equitable flow of benefits and positive results for all parties concerned, and to ensure  
 1156 the sustainability of both protected area values and businesses reliant on these values.
- 1157

1158 Figure 6 uses the concepts behind figure 5 to summarise the relationships in the case studies developed for this report.  
 1159 Perhaps not surprisingly the vast majority (83%) were from the final scenario outlined above where protected areas,  
 1160 business and local communities had led to successful conservation and economic outcomes benefiting local  
 1161 communities.

1162



1163  
 1164 **Figure 6: Analysis of the types of relationship between protected areas, business and local communities in the case**  
 1165 **studies presented**

1166 **Key:**

1167 Scenario 2: Business and local communities linked, but no understanding / recognition of the link to protected areas

1168 Scenario 3: Protected areas are working with local communities, but there is little link to business and markets

1169 Scenario 4: Business and protected areas are directly linked, but no direct link to local communities

1170 Scenario 5: A three-way direct link between protected areas, business and local communities

1171

1172

1173 A literature review carried out for the CBD a decade ago suggested that the poor tend to depend disproportionately on  
 1174 relatively low value or 'inferior' goods and services from biodiversity, while the more affluent groups are more likely to  
 1175 engage in biodiversity conservation when higher commercial values are available (sometimes at the expenses of poorer  
 1176 local communities).<sup>113</sup> The existence of successful economic gains from a protected area therefore does not necessarily  
 1177 mean that poverty reduction or inequalities within the community are being reduced; in fact the reverse can occur if a  
 1178 wealthy elite can cash in at the expense of other people. Monitoring of projects therefore needs to look at a wide range  
 1179 of factors.

1180  
 1181 Several of the case studies focus on ensuring the full value of resources stay local by developing local production  
 1182 facilities. This can easy where production processes are relatively simple, as in the examples from Jordan, Uganda and  
 1183 Lebanon. In Switzerland, a special brand highlighting the protected area has been developed to enhance marketing.  
 1184 Both Cacao-based agroforestry enterprises in Belize and Sierra Leone have ensured linkages with fair trade producers,  
 1185 whilst in Argentina is has been estimated that the value of wool to local producers could increase almost fourfold if  
 1186 refined locally.

1187  
 1188 In the terms used by the United Nations, it is not enough to look only at the first of the Sustainable Development Goals  
 1189 (SDG1: No poverty) but is also important to consider SDG10 (reduced inequalities), SDG5 (gender equality) and others  
 1190 relating to health, sanitation and decent work. In this context, it is also paramount that any economic activity does not  
 1191 undermine conservation aims; SDG 15 (life on land) and SDG 14 (life below water) along with SDG13 (climate action).

#### 1194 **1.10 What causes projects to fail?**

1195 Small enterprises in rural areas have to survive in volatile conditions, often without the security of savings to help them  
 1196 through lean times. Of course, smaller businesses can also be more versatile and adaptable, but this depends on a clear  
 1197 understanding of business conditions and opportunities.

1198  
 1199 While much of this report focuses on successful attempts to create sustainable economies associated with protected  
 1200 areas, it is perhaps even more important to understand why projects sometimes fail.<sup>114</sup> So, before looking at some of  
 1201 the components of success, we start by discussing some of the cases that did not finally make it into the report, and  
 1202 outline what went wrong. Our research identifies a number of key factors; several of these may operate  
 1203 simultaneously.

1204  
 1205 **Unforeseen pressures:** A single event can undermine years of effort. The COVID-19 crisis, ongoing at the time of writing  
 1206 and likely to be a dominant factor for some time to come, has highlighted the fragility of many ecotourism ventures.  
 1207 Throughout the world, tourism has collapsed; the world's largest industry is at a virtual standstill. While this has been  
 1208 devastating for many coastal communities, ski resorts and cultural sites, additionally the World Tourism Council  
 1209 estimates that there are in excess of 20 million jobs linked to wildlife tourism;<sup>115</sup> most of these will now be on hold and  
 1210 the speed with which they will recover, if at all, remains uncertain.<sup>116</sup> Funding for protected areas is likely to further  
 1211 contract and many associated community projects will face huge challenges, we can predict that many will simply fail.  
 1212 The pandemic is a particularly acute example of a more general phenomenon. A single terrorist attack in Bwindi  
 1213 National Park, Uganda, undermined the country's wildlife tourism for some years; similar issues now threaten many  
 1214 other countries where domestic tourism is or was on the increase. Earthquakes, hurricanes, and the impact of  
 1215 environmental degradation can all undermine what were once profitable enterprises.

1216  
 1217 **Market forces too strong to resist:** Sustainability is often fragile; what works for one generation may not be as  
 1218 attractive for the next. In 1985, Brazil's National Council of Rubber Tappers proposed the concept of extractive reserves  
 1219 (*Reserva Extrativista*, or RESEX) as a means of protecting large tracts of forest whilst improving economic development  
 1220 for local communities.<sup>117</sup> RESEX in Brazil are publicly owned but communities have rights to traditional extractive  
 1221 practices (hunting, fishing, rubber tapping, etc). Chico Mendes RESEX, named after the environmentalist and rubber

1222 tapper assassinated in 1988, is in the state of Acre. Here, harvesting latex led to low rates of deforestation.<sup>118</sup> In 2009, it  
 1223 was estimated that families extracted up to 260 kg annually, however this had decreased from a 1995 average of 714 kg  
 1224 due to unstable rubber markets and the economic crash of 2008. The government invested US\$10 million in building  
 1225 the Natex condom factory in Xapuri in 2008,<sup>119</sup> the world's only producer of native-forest latex condoms, a non-profit  
 1226 employing 170 people, paying above-market prices for latex and supporting the Ministry of Health's fight against HIV.<sup>120</sup>  
 1227 However, more recently the reserve is under threat again from farmers and ranchers pressuring for subdivision and  
 1228 grazing use, and deforestation has increased dramatically since 2017. Even some of the rubber tappers and Brazil nut  
 1229 collectors are reported to be switching to cattle because it is more profitable.<sup>121</sup> Some sources now rank it as one of the  
 1230 most threatened protected areas in Brazil.<sup>122</sup>

1231  
 1232 **Unsustainable use:** Some projects fail because, while they might make money for communities, the environment  
 1233 continues to degrade. The Nha Trang Bay (NTB) reef is Vietnam's most biodiverse coastal ecosystem and is of critical  
 1234 importance as a major nursery ground to other coral reefs of Vietnam and possibly Cambodia. It is also a major centre  
 1235 for aquaculture, with exports worth around US\$400 million per year,<sup>123</sup> but with fisheries facing mounting risks from  
 1236 pollution and overfishing. The NTB MPA was created in 2002 as a pilot initiative to enable the sustainable management  
 1237 of the fringing reef communities, while securing the livelihoods of local fishers.<sup>124</sup> The most popular form of aquaculture  
 1238 in NTB is the rearing of spiny, green and red lobster in floating cages attached to rafts. In 2005, around 1,600 families  
 1239 were likely to be benefiting from lobster farming in NTB and earning approximately US\$4,000 per year per family.<sup>125</sup>  
 1240 The project was supported by the World Bank, GEF and DANIDA. But unfortunately, there are now many examples of  
 1241 unsympathetic coastal development, with 600,000 tourists in 2015. Overfishing, illegal coral collection, pollution from  
 1242 onshore sources and increasing lobster culture are all causing problems.<sup>126</sup>

1243  
 1244 **Over supply and poor market access:** Prespa National Park (PNP) makes up the Albanian fifth of the first transboundary  
 1245 protected area in the Balkans; the Transboundary Prespa Park, joining Macedonia and Greece. It includes mountainous  
 1246 mixed forests with 270 species of birds (it is an Important Bird Area) and 60 mammals. The park is one of the last  
 1247 European refuges for the Balkan lynx (*Lynx lynx balcanicus*). Twelve villages border PNP<sup>127</sup> on the Albanian side in Korçë  
 1248 district and the park itself provides habitat for a rare species of the perennial plant, *Sideritis raeseri*, valued highly  
 1249 across the region as an herbal remedy. The dried flowers are used to prepare 'mountain tea', used traditionally to treat  
 1250 inflammation, gastrointestinal disorders, coughs and anaemia.<sup>128</sup> Just over 50km<sup>2</sup> of PNP was allocated for the  
 1251 collection of *S. raeseri*, generating a potential annual harvest of over 2,800 kg, with a hundred families organised into  
 1252 the Prespa Marketing Organisation.<sup>129</sup> However, supply badly outstripped demand, there was a failure to gain market  
 1253 access and sales collapsed; apparently no tea at all was sold in 2019.

1254  
 1255 **Changes in legislation:** Legislative changes can sometimes undermine useful projects even if this is not the intention.  
 1256 The Amani Forest Nature Reserve is situated on some of Tanzania's most fertile soils and under threat from conversion  
 1257 to farming. In response a butterfly farming project created an economic incentive for local communities to conserve the  
 1258 forest.<sup>130</sup> To start a butterfly farm, a farmer collects a few specimens from Amani's forest using a net baited with  
 1259 fermented fruit juice,<sup>131</sup> and houses them in an enclosure with a few choice seedlings specific to the tastes of the  
 1260 butterfly species. The females lay up to 500 eggs which hatch into larvae requiring soft seedlings to eat – to provide  
 1261 this, the farmers must collect seeds from the forest and raise seedlings in nurseries. Once the larvae pupate, they are  
 1262 collected by Amani Butterfly Project staff, sorted and packaged carefully into cotton-lined boxes and shipped to buyers  
 1263 around the world. From the villages in Amani's buffer zone, four hundred farmers, half of them women, have increased  
 1264 their annual household income by an average of 25 per cent from the rearing and sale of butterflies. Coveted species,  
 1265 such as the bright blue forest king emperor (*Charaxes xiphares*) sell for about US\$3 per pupae, 70% of which goes to the  
 1266 farmers, 10% to the village development fund (governed by an elected board of twelve butterfly farmers) to build  
 1267 schools etc., the balance pays project staff salaries and operational costs. Between 2004 and 2019, annual sales grew  
 1268 from about US\$20,000 to over US\$80,000. However, in response to concerns about trophy hunting and the spread of  
 1269 zoonotic diseases, the Government of Tanzania has banned all live cross-border wildlife trade, which includes butterfly  
 1270 pupae, the trade has collapsed and the project has had to close.<sup>132</sup>

### 1271 **1.11 What do the case studies tell us about the nature of success?**

1272 The cases discussed above are disheartening, perhaps particularly when good projects are completely undermined by  
 1273 forces beyond peoples' control, as seemed to happen in Tanzania and Brazil. But the better news is that many good  
 1274 examples still do exist. Although only a preliminary collection of examples, the case studies presented in section 2  
 1275 already allow us to identify some of the elements that need to be in place to successfully and sustainably link protected  
 1276 areas, local communities and business in ways which lead to economic gain.

1277  
 1278 **Innovation works best from the ground up:** it is clear from many of the case studies that initiatives have come from the  
 1279 bottom up, in other words they have been successful because the people involved have been innovators or willing  
 1280 participants in new ideas from the start. Examples include the cases from Argentina, Fiji and Morocco, although this  
 1281 bottom up approach seems to be across the board. This makes perfect sense but also creates a challenge; does this  
 1282 make progress impossible in the absence of a local entrepreneur? In practice this is not the case; careful seeding of  
 1283 ideas can come from "outside"; from protected area managers in the case of state or privately run protected areas, or  
 1284 from associated NGOs or development agencies. But in these cases additional care is needed to ensure that the  
 1285 community is really behind the initiative and not just paying lip-service in the hope of some short term support,  
 1286 meaning that the start-up negotiation process is likely to take longer (and that schemes should not go forward if there  
 1287 is no real level of support).

1288  
 1289 **A three-way link between communities, protected area managers and businesses is the most successful model:**  
 1290 referring to Figures 5 and 6, it is clear that most of the successful projects are where protected areas, communities *and*  
 1291 businesses all work in harmony together. This can usually only happen if appropriate governance and equity measures  
 1292 are in place. Links between just business and protected areas can be successful in terms of making money, as in  
 1293 ecotourism in Rwanda and India, but not necessarily provide as much as they could do in terms of local livelihoods  
 1294 resulting in lack of equity usually as a result of poor governance. As mentioned above, smaller but better distributed  
 1295 economic gains may be more beneficial to the long-term conservation success of a protected area than major profits  
 1296 coming to a minority. Similarly a link between business and local communities that does not involve the protected area,  
 1297 as seemed to be the case in Lake Skadar, is problematic because it means the people who know most about the needs  
 1298 of conservation are cut out of the conversation; again impacting effective management and governance.

1299  
 1300 **Effective and sustainable management is at the heart of successful business models:** it should go without saying that  
 1301 effective and sustainable management is a critical element but in practice this is sometimes forgotten. The collection of  
 1302 medicinal fungi from national parks in Bhutan has made some local people surprisingly wealthy, and park management  
 1303 has in effect created a cartel for people living within its boundaries, but the amounts collected are quite carefully  
 1304 controlled to avoid exhausting this resource. This is also the philosophy of LMMAs and other marine protected areas  
 1305 that are linked to local fishing communities. But it spreads to all the examples listed here: for example too many  
 1306 tourists will dilute the experience for everyone and will put ecosystems under pressure.

1307  
 1308 **Ecotourism needs publicity and unique selling points:** despite the huge growth in ecotourism, most of the really  
 1309 successful international ventures have something unique to offer, or at least can persuade tourists that they have  
 1310 something unique. Of the ones we highlight, the Indian site is one of the places with the best chance of seeing a tiger;  
 1311 Rwanda has highly unusual access to gorillas, along with luxury accommodation for high-end tourists, the Philippine site  
 1312 has a cave system voted one of the seven new wonders of the world and both the US sites are globally famous. When  
 1313 attracting domestic tourists, the needs are more modest: pleasant scenery, good places to stay and eat, interesting  
 1314 wildlife and a tourist infrastructure of footpaths, bike trails and visitor centres.

1315  
 1316 **High-value and quality market products are a key element in natural resource use:** and in addition, they should be  
 1317 capable of collection without causing damage, portable and with an adequate market. Betel nuts from Bangladesh,  
 1318 Brazil nuts from Bolivia, the seeds from the Seychelles and honey from Malaysia all fit these requirements. Collection  
 1319 from a protected area can provide an added selling point and can, with good liaison, also mean that protected area

1320 managers or consultants can help to agree more profitable sales for local collectors, who in other circumstances can be  
 1321 exploited by middlemen.

1322

1323 **Successful models cannot simply be replicated:** while some of the approaches outlined here, such as ecotourism,  
 1324 sustainable grazing, or fishing, can be applied in many places, others are unique. The protected area in Costa Rica  
 1325 where turtle eggs are collected is the only such site in the world and covered by unique legal exemptions; while a few  
 1326 other MPAs might be able to do the same this can hardly be a model everywhere. The fact that a few tourists are willing  
 1327 to pay large sums of money for suggestive looking seed cases is a way of supporting two World Heritage sites in the  
 1328 Seychelles, but a unique situation. The wider message here is that where people have looked at the resources available  
 1329 and been smart, they have sometimes, maybe often, found a way of raising some money without undermining the  
 1330 central conservation ambitions.

1331

1332 **A diversification of funding is a good insurance policy:** this is really looking ahead to the next section that analyses  
 1333 where things have not worked out. But it is very clear, as mentioned above, that many enterprises remain at risk from  
 1334 sudden changes in conditions beyond the control of an individual community or protected area management.

1335 Therefore, diversification offers important additional insurance against failure of one part. Locally-managed marine  
 1336 areas (LMMAs) provide some income from selling fish, but they also supply food directly to communities even if the  
 1337 commercial market declines or fails. Cordyceps collection is a huge boon in Bhutan but the collectors continue to farm  
 1338 in case the species declines, or the market collapses in the face of more effective alternatives.

1339

1340

### 1341 **1.12 Recommendations: making conservation work and pay**

1342 Trying to find the balance between conservation objectives and economic gain is far from easy; win-win situations are  
 1343 not common in any walk of life. Every situation is unique; what works in one area may not work at another. For every  
 1344 protected area and potential project, new assessments, studies and monitoring based on local and external knowledge  
 1345 are necessary.<sup>133</sup> However, reviewing the case studies presented here and other relevant literature<sup>134,135,136,137,138,139</sup>  
 1346 that has analysed progress and characterised elements of success when developing conservation enterprises, a number  
 1347 of enabling conditions and good practices have been identified.

1348

#### 1349 **Enabling conditions**

1350 Projects will have a much greater chance of success if they exist in a supportive environment. Of the steps listed below,  
 1351 clearly the existence of a product and a market are essential. All the others can be worked around in some  
 1352 circumstances, but the task will be much more difficult if they are absent.

1353

- 1354 1. **Something to sell:** Whether this is a product, like a fish, or a benefit, like carbon storage, or the experiences that  
 1355 make up a successful ecotourism venture. Not all protected areas may have this option; this does not mean they  
 1356 are unimportant as protected area, but rather that they need a different funding model.
- 1357 2. **A good market strategy that assesses long term market demand and supply chains.** Clearly any products  
 1358 produced need a reliable market. A small profitable enterprise can encourage many others to try to cash in and  
 1359 result in over-supply; it is important to have a good understanding of the market, market trends and competition.  
 1360 The presence of a strong and stable market, and access to these markets, are both vital to ensure success. Knowing  
 1361 the value of products at different stages along the supply chain is also crucial, so that local producers do not lose  
 1362 out to unscrupulous middlemen.
- 1363 3. **Stable and supportive legal and political environment:** Success is much easier to achieve if projects take place in  
 1364 conditions where national laws and policies help rather than hinder. It is therefore important to have knowledge of  
 1365 and ensure compliance with government requirements, e.g. government laws and regulations relating to health,  
 1366 safety, export, land tenure, land use, transportation, benefit sharing etc. Policies and legal frameworks should  
 1367 assist sustainable resource use and avoid overuse of resources by participants and outsiders.

- 1368 4. **Security of tenure over resources:** Those involved in a project need to have confidence that they are secure,  
 1369 through land ownership, or through long-term agreements relating to tenure and/or use. Running a profitable  
 1370 business in the absence of this kind of security can simply encourage less scrupulous and more powerful people to  
 1371 move in and take over and will not lead to stakeholders feeling it is safe to invest.
- 1372 5. **Seed funding and institutional support:** Whilst not essential, support in getting started, through microfinance  
 1373 projects, low cost or zero-interest loans, start-up grants and the provision of technical expertise can all help kick-  
 1374 start a successful project.<sup>140</sup> This should be temporary; although grant funding can be important to develop  
 1375 conservation businesses, it can stifle enterprises and is rarely fully sustainable.
- 1376 6. **Commercial expertise.** Successful enterprises need a whole range of expertise including business planning, market  
 1377 research, risk analysis, competitor analysis, deal negotiating, deal structuring and financing, ensuring market  
 1378 access, supporting marketing and promotion, access to and maintenance of equipment, infrastructure etc. Training  
 1379 and capacity building are usually major contributions to project success. The concept on ‘conservation enterprise  
 1380 incubators’ describes an approach where technical assistance, development grants, and/or debt or equity financing  
 1381 is provided to assist new commercial ventures to grow to the point of viability or follow-on funding.
- 1382 7. **Local enthusiasm:** None of the above will be enough unless a critical number of people are determined to see the  
 1383 project go ahead. Experience in all the case studies suggests that bottom-up approaches are those with the  
 1384 greatest chance of success.

#### 1386 Good practices

1387 Once enough enabling conditions are identified and the enterprise is deemed to be possible, there are a series of steps  
 1388 that can help to increase the chances of success.

- 1390 8. **Clear conservation objectives.** Livelihood gains such as increased economic returns do not necessarily lead directly  
 1391 to improved conservation practices. Indeed, they can become drivers for increased resource use and unsustainable  
 1392 practices as some of the failed examples mentioned above demonstrate. Any enterprise based on resource use in  
 1393 conservation areas should ensure appropriate research into potential environmental impacts of the enterprise has  
 1394 been carried out and appropriate quotas are in place. There should also be clarity of link between the enterprise  
 1395 and conservation objectives to reinforce people’s role as stewards of natural resources.
- 1396 9. **Monitoring and adaptive management:** Working out quotas, sustainable yields, maximum tourism numbers and  
 1397 other variables is difficult, and conditions may also change over time – what is sustainable in a normal season may  
 1398 be overharvesting in a period of unseasonal weather for instance. All projects therefore need an agreed monitoring  
 1399 system, which involves the people using the product (who should have a strong incentive for sustainability). The  
 1400 monitoring system should ideally also include agreed indicators (decline of harvested species, signs of damage  
 1401 from ecotourism) at which changes are needed, this is the essence of adaptive management.
- 1402 10. **Local relevance:** Enterprises linked to protected areas need to be appropriately matched to, and ideally build upon,  
 1403 local cultures, belief systems, traditional knowledge, and practices. The enterprise should be aligned with the  
 1404 needs, aspirations, and capacity (or potential capacity) of local people and needs to either be driven by, or  
 1405 developed from the beginning in collaboration with, the communities who will be directly involved over the long  
 1406 term.
- 1407 11. **Socially and environmentally responsible private sector partners.** It is important to find the right business  
 1408 partners: they need to be good businesspeople but also attuned and sympathetic to the wider social and  
 1409 environmental aims of the operation. Many of the enterprises presented in the case studies have private sector  
 1410 business partners who help develop the enterprise, access commercial markets advise on messaging, packaging  
 1411 and marketing. Partner businesses should have track records in prioritising social and environmental benefits as  
 1412 well as a profit-making success.
- 1413 12. **Community partners with appropriate governance structures.** A vital element is to find and reach agreement with  
 1414 legally recognized community organizations with rights over the natural resources needed for products and  
 1415 services. These organizations need strong governance; including well-articulated and functioning management  
 1416 structures that adhere to the principles of participation, transparency, accountability, equity and effectiveness.<sup>141</sup>

1417 Encouraging local leadership capacity, including the ability to transition leadership over time, is critical to achieving  
1418 and sustaining conservation enterprises.

- 1419 13. **Transparent benefit-sharing arrangements.** Benefit-sharing is the intentional transfer of monetary and  
1420 nonmonetary incentives (goods, services, or other benefits) to stakeholders funded by revenues derived from  
1421 those results. Typically, only a small percentage of community members receive direct cash benefits in the form of  
1422 wages from conservation enterprise employment or incomes. Ideally, wider community members should also  
1423 receive other benefits in the form of improved community services (e.g., infrastructure, education and healthcare),  
1424 supported by the conservation enterprise.
- 1425 14. **Local coordination:** Good ideas can also proliferate. It is important that there is coordination with other  
1426 conservation enterprises. Research suggests that businesses operating in and around protected areas may have  
1427 little contact with each other<sup>142</sup> and be missing out on opportunities for mutually beneficial collaboration.
- 1428 15. **Conservation enterprise is nested in overall conservation strategy:** Successful conservation is complex, and a suite  
1429 of conservation strategies is usually needed that, depending on the area, can include awareness-building, research,  
1430 assessment and monitoring, securing land tenure and resource rights, law enforcement, human-wildlife conflict  
1431 mitigation and so on. All strategies, including conservation enterprises, need to work together to reduce threats  
1432 and achieve conservation objectives.
- 1433 16. **Sound financial planning:** Financial planning and reporting should be aligned with GAAP (generally accepted  
1434 accounting principles) and international accounting and reporting frameworks. Sufficient planning, forecasting, risk  
1435 management and understanding the resilience of business models is vital for success. (More discussion on  
1436 reporting is provided below).

#### 1437 **Reporting success**

1438 One clear finding of this report – an unexpected one – is the difficulty in getting not only good examples but also clear  
1439 and up to date economic information. Some suggestions are given below drawn from the case studies (and from the  
1440 many potential case studies rejected due to lack of clarity of information).

- 1441 19. **Clarity on reporting economic benefits is needed:** Clarity on reporting success is vital to attract funding and secure  
1442 investment and should be readily and easily available and both transparent and accurate. Some suggestions on  
1443 how to achieve this include:
- 1444 ○ **Gross or net:** Gross is the total income before taxes and other deductions; net the income after  
1445 deductions and taxes. We assume that most of the reporting provided in the material we used to assess  
1446 the case studies was for net income, but this was rarely clear. We recommend that reporting of economic  
1447 benefits is consistently for **net income** (see box 2).

#### 1448 **Box 2: Understanding costs**

1449 Reporting net income is recommended, but it is also useful to provide clarity on the calculations that determine gross  
1450 to net income. Understanding the following assists in growth, attracting further investment or incentives, and in  
1451 reducing costs to be more resource efficient:

- 1452 • General expenses
- 1453 • Extraordinary expenses
- 1454 • Conservation related expenses
- 1455 • Staffing (e.g. all employment related expenses)
- 1456 • Risk costs (including losses and related loss, administrative time etc)
- 1457 • Transaction costs (e.g. the costs of bringing a good or service to market)
- 1458 • Available tax deductions and incentives (tax efficiency is often overlooked as a tool to increase net income).

- 1459 • **Return on investment:** Another form of expressing economic benefits is through the return on  
1460 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 viability of projects as well as any potential replicability. We recommend that reporting includes reporting **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. in 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 (as being experienced currently with the impact of COVID-19 on tourism). 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 as long as the timeframe being reported is clear and that annual reporting as noted above is all carried out. 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 make, 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 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 method for measuring resource use provided**.
- **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 issue is particularly difficult to compare, as household numbers vary dramatically around the world.<sup>143</sup> We recommend increasing clarity by splitting reporting between **direct beneficiaries** (e.g. the person receiving the income such as the handicraft 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>144</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 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 areas management plan and then reporting the percentage attributed to these costs by the economic benefit. This can then show the finance gap for effective management as well as the full contribution of the benefit to effective

1515 management. If costs are not ring-fenced for management then there needs to be a way to report on their  
1516 benefit for the area as a whole. Most of the recommendations regarding reporting given above are  
1517 relevant here as well; with the importance of the benefit for management or for a specific management  
1518 activity (e.g. fire mitigation, patrolling, etc) again being particularly important. In addition, co-benefits can  
1519 be added to the contribution to conservation beyond just the monetary assistance for conservation  
1520 management such as business growth, additional employment, ecological infrastructure investment etc.  
1521 We recommend reporting provides clarity on the relative importance of benefits, ideally through **an**  
1522 **indication of percentage of annual income for protected management as a whole, or for specific**  
1523 **management activities.**

- 1524  
1525 20. **More reporting of successful examples:** Importantly, we would like to encourage many more protected areas to  
1526 report on their methods and innovations to produce economic benefits where this is applicable given the area's  
1527 conservation objectives. The case studies below provide a simple format for reporting, and hopefully the guidance  
1528 above on reporting economic benefits can help provide clarity of reporting. Database such as IUCN's Panorama,<sup>145</sup>  
1529 provides an excellent reporting format for successful projects.

1530  
1531 Finally, the case studies and analysis provides powerful evidence that land and water set aside for conservation is not  
1532 "dead space", tied up for the protection of biodiversity and nebulous ecosystem services, but also produce concrete  
1533 benefits for both local and more distant communities. Many of the cases recorded here have involved a change in  
1534 attitude by stakeholders – governments, companies, or communities – that were initially reluctant about protected and  
1535 conserved areas but changed their minds when they see real economic returns, often in places with few other options.  
1536 These arguments are particularly pertinent as the world builds up to agreeing important new targets for conservation  
1537 from 2020 to 2030. The environmental and climate arguments for retaining large areas of natural ecosystems are  
1538 already well known. Here we provide extra evidence that saving the world does not have to also cost the earth.

## 1539 SECTION 2: THE CASE STUDIES

1540

1541

1542 [please note each case study will be designed on one page with the references in a box for ease of reading and

1543 following up ... pictures of some case study sites will appear on this page and a few additional picture pages

1544 throughout the report]

DRAFT

## 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 decreasing rates of conflict between ranchers and native predators and ungulates.**

**Ecosystem service highlighted:** Agriculture

**Protected area:** Península Valdés Protected Area and World Heritage Site, Size: 4,000km<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 geofroyi*) 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*).

### 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 marginalised habitats.<sup>4</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>5</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>6</sup> Their sustainable grazing management plan decreased herd stocking rate and outlined the non-lethal control of predators and guanacos (e.g. guardian dogs).<sup>7</sup> In 2016, their wool was Certified Wildlife Friendly®.<sup>8</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 per kg, generating US\$35,750 to US\$48,000 per ranch annually. The ranchers also invested in a small facility to experiment in refining the wool themselves into 'top wool' (e.g. removing any twists in the fibres and aligns them in preparation for spinning into yarn). 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>9</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.

### Reference

<sup>2</sup> Merino de Península Valdés website: <http://merinopeninsulavaldes.com/eng/who-we-are/> (accessed 21/3/2020)

<sup>3</sup> Chartier, M. and Rostagno, C., 2006. Soil erosion thresholds and alternative states in north-eastern Patagonian rangelands. *Rangeland Ecology & Management*, 59: 616–624.

<sup>4</sup> 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.

<sup>5</sup> 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/> (accessed 3/4/20)

<sup>6</sup> Ibid.

<sup>7</sup> Baldi, R., 2020. Instituto Patagónico para el Estudio de los Ecosistemas Continentales (IPEEC), Centro Nacional Patagónico-CONICET (interviewed 21/3/2020)

<sup>8</sup> WFEN and WCS-Argentina. 2016. Announce Availability Of Traceable Certified Wool From Iconic Peninsula Valdés, Wildlife Friendly Enterprise Network website: <http://wildlifefriendly.org/fiberswitha consciencepv/> (accessed 22/3/2020).

<sup>9</sup> Baldi. 2020. *op cit*

## 2.2 AUSTRALIA: WARDDEKEN INDIGENOUS PROTECTED AREA

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

**Ecosystem service:** Carbon

**Protected areas:** 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 a 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 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 also function as a strategy under Australia's 'closing the gap' policy; reducing disparities in health, education and employment between Indigenous and non-Indigenous Australians whilst conserving ecosystems and cultures.<sup>2</sup> IPAs cover 44.6% (over 670,000 km<sup>2</sup>) of Australia's National Reserve System<sup>3</sup> and, along with Australia's Indigenous Advancement Strategy (IAS), generate numerous opportunities for employment (as rangers, wildlife officers, scientists, tour guides etc.) and training. Between 2013 and 2014, the IPA programme employed 579 Indigenous Australians on a full-time, part-time and casual basis. Crucially, the employment retention rate under IPAs is high at approximately 80%.

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 IAS, 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 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 people (47% were women) paying a gross of some US\$2.3 million in 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

<sup>1</sup> 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)

<sup>2</sup> 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.

<sup>3</sup> 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.

<sup>4</sup> 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>

<sup>5</sup> 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.*

**Ecosystem service:** Carbon

**Protected areas:** 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 the 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 People 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 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

<sup>1</sup> 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.

<sup>2</sup> *Ibid.*

<sup>3</sup> 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-Documents.pdf>

<sup>4</sup> 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>

<sup>5</sup> Pers comm. with Paul Jenkins, ILSC staff. 12/5/2020.

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## 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.*

**Ecosystem service:** Crocodile eggs and hatchlings

**Protected areas:** 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 protected 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 characterised by economic marginalisation 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 specialised 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

<sup>1</sup> 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.

<sup>2</sup> 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)

<sup>3</sup> 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.

<sup>4</sup> 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>

<sup>5</sup> Pers comm. with Ingrid Stonhill and Alex Earl, Bawinanga Aboriginal Corporation staff. 09.06.20.

<sup>6</sup> Commercial Services. Djelk Rangers website. Available at: <https://www.bawinanga.com/what-we-do/bawinanga-rangers/what-we-do/> Accessed 10/06/20

<sup>7</sup> Ingrid Stonhill and Alex Earl. Op cit

## 1719 2.5 BANGLADESH: LAWACHARA NATIONAL PARK

1720

1721 *The indigenous Khasia people generate US\$95,000 annually from the sale of forest-friendly betel leaf and nut using*  
 1722 *traditional practice of forest-based farming within the national park.*

1723

1724 **Ecosystem service:** Non-timber forest products

1725

1726 **Protected areas:** Lawachara National Park, Size: 12.50 km<sup>2</sup>, WDPA ID: 142993, IUCN management category: II

1727

1728 **Adjusted net national income per capita (US\$):** 1,484

1729

### 1730 Conservation value

1731 The semi-evergreen and mixed deciduous forests of Lawachara National Park support 266 species of birds and 50  
 1732 mammal species including a population of about 60 critically endangered western hoolock gibbons (*Hoolock hoolock*).

1733

### 1734 Description

1735 Lawachara National Park (LNP), in north-east Bangladesh, is named after one of the two villages (or *punji*) inside its  
 1736 boundaries; both ancestral dwellings of the Khasia indigenous group, a Bangladeshi ethnic minority.<sup>1</sup> These are two of  
 1737 30 punjis surrounding LNP that have been co-managing and protecting the park with the Bangladesh Forest  
 1738 Department since 2005 through a USAID conservation initiative entitled “Nishorgo” meaning idyllic nature.<sup>2</sup> The Khasia  
 1739 depend on LNP’s forest for a number of different NTFPs, including bamboo, cane, fuelwood, mushrooms, wild  
 1740 vegetables (such as bamboo shoots, taro etc.) wild fruits (such as chapalish, kau, jackfruit, cane fruits, bananas, dewa  
 1741 etc.) and medicinal plants.<sup>3</sup>

1742

1743 The Khasia are also highly dependent on LNP for their traditional practice of forest-based farming of betel leaves (*Piper*  
 1744 *betle*), which they have been growing since 1952.<sup>4</sup> Betel leaves are very popular with people of South and South-East  
 1745 Asia and their descendants around the world, creating a high market demand and value. The leaf is usually chewed, for  
 1746 its medicinal qualities, as ‘*pann*’ with slices of betel nut and lime.

1747

1748 The betel leaf vine requires trees for support and as such the Khasia never fell trees in their allocated area of the park,  
 1749 but instead prune branches for fuelwood and lumber. Cultivation uses traditional conservation-friendly practices and  
 1750 research has found tree species richness and diversity and avian richness in betel agroforests were higher than, or  
 1751 similar, to secondary forests in the area.<sup>5</sup> On average, Khasia households earn US\$1,477 from betel sales each year –  
 1752 71% of their annual income,<sup>6</sup> with one hectare of betel agroforestry generating around US\$950 annually.<sup>7</sup>

1753

### 1754 Tangible benefits

1755 Income: the annual sale of betel leaves from agroforestry plantations generates US\$95,000 for the 102 households  
 1756 divided between the two forest villages inside LNP.

1757

### 1758 References

<sup>1</sup> USAID. 2006. *Management Plans for Lawachara National Park*. International Resources Group, Washington D.C. 20036.

<sup>2</sup> Pers comm. with Sumaiya Firoze, staff at USAID Bangladesh. 26/5/2020

<sup>3</sup> *Implications of livelihood dependence on NTFPs in Lawachara National Park*. 2009. Country Compass – Bangladesh. Non-wood News. No. 19. Food and Agriculture Organisation of the United Nations (FAO).

<sup>4</sup> 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

<sup>5</sup> 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**: 118-134.

<sup>6</sup> Islam, J. and Nath, T.K. 2014. Op cit

<sup>7</sup> 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.*

**Ecosystem service:** Cacao

**Protected areas:** 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 pecar*), 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 practiced slash-and-burn agriculture for generations, but by the mid-2000's, 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 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

<sup>1</sup> IAF website. Available at: <https://archive.iaf.gov/resources/publications/annual-reports/2013/belize.html> (accessed 23/3/2020).

<sup>2</sup> 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)

<sup>3</sup> 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>

<sup>4</sup> 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).

<sup>5</sup> 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)

<sup>6</sup> <http://transparenttradecoffee.org/> (accessed 6/6/2020)

<sup>7</sup> Uncommon Cacao. 2018. *2018 Transparency Report*. Available at: <https://indd.adobe.com/view/4afb053a-306c-4f52-8612-f77b23c7d466>

<sup>8</sup> 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 areas ecological integrity.*

**Ecosystem service:** Medicinal plants

**Protected area:** Wangchuck Centennial National Park, Size: 4921 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 legalised 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

<sup>1</sup> 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

<sup>2</sup> MAF. 2019. *Cordyceps Auction Report 2019*, Department of Agricultural Marketing and Cooperatives (DAMC), Ministry of Agriculture and Forests (MoAF), Royal Government of Bhutan.

<sup>3</sup> 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

<sup>4</sup> 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.

<sup>5</sup> 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.

<sup>6</sup> Rinzin, C., Vermeulen, W.J.V., Wassen, M.J. and Glassbergen, P. 2009. Nature conservation and human well-being in Bhutan: An assessment of local community perceptions. *The Journal of Environment and Development* 18 (2): 177-202. DOI: 10.1177/1070496509334294

<sup>7</sup> 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

<sup>8</sup> Anon. 2019. *Cordyceps Collection Increases By 272 Grams*. [Business Daily News, September 17, 2019, https://www.businessbhutan.bt/2019/09/17/cordyceps-collection-increases-by-272-kg/](https://www.businessbhutan.bt/2019/09/17/cordyceps-collection-increases-by-272-kg/)

<sup>9</sup> Anon. 2019. *Conservation Management Plan: Wangchuk Centennial National Park July 2012 – June 2017*, Department of Forest and Park Services, Ministry of Agriculture and Forests, Royal Government of Bhutan, Thimphu

## 2.8 BOLIVIA: MANURUPI 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 areas:** Manuripi National Wildlife Reserve, Size: 7463.62 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 bird, 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 50m 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 specialised 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 Manupiri 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>

SERNAP has traditionally relied on international support to cover the other 50% but due to recent withdrawals of cooperation, it has been necessary for the past savings SERNAP put aside from harvester fees to pay the total Manupiri management costs, thus harvesters have become a driving force in protected area sustainability.<sup>7</sup> WWF Bolivia has been working with the Bolivian National Service for Protected Areas (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

<sup>1</sup> The Observatory of Economic Complexity (OEC) website. 2020. Available at: <https://oec.world/en/profile/hs92/080120/> (accessed 24/4/2020)

<sup>2</sup> The Bolivian Institute for Foreign Trade (IBCE). *Bolivia: Export of Brazil nuts*. CIFRAS Bulletin Edition No. 840. Banco Ganadero.

<sup>3</sup> 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, Brasília and Quito.

<sup>4</sup> Evans, M. 2017. *Brazil nuts: Saviour seeds of the Amazon basin? Re-examining the region's 'cornerstone of conservation'*. Forests News. CIFOR, Bogor, Indonesia.

<sup>5</sup> 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.

<sup>6</sup> Pers comm. with Jordi Surkin, Jose Argandoña and Victor García, WWF Bolivia staff members. 24/4/2020

<sup>7</sup> *Ibid.*

1886 **2.9 BRAZIL: FERNANDO DE NORONHA MPA**

1887

1888 *Fisheries generate US\$674,000 annually thanks to spill-over from the MPA. Much of this is sold to local restaurants*  
1889 *catering to the 70,000 tourists that visit the MPA each year, the rest constitutes an important source of protein for*  
1890 *local families.*

1891

1892 **Ecosystem service:** fisheries

1893

1894 **Protected areas:** Fernando de Noronha MPA and World Heritage Site, Size: 109.33 km<sup>2</sup>, WDPA ID: 41087, IUCN  
1895 management category: II

1896

1897 **Adjusted net national income per capita (US\$):** 8,397

1898

1899 **Conservation value**1900 The Fernando de Noronha Archipelago and Rocas Atoll off the coast of mainland Brazil is made up of the visible parts of  
1901 a range of submerged mountains in the Southern Atlantic. The areas rich waters are extremely important for the  
1902 breeding and feeding of tuna, shark, turtle and other marine mammals. The islands are home to the largest  
1903 concentration of tropical seabirds in the Western Atlantic.

1904

1905 **Description**1906 Each year, 70,000 tourists visit the Fernando de Noronha archipelago, driving a demand for locally caught fish in  
1907 restaurants and hotels.<sup>1</sup> Local small-scale fisheries, involving about 40 of the 5,000 residents of the Archipelago, meet  
1908 over 80% of this demand, with more than half of this catch being traded without a middleman.<sup>2</sup> Profitable fishing  
1909 grounds are found around the edges of no-take zones, indicating the benefits from MPA spill-over. Artisanal fishers  
1910 either practice *hook and line* fishing, pulling in an average of 3.75 kg/hour/fisher (Catch Per Unit Effort – CPUE) or *rod*  
1911 *and reel* fishing, catching an average of 3.07 kg/hour/fisher. Annually, fisheries generate around US\$674,000. Fish  
1912 caught also constitute a major source of protein for local families.<sup>3</sup>

1913

1914 The MPA is divided into two management categories: 70% is a no-take zone and 30% a sustainable use zone. Sardine  
1915 has historically been used as a bait for pelagic fish fisheries in Fernando de Noronha, however sites inside the no-take  
1916 zone are the most viable due to local environmental conditions. Local small-scale fishers were thus allowed to continue  
1917 to catch sardine insides the no-take MPA. However, in 2000, all conservation units in Brazil began being managed under  
1918 a specific law that forbade resource extraction in areas classified as no-take zones. This has caused conflict around MPA  
1919 zone management and regulations, specifically given the MPA was established on the trust that fishers could maintain  
1920 their fishing traditions.<sup>4</sup>

1921

1922 Many younger fishers from the archipelago have thus begun to take advantage of tourism opportunities to diversify  
1923 employment becoming full (9.1% of fishing boats) or part-time (27.3%) recreational fishing guides to supplement  
1924 artisanal fishing income. Fishers can take their recreational catch for their own consumption or to sell to local  
1925 restaurants. Total revenues generated by tourism through recreational activities like fishing trips, scuba diving and  
1926 entrance tickets to the MPAs no-take zones, amounts to US\$11.64 million per year.<sup>5</sup>

1927

1928 **Tangible benefits**

1929 Latest estimate in 2018 indicate fisheries generate US\$674,000 annually.

1930

1931 **References**

1932

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<sup>1</sup> 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>

<sup>2</sup> 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>

<sup>3</sup> 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

<sup>4</sup> Lopes et al, Op cit.

<sup>5</sup> 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, altogether spending on average nearly US\$150,000 annually.*

**Ecosystem service:** Research

**Protected areas:** Reserva Particular Do Patrimônio Natural Reserva Ecológica De Guapiaçú, 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 Guapiaçú (REGUA) is a privately protected patch of the Atlantic Forest in the upper Guapiaçú watershed and also the name of a small environmental organisation 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 enhances 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 Guapiaçú 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 Guapiaçú 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 facilitate 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

<sup>1</sup> CEPF. 2020. Atlantic Forest - Species. Retrieved from Conservation International: <https://www.cepf.net/our-work/biodiversity-hotspots/atlantic-forest/species> (accessed 3/6/2020)

<sup>2</sup> Dantas, J. R., Almeida, J. R., & 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.

<sup>3</sup> Rangel, D.A., Lisboa, C.V., Novaes, R.L.M., Silva, B.A., Souza, R. 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>

<sup>4</sup> 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.*

**Ecosystem service:** employment

**Protected areas:** Sichuan Giant Panda Sanctuaries, Size: 9,245km<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 outer most '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-wildlife 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

<sup>1</sup> 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), pp.1665–1686.

<sup>2</sup> UNESCO World Heritage Convention. *Sichuan Giant Panda Sanctuaries – Wolong, Mt Siguniang and Jiayin Mountains*. Available here: <https://whc.unesco.org/en/list/1213/>

<sup>3</sup> Pers comm. with Yan Zhang, IUCN staff. 7/5/2020

<sup>4</sup> Ma, et al. 2017. *op cit*

<sup>5</sup> Yan Zhang. *op cit*

<sup>6</sup> Ma, et al. 2017. *op cit*

<sup>7</sup> 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 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 synchronised 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, visit 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 800m 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

<sup>1</sup> 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.

<sup>2</sup> Inter-American Convention for the Protection and Conservation of Sea Turtle Costa Ric Annual Report 2018; <http://www.iacseaturtle.org/eng-docs/informes-anauales/2018/2018%20Costa%20Rica%20Annual%20Report.pdf> (accessed 17/5/2020)

<sup>3</sup> 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. Brisenö-Duenás, R. Márquez-Millán, and L. Sarti-Martínez, 4–5. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-SEFSC-436

<sup>4</sup> <https://costa-rica-guide.com/nature/wildlife/turtle-egg-harvest/> (accessed 14/1/2020)

<sup>5</sup> 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.

<sup>6</sup> Ballestero *et al*, *op cit*

<sup>7</sup> 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.

<sup>8</sup> Trøeng, 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 areas:** 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 the over 4,000 residents of Hojanca town in the Guanacaste region.<sup>1</sup> The areas 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 mushrooms (*Entoloma macrofungi*).

### 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 Hojanca and causing an out-migration of more than half the population.<sup>3</sup>

To combat this, in 1993 a group of twelve Hojanca farmers incorporated the Monte Alto Foundation (MAF), with the mandate to acquire and reforest land at the head of the river and 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

<sup>1</sup> <https://www.equatorinitiative.org/2017/05/28/fundacion-pro-reserva-forestal-monte-alto-foundation-for-monte-alto-forest-reserve/> (accessed 19/3/2020).

<sup>2</sup> United Nations Development Programme. 2012. *Foundation for Monte Alto Forest Reserve, Costa Rica*. Equator Initiative Case Study Series. New York, NY.

<sup>3</sup> 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).

<sup>4</sup> *Ibid.*

2101 **2.14 FIJI: VUETI NAVAKAVU LOCALLY MANAGED MARINE AREA**

2102

2103 *Fisheries from the Vueti Navakavu Locally Managed Marine Area generate over US\$475,000 per year, plus an*  
 2104 *additional 86,000 kg of protein consumed locally.*

2105

2106 **Ecosystem service highlighted:** Fisheries

2107

2108 **Protected area:** Vueti Navakavu Locally Managed Marine Area (LLMA), Size: 18.71km<sup>2</sup>, WDPA Code: 555547791, IUCN  
 2109 management category: N/A

2110

2111 **Adjusted net national income per capita (US\$):** 5,137

2112

2113 **Conservation value**

2114 The Muaivuso peninsula is surrounded by a fringing coral reef, mangroves and remnants of coastal littoral forest  
 2115 providing important habitat for biodiversity, including many species important for local fisheries. The mangrove and  
 2116 reefs also provide coastal protection against storm surges and erosion; a significant indirect use value in an area where  
 2117 cyclones and tropical storms occur frequently.<sup>1</sup>

2118

2119 **Description**

2120 The Navakavu LMMA is the traditional fishing ground (or *qoliqoli*) for four villages; Nabaka, Nammakala, Muaivuso and  
 2121 Waiqanake<sup>2</sup> and whilst Fiji is one of the more affluent countries of the South Pacific, these four villages are relatively  
 2122 poor (in 2007 the average income here was less than half the Fijian average).<sup>3</sup> Muaivuso households rely heavily on  
 2123 fishing for both sustenance and income; roughly 40% of the fish caught provide nutrition for Navakavu households, the  
 2124 remaining 60% are sold in the market.<sup>4</sup>

2125

2126 In 2002, responding to declines in catches, the communities set up a 'no-take zone' with support from the Fiji LMMA  
 2127 network and the University for the South Pacific. Here, all fishing and other extractive activities are prohibited, but the  
 2128 spill over effects of the MPA now replenish fish stocks in the surrounding traditional fishing grounds (for which the four  
 2129 villages have exclusive use rights). For example, during the four years after the establishment of the 'no-take zone',  
 2130 community finfish catches increased by 3%.<sup>5</sup>

2131

2132 The proportion of male fishers to female is roughly 50%, each household has an average of two fishers, and these make  
 2133 around 80 fishing trips per year to the fishing grounds bringing in just over 215,000 kg of seasonal and non-seasonal  
 2134 catch each year. The 60% that is sold, generates just over US\$475,000 for the communities each year – on average this  
 2135 comes to just under US\$4,300 per household.<sup>6</sup>

2136

2137 **Tangible benefits**

2138 Income: Households generate US\$4,300 each year through the 60% of catch sold in markets, households also save just  
 2139 under US\$2,900 each year through not having to purchase protein.

2140

2141 **References**

2142

<sup>1</sup> 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.

<sup>2</sup> IUCN. 2009. *Navakavu Locally Managed Marine Area, Viti Levu Island, Fiji*. Marine Protected Area Case Studies.

<sup>3</sup> Beukering, P.J.H., *et al.* 2007. Case Study 1: Yavusa Navakavu Locally Managed Marine Area (Fiji). Nature's Investment Bank. Report 58.

<sup>4</sup> O'Garra, T. 2012. Economic valuation of a traditional fishing ground on the coral coast in Fiji. *Ocean and Coastal Management*. **56**, 44-55

<sup>5</sup> IUCN. 2009. Op cit

<sup>6</sup> 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: 1021.48 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 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\$42 million and resulted in the employment of 326 people.<sup>8</sup>

### Tangible benefits

Tourism accounted for US\$42 million and 326 jobs in 2019.<sup>9</sup>

### References

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<sup>4</sup> 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.

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<sup>7</sup> [https://www.metsa.fi/documents/10739/3335805/visitationnumbers\\_2019.pdf/99807344-c88f-46e8-a4c9-317772ab8ff1](https://www.metsa.fi/documents/10739/3335805/visitationnumbers_2019.pdf/99807344-c88f-46e8-a4c9-317772ab8ff1) (accessed 7/6/2020)

<sup>8</sup> [https://www.metsa.fi/documents/10739/1366250/Localconomyimpacts\\_2019.pdf/4a2bcdcf-15c3-4a04-8e63-370b4dbad756](https://www.metsa.fi/documents/10739/1366250/Localconomyimpacts_2019.pdf/4a2bcdcf-15c3-4a04-8e63-370b4dbad756) (accessed 7/6/2020)

<sup>9</sup> <http://www.metsa.fi/web/en/economicbenefitsofnationalparks> (accessed 7/6/2020)

2183 **2.16 GERMANY: SCHAALSEE BIOSPHERE RESERVE**

2184

2185 *Despite being one of Germany's smaller biosphere reserves, Schaalsee is developing a multi-million dollar tourist*  
2186 *industry with strong identification to the biosphere brand.*

2187

2188 **Ecosystem service:** Tourism

2189

2190 **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  
2191 transition zone 201.40km<sup>2</sup>, WDPA Code: 198341, IUCN management category: not applicable.

2192

2193 **Adjusted net national income per capita (US\$):** 40,2652194 **Conservation value**2195 Schaalsee is one of the deepest lakes in Germany; characterised by islands, bays, Baltic beech forest and extensive reed  
2196 beds that are important for migratory birds. The area supports rare swamp and aquatic birds like Eurasian crane (*Grus*  
2197 *grus*) and osprey (*Pandion haliaetus*). It provides habitat for otter (*Lutra lutra*) and for threatened plants like the fen  
2198 orchid (*Liparis loeselii*), flea sedge (*Carex pulicaris*), Rannoch rush (*Scheuchzeria palustris*) and various marsh orchids.

2199

2200 **Description**2201 Germany has 18 biosphere reserves covering over 20,000km<sup>2</sup>. These have been the subject of a long-term study of  
2202 economic benefits, mainly focused on ecotourism.<sup>2</sup> Total tourism in German biosphere reserves equalled 65.3 million  
2203 visitor days, and US\$3.40 billion gross tourist spending. Most tourists interviewed knew that they were visiting a  
2204 biosphere reserve. A relatively small number, 4.21 million visitor days (6.5% of tourism demand) were visitors with a  
2205 high biosphere reserve affinity, who chose to visit explicitly because the site is a biosphere reserve and who spent  
2206 around US\$2000 million.<sup>3</sup>

2207

2208 Schaalsee is in the north of Germany. For many years the area was controlled by the military and little visited, in  
2209 consequence it redeveloped many natural characteristics. The reserve is fairly small and has relatively low gross tourist  
2210 spending of around US\$13.4 million/year but this has increased from almost no tourism before German reunification.<sup>4</sup>  
2211 Furthermore, Schaalsee has a far larger than average proportion of visitors with a high biosphere reserve affinity  
2212 (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  
2213 visitor centre attracts around 40,000 visitors a year, spending US\$1.5 million and an eight-day a year market selling  
2214 food from the biosphere has a turnover of between US\$17,000-30,000 per market day (almost half the people  
2215 attending do so explicitly because the food is from the biosphere reserve).<sup>6</sup>

2216

2217 **Tangible benefits**2218 Income from specifically from local food production sales from the annual eight-day market makes between  
2219 US\$136,000 – US\$240,000 per year; overall the biosphere reserve has gross tourist spending of around US\$13.4 million  
2220 annually.

2221

2222 **References**


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<sup>4</sup> Engelbauer, M., Majewski, L. and Job, H. 2018. Regional economic impact of tourism in German biosphere reserves. *9<sup>th</sup> International Conference on Monitoring and Management of Visitors in Recreational and Protected Areas*. Bordeaux, France. pp 313-314.

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2223

## 2224 2.17 INDIA: RANTHAMBORE TIGER RESERVE

2225

2226 *Tiger viewing is increasing in popularity amongst both local and foreign tourists in India; in Ranthambore tourism*  
 2227 *contributes about US\$18 million to the local economy annually.*

2228

2229 **Ecosystem service:** Tourism

2230

2231 **Protected area:** Ranthambore Tiger Reserve, Size: 282 km<sup>2</sup>, WDPA ID: 1808, IUCN management category II

2232

2233 **Adjusted net national income per capita (US\$):** 1,678

2234

### 2235 Conservation value

2236 Ranthambore Tiger Reserve was India's first designated tiger (*Panthera tigris*) reserve, in an area of dry forest in  
 2237 Rajasthan. The park's deciduous forests protect a wide of fauna in addition to tigers, including leopard (*P. pardus*), nilgai  
 2238 (*Boselaphus tragocamelus*), sambar (*Rusa unicolor*), sloth bear (*Melursus ursinus*), rhesus macaque (*Macaca mulatta*),  
 2239 mugger crocodile (*Crocodylus palustris*) and chital (*Axis axis*) to name a few. The park is home to a wide variety of trees,  
 2240 plants, birds and reptiles, as well as one of the largest banyan trees (*Ficus benghalensis*) in India.

2241

### 2242 Description

2243 The role of tigers in tourism is very important across the tiger range, although benefits are often unevenly distributed.<sup>1</sup>  
 2244 Ranthambore was India's highest earning protected area in 2016-17 according to government figures, with a revenue of  
 2245 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  
 2246 which were domestic tourists.

2247

2248 Ranthambore's popularity has a major impact on the local economy, over 2,000 staff are employed full-time by the  
 2249 park, of which 70% are from the local district and 21% are from the state. The surrounding area supports some 3,000  
 2250 tourist beds along with guiding activities and other tourism associated employment. Just under 70% of all  
 2251 accommodation is owned by local people. Benefits include direct employment, on average one person for every room,  
 2252 and contributions to the local economy; a 2016 survey found 34% of all lodges donate money or contribute in kind to  
 2253 local schools and 24% support health care initiatives. Revenue estimated from small business enterprises in local  
 2254 villages with tourism infrastructure is estimated at US\$161,000 annually, four times higher than non-tourism villages. It  
 2255 has been estimated that tourism and associated services in and around the park generate over US\$33 annually, of  
 2256 which over 55% (approximately US\$18 million) goes back to the local economy.<sup>3</sup>

2257

2258 Other ecosystem services identified in India's tiger reserves include water, carbon storage, disaster risk reduction,  
 2259 medicinal plants, fodder, fish stocks and biological control.<sup>4</sup> An economic analysis of Indian tiger reserves identified  
 2260 benefits, including annual water services at US\$1.6 million and carbon storage at US\$936,000;<sup>5</sup> however these benefits  
 2261 do not accrue to the protected area or local community at present.

2262

### 2263 Tangible benefits

2264 Jobs and tourism-related income: the benefits from this highly visited park are multiple; contributing around US\$18  
 2265 million to the area's economy.

2266

### 2267 References

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<sup>3</sup> Raju, U. 2018. *The value of Wildlife Tourism around Ranthambore Tiger Reserve in Rajasthan for Wildlife Conservation and Local Communities*, TOFTigers and Bagh AAP Aur Van (BAAVAN) Trust, India.

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## 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.*

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

**Protected areas:** 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, 10km 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

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<sup>2</sup> Meet the Women. Wild Jordan website. Available at: <https://www.wildjordan.com/meet> (accessed 19/03/2020).

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<sup>5</sup> Pers comm. with Hussam Alawaidat, RSCN staff member. 13.02.20.

<sup>6</sup> Ibid

2308 **2.19 KENYA: BILIQO-BULESA COMMUNITY CONSERVANCY**

2309

2310 *In Kenya's arid north, the Borana people are sustainably utilising healthy grasslands within conservancies to graze*  
 2311 *livestock, and benefit from conservation-linked enterprise which generated over US\$170,000 for pastoralists in*  
 2312 *livestock sales in 2019.*

2313

2314 **Ecosystem service highlighted:** Grazing

2315

2316 **Protected area**

2317 Biliqo-Bulesa Community Conservancy, Size: 3,784.82 km<sup>2</sup>, WDPA Code: 555555520, IUCN management category: not  
 2318 reported

2319

2320 **Adjusted net national income per capita (US\$):** 1,321

2321

2322 **Conservation value**

2323 The conservancy is an important corridor and dispersal area for wildlife including elephant, lion, cheetah, buffalo,  
 2324 leopard, lesser kudu (*Tragelaphus imberbis*), gerenuk (*Litocranius walleri*) and other smaller mammals.

2325

2326 **Description**

2327 Livestock is the cultural and economic cornerstone of Kenya's arid North and Biliqo-Bulesa Conservancy (BBC) of Isiolo  
 2328 county is no exception. BBC supports a population of some 5,800 people and 57% of these are dependent on incomes  
 2329 derived from goats, sheep, cattle and camels.<sup>1</sup> The Borana people are well adapted to a semi-nomadic, pastoralist  
 2330 lifestyle – dividing their herds to reduce risk from attacks, droughts, cattle theft etc. and moving for hundreds of  
 2331 kilometres in search of water and pasture.

2332

2333 This way of life is wholly dependent on rangelands and the grasses they support. As such, the entire conservancy is  
 2334 managed as an integrated livestock and wildlife range – there are no areas where livestock are excluded year-round  
 2335 and maintaining fair market prices for cattle and grazing management plans have been crucial in reinforcing the link  
 2336 between healthy rangelands and healthy livestock.

2337

2338 The Northern Rangelands Trust Trading (NRTT) is a social enterprise established to build sustainable businesses and  
 2339 resilient commercial activity in Northern Kenya; providing revenues for community conservancies.<sup>2</sup> NRTT initiated its  
 2340 Livestock-To-Markets (LTM) business in 2006, purchasing livestock from pastoralists in conservancies and selling to  
 2341 markets in Nairobi. In 2019, LTM purchased 404 cattle from BBC at US\$178,400, of this US\$10,150 was invested back  
 2342 into the conservancy.<sup>3</sup> Over the course of 2019, NRT purchased a total of 1,532 cattle from twelve conservancies,  
 2343 generating US\$620,000 for pastoralists.

2344

2345 **Tangible benefits**

2346 Income: Sale of livestock to NRTT earned over US\$170,000 in 2019; the semi-nomadic, pastoralist communities of  
 2347 Biliqo-Bulesa Conservancy are reliant on livestock for 57% of their incomes and manage the conservancy to optimize  
 2348 livestock and wildlife grazing.

2349

2350 **References**

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<sup>3</sup> 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, 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.*

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

**Protected areas:** 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 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 gazelle*), golden jackal (*Canis aureus*) and the reintroduce the 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 of honey more 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

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<sup>3</sup> El-Jisr et al. Op cit

<sup>4</sup> El-Jisr et al. Op cit

<sup>5</sup> Pers comm. with Nizar Hani, Director of the UNESCO Shouf Biosphere Reserve. 23/4/2020.

2396 **2.21 MADAGASCAR: MAKIRA NATURAL PARK**

2397

2398 *Over US\$3.8 million was generated between 2005 and 2017 through the sale of carbon credits from avoided*  
 2399 *deforestation and its associated 1.2 million annual tCO<sub>2</sub>.*

2400

2401 **Ecosystem service highlighted:** Sale of carbon credits

2402

2403 **Protected area:** Makira Natural Park

2404 Size: 3601.91 km<sup>2</sup>, WDPA Code: 352249, IUCN management category: II

2405

2406 **Adjusted net national income per capita (US\$):** 405

2407

2408 **Conservation value**

2409 Makira Natural Park (MNP) is Madagascar's largest category II protected area and features the largest remaining  
 2410 contiguous tract of low and mid-altitude rainforest in eastern Madagascar - the only habitat in the world where all five  
 2411 families of lemur are represented, four species of which are critically endangered. MNP also provides habitat for over  
 2412 120 species of birds, 200 reptiles and amphibians and 450 species of plants.

2413

2414 **Description**

2415 Whilst MNP is a state-owned protected area, it is managed by the Wildlife Conservation Society (WCS). The area has  
 2416 historically suffered severe deforestation from slash-and-burn agriculture and illegal logging for charcoal; losing an  
 2417 estimated 15,000 ha between 1995 and 2005.<sup>1</sup> Since then, WCS and local stakeholders have cut deforestation rates by  
 2418 half and saved almost 6,000 ha of forest.<sup>2</sup> In 2008, the Makira Carbon Company (MCC), a WCS subsidiary, was  
 2419 appointed by the government as the exclusive agent for the sale of Makira carbon credits. Four years later Verified  
 2420 Carbon Units (VCUs) were retroactively certified to be sold on international carbon markets.<sup>3</sup> By the end of 2017, the  
 2421 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>  
 2422 each year.<sup>5</sup>

2423

2424 Half of the carbon credit sale proceeds are distributed to 75 community management associations that have  
 2425 established contracts with the government to sustainably manage the park's buffer zone.<sup>6</sup> These proceeds are used to  
 2426 pay biodiversity patrol teams and implement socio-economic development projects such as training communities in  
 2427 natural resource management and alternative livelihoods in ecotourism and the production of sustainable cash crops  
 2428 including vanilla, cloves, raffia and cacao.<sup>7</sup> The remaining half of the proceeds is divided between the government of  
 2429 Madagascar (20%) for REDD+ program training, WCS (20%) for the management of the park and up to 10% is reinvested  
 2430 into the financial management of community funds, marketing and carbon certification fees.<sup>8</sup>

2431

2432 **Tangible benefits:** Income: The avoidance of 1.2 million tCO<sub>2</sub> in emissions from deforestation allows for the sale of over  
 2433 US\$300,000 of carbon credits each year – US\$150,000 of which is invested into sustainable livelihoods for communities.

2434

2435 **References**

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<sup>3</sup> Ibid.

<sup>4</sup> 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.

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<sup>6</sup> World Bank Group. Op cit

<sup>7</sup> Natural Capital Partners. Op cit

<sup>8</sup> 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.*

**Ecosystem service:** Fisheries

**Protected areas:** 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 totally 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 with protein<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 fisheries impacts of 36 closures within Velondriake over eight years showed that the average weight of octopus landed per fisher per day increased by 87%, from 2.4kg in the month prior to the closure to 4.4kg 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 (usually it is men that fish for octopus in deeper water using boats). Landings in closure sites generated more revenue than simulated landings assuming continued open-access 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

<sup>1</sup> 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.

<sup>2</sup> 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), pp.175–185.

<sup>3</sup> MIHARI Madagascar Locally Managed Marine Area Network FAQs and Resources page. Available at: <https://mihari-network.org/how/> (accessed 30/4/2020)

<sup>4</sup> 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.

<sup>5</sup> Pers comm. with Jenny Oates, staff of Blue Ventures. 30/04/2020.

<sup>6</sup> 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>

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<sup>8</sup> Blue Ventures website. Available at: <https://discover.blueventures.org/marine-management-pays/#11> (accessed 30/4/2020)

<sup>9</sup> Gardner, C.J., Cripps, G., Prèmesnil, L., Dewar, K., Gough, C., Peabody, S., Tahindraza, G., and Harris, A. (In review) A decade and a half of learning from Madagascar’s first locally managed marine areas.

2479 **2.23 MALAWI: MAJETE WILDLIFE RESERVE**

2480

2481 *African Parks Malawi has restored a once ecologically impoverished park into a successful tourism enterprise*  
 2482 *benefiting people through over 170 jobs and US\$0.5 million annual revenue, much of which is reinvested into both*  
 2483 *the reserve and local communities through infrastructure and scholarships.*

2484

2485 **Ecosystem service:** Ecotourism

2486

2487 **Protected areas:** Majete Wildlife Reserve, Size: 704.7 km<sup>2</sup>, WDPA ID: 2319, IUCN management category: IV

2488

2489 **Adjusted net national income per capita (US\$):** 243

2490

2491 **Conservation value**

2492 The reserve includes savannah and woodland ecosystems, including riparian forest. Majete became Malawi's first big  
 2493 five game reserve in 2012 with populations of African buffalo (*Syncerus caffer*), African elephants (*Loxodonta africana*),  
 2494 African leopards (*Panthera pardus*), lions (*P. leo*), and rhinoceros (*Diceros bicornis*).

2495

2496 **Description**

2497 Decades of poaching and neglect had left Majete Wildlife Reserve a desolate wasteland by the 1990's with just a few  
 2498 remaining species of antelope, twelve employees and no tourists.<sup>1</sup> In 2003, this all changed when African Parks Malawi  
 2499 (APM – the local legal entity set up by African Parks, a non-profit organisation aiming to save, restore and protect  
 2500 Africa's wild places) assumed management of the reserve.<sup>2</sup> APM have since worked with local communities and the  
 2501 Malawi government to introduce over 15 species including lion, leopard and cheetah – reviving the park into a popular  
 2502 'Big Five' tourist destination. Over this period, effective law enforcement and developing community trust and  
 2503 collaboration has resulted in zero incidents of rhino or elephant poaching. Since 2019, eight pangolins (famously the  
 2504 world's most trafficked mammal)<sup>3</sup> have been carefully rescued by villagers and returned to the reserve.<sup>4,5</sup>

2505

2506 The reserve now drives the economy of the area; in 2019, over 11,000 tourists visited the park (50% were Malawian  
 2507 nationals) generating in excess of US\$500,000 in direct revenue and nearly US\$4,000 from the sale of local products  
 2508 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  
 2509 coming from local communities around the reserve – historically one of the poorest areas of Malawi.<sup>8</sup> In 2016, the  
 2510 Majete Scholarship Programme, managed by APM, paid around US\$15,000 in school fees for four university students  
 2511 and 100 school students and in 2017, APM built the Chiguma Primary School, housing 180 students. Over the years,  
 2512 APM have also built boreholes, clinics, community tourism camps and teacher's accommodations.

2513

2514 **Tangible benefits**

2515 Income and jobs: In 2019, 171 people were employed full-time and over 200 casually (many of whom are local); over  
 2516 US\$0.5 million was generated from tourism spending. Much of these revenues are reinvested back into the community  
 2517 through infrastructure and scholarships.

2518

2519 **References**

<sup>1</sup> 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)

<sup>2</sup> African Parks site. Majete page. Available At: <https://www.africanparks.org/the-parks/majete> (accessed 1/6/2020)

<sup>3</sup> 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)

<sup>4</sup> Pers comm. with Sophie Vossenaar and John Adendorff, African Parks staff members. 07.04.20.

<sup>5</sup> 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)

<sup>6</sup> Vossenaar, S. and Adendorff, J. Op cit

<sup>7</sup> Ibid

<sup>8</sup> 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 areas:** 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 appear 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 1960's<sup>7</sup> and although still not fully protected, the governments intention is for the whole area to be protected.<sup>8</sup>

At up to 83.8m, the tualang is 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 villages.

### Reference and notes

<sup>1</sup> Note: Malaysian protected area data on the WDPA is currently being updated.

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[https://www.wwf.org.my/about\\_wwf/what\\_we\\_do/forests\\_main/forest\\_protect/protect\\_projects/ulu\\_muda/\(accessed 5/5/2020\)](https://www.wwf.org.my/about_wwf/what_we_do/forests_main/forest_protect/protect_projects/ulu_muda/(accessed%205/5/2020)).

<sup>4</sup> Sulaiman, S.A. and Mohamed, M. 2014. Health benefits and safety profiles of Tualang honey AgroMas Malaysia: A review. *PharmaNutrition* 2(3):108

<sup>5</sup> 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

<sup>6</sup> 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/malaysias-honey-hunters-defy-angry-bees-to-harvest-treetop-treasure \(accessed 5/5/2020\)](http://www.straitstimes.com/asia/se-asia/malaysias-honey-hunters-defy-angry-bees-to-harvest-treetop-treasure(accessed%205/5/2020)).

<sup>7</sup> WWF website. [op cit](#)

<sup>8</sup> Pers comm. with Surin Suksuwan. 5/5/2020.

<sup>9</sup> Anon. 2018., [op cit](#)

<sup>10</sup> Shahwahid. 2012. Unpublished WWF-Malaysia study.

<sup>11</sup> 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 fisherfolk providing around US\$2.1 million annually.*

**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 with 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 recognised 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 fisherfolk. 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, fisherfolk 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

<sup>1</sup> 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)

<sup>2</sup> Selulić, G. Ivanić, K.Z. and Porej, D. 2017. *Protected Areas Benefits Assessment (PA-BAT) in Montenegro*. WWF Adria, Zagreb.

<sup>3</sup> 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

<sup>4</sup> *Ibid*

<sup>5</sup> Mrdak, D. 2009. Environmental risk assessment of the Morača river canyon and Skadar Lake. WWF MedPo and Green Home, Podgorica.

<sup>6</sup> 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 areas:** 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 72km 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

<sup>1</sup> United Nations Development Programme. 2016. *Association de Gestion Intégrée des Ressources (AGIR), Morocco*. Equator Initiative Case Study Series. New York, NY.

<sup>2</sup> Pers comm. with Atef Limam, Royal Activity Center for Specially Protected Areas staff member. 07.05.20

<sup>3</sup> AGIR website. Available at: <https://agir-env.org/au-port-dal-hoceima-les-nasses-seraient-elles-une-alternative/> (accessed 19/032020).

<sup>4</sup> 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)

<sup>5</sup> PANORAMA website. Available at: <https://panoramatest.tbodev.de/en/solution/sustainable-management-moroccos-marine-resources> (accessed 19/032020).

<sup>6</sup> 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 areas:** 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 Transfronteir 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, is found throughout Namibia and has been commercialised since the 1960's 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 commercialisation, 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 which 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

<sup>1</sup> Cole, D. 2014. *Indigenous Plant Products in Namibia*. Venture Publications, Windhoek, Namibia.

<sup>2</sup> <http://www.nbri.org.na/sections/economic-botany/INP/sectors/Devils-claw>

<sup>3</sup> Massyn, P., E. Humphrey, M. Everett, and T. Wassenaar. 2009. *Tourism Development Plan: Bwabwata, Mudumu, and Mamalia National Parks*. Windhoek, Namibia: Ministry of Environment and Tourism.

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<sup>5</sup> MacLennan, A. 2016. *Devil's claw an organic remedy to economic hardship*. Washington DC, WWF US,

<sup>6</sup> 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 eco-tourism 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 highlighted:** 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 prioritised 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 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 downturns. 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 raising) 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; Volcanoes National Park is the most visited protected area although the share of the national ecotourism revenue from this protected area has not been disaggregated.

### Reference

<sup>1</sup> 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).

<sup>2</sup> 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.

<sup>3</sup> Nielsen, H. and Spenceley, A. 2010. *The success of tourism in Rwanda – Gorillas and more*. Paper for the World Bank and SNV.

<sup>4</sup> <https://www.bloomberg.com/news/features/2017-09-28/how-rwanda-became-the-unlikeliest-tourism-destination-in-africa> (accessed 22/3/2020).

<sup>5</sup> <https://allafrica.com/stories/201808290251.html> (accessed 22/3/2020).

<sup>6</sup> <https://www.volcanoesnationalparkrwanda.com/blog/rwanda-has-double-gorilla-permits-fees.html> (accessed 24/4/2020)

<sup>7</sup> 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.

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2733 **2.29 SEYCHELLES: VALLÉE DE MAI NATURE RESERVE**

2734

2735 *Sale of the coco de mer nut is an important source of revenue for the Seychelles Islands Foundation, raising over*  
 2736 *US\$60,000 in sales per year. The Vallée de Mai site also raises approximately US\$2.7 million annually in tourism*  
 2737 *revenues.*

2738

2739 **Ecosystem service:** Non-timber forest products and tourism revenue

2740

2741 **Protected areas:** Vallée de Mai Nature Reserve and World Heritage Site, Size: 0.2 km<sup>2</sup>, WDPA ID: 5185, IUCN

2742 management category: not reported

2743

2744 **Adjusted net national income per capita (US\$):** 11,667

2745

2746 **Conservation value**

2747 Vallée de Mai protects a remnant of ancient Praslin island palm forests and is one of the Seychelles' largest intact  
 2748 habitats of the endemic coco de mer palm (*Lodoicea maldivica*).<sup>1</sup> Also protected, are endemic and globally important  
 2749 species, including the Seychelles black parrot (*Coracopsis barklyi*) and the golden panchax (*Pachypanchax playfairi*), the  
 2750 only freshwater fish endemic to the Seychelles.

2751

2752 **Description**

2753 The coco de mer palm bears the world's largest seed, weighing up to 17kg; the seed has become a popular souvenir for  
 2754 tourists and has historically been heavily exploited. Despite its endangered status<sup>2</sup> and recognition on CITES Appendix  
 2755 III, exploitation has increased since the 1990's as the kernel has gained popularity in South East Asia for medicinal  
 2756 purposes. In 2010, it was estimated that >95% of seeds were being unsustainably harvested and a 2018 census found  
 2757 only approximately 8,000 mature palms remained.<sup>3</sup> 14% of populations are female palms, these typically produce one  
 2758 seed per year, totalling a potential annual production of 1,120 nuts. The trade in seeds is now strictly regulated under  
 2759 Seychelles law.<sup>4</sup>

2760

2761 The Seychelles Islands Foundation (SIF) non-profit organisation manages the Vallée de Mai (VM) and, along with other  
 2762 licensed sellers, sells seeds certified by the Department of Environment which recommends 20% of seeds produced are  
 2763 replanted to stabilize and increase population growth. Around 900 seeds are sustainably harvested each year, these  
 2764 certified seeds can be purchased for between US\$365 and US\$440<sup>5</sup> depending on size and symmetry, while the edible  
 2765 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  
 2766 around US\$67,000 annually.<sup>7</sup>

2767

2768 In addition, the VM itself is a source of revenue from tourism. In 2019, just under 109,000 tourists visited the reserve,<sup>8</sup>  
 2769 entrance fees cost US\$25, thus generating approximately US\$2.7 million that year, much of which was re-invested into  
 2770 SIF's management, protection and research activities of both VM and the other Seychelles' World Heritage site –  
 2771 Aldabra Atoll. SIF employs 78 full-time staff and VM employs 44 staff.<sup>9</sup>

2772

2773 **Tangible benefits**

2774 Income and jobs: Annually, the site makes US\$2.7 million from tourism and SIF generates some US\$67,000 from seed  
 2775 and kernel sales.

2776

2777 **References**

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<https://seylit.org/sc/legislation/consolidated-act/37>

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<sup>6</sup> 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.

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## 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.*

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

**Protected areas:** 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 on Global Finance's 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 practice 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 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 benefitting from the cocoa work, these support another 17,000 people through the additional household income.<sup>5</sup> The 2019-2020 harvest season has so far 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

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<sup>2</sup> Sims, K. 2018. *Eat chocolate, save a rainforest – the Gola Cocoa Project tells you how*. Birdlife International.

<sup>3</sup> <https://www.africa-eu-partnership.org/en/success-stories/trans-boundary-peace-park-sierra-leone-and-liberia> (accessed 22/3/2020).

<sup>4</sup> 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).

<sup>5</sup> Pers comm. with Richard Dixon and Andrew BrockDoyle, RSPB staff members. 29/04/2020.

2824 **2.31 SWITZERLAND: ENTELBUCH UNESCO BIOSPHERE RESERVE**

2825

2826 *Under the established brand Echt Entlebuch, products produced within Entlebuch Biosphere Reserve generate almost*  
 2827 *US\$6 million annually.*

2828

2829 **Ecosystem service highlighted:** Agriculture and forestry

2830

2831 **Protected area:** Entlebuch Biosphere Reserve site

2832 Size: 396.59 km<sup>2</sup>, WDPA Code: 900544, IUCN management category: N/A

2833

2834 **Adjusted net national income per capita (US\$):** 64,307

2835

2836 **Conservation value**

2837 The Entlebuch Biosphere Reserve (BRE) in the Lucerne region is a mixed landscape of high peatlands, subalpine, riverine  
 2838 and alluvial forests, meadows and karst mountains with cave systems. Over 2,000 people work in the primary sector  
 2839 (dominated by agriculture and forestry) and over 1,500 work in the secondary sector (mostly dairy and forest products),  
 2840 and thus are highly reliant on the ecosystem services of BRE.<sup>1</sup>

2841

2842 **Description**

2843 The BRE was established in 2001 through a highly participative approach led by local communities living in the area with  
 2844 the aim of conserving ecosystem services, promoting sustainable regional products, cultivating natural resources and  
 2845 developing ecotourism.<sup>2</sup> Once BRE was set up, the management team launched the product label “Echt Entlebuch” to  
 2846 promote the sales of regionally produced products.

2847

2848 Over the next 13 years, BRE management built up the regulations, identity, credibility and market connections of Echt  
 2849 Entlebuch. To qualify for the label, 80% of goods (processed and unprocessed) need to originate from within BRE and  
 2850 two thirds of the added value of the product (i.e. salaries, investments in infrastructure developments, etc.) must be  
 2851 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  
 2852 products and BRE management, as a cooperative, to advertise, sell and distribute the produce. By 2020, 50  
 2853 organisations were making more than 500 Echt Entlebuch-labelled products, including cheeses, cold cuts, preserves,  
 2854 pasta, baked goods, beverages and wooden doors.<sup>5</sup> As a result of the growing number of products and increased  
 2855 professionalisation through Biosphäre Markt, demand for Echt Entlebuch products grew and, with it, distribution reach.  
 2856 Since its establishment, the net turnover has been increased three-fold.<sup>6</sup> In 2014, Echt Entlebuch products generated a  
 2857 gross added value of US\$5.8 million (twice the annual BRE management budget).<sup>7</sup>

2858

2859 **Tangible benefits**

2860 Income: US\$5.8 million is generated annually from the sale of Echt Entlebuch-labelled products.

2861

2862 **References**

2863

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<sup>2</sup> MAB Biosphere Reserves Directory. <http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?code=SWI+02&mode=all> (accessed 7/5/2020)

<sup>3</sup> Knaus et al., op cit

<sup>4</sup> <http://www.biosphaeremarkt.ch/> (accessed 7/5/2020)

<sup>5</sup> Pers comm. with Florian Knaus, ETH Zürich Dept. of Environmental Systems Science staff. 11.05.20

<sup>6</sup> Ibid.

<sup>7</sup> 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 areas:** Puerto-Princesa Subterranean River National Park and World Heritage Site, Size: 222.02 km<sup>2</sup>, WDPA 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 from 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, 2.5km 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

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<sup>2</sup> Wildlife Friendly Enterprise Network. *Enterprises that Protect Water Monitor Lizards*. Available at: <http://wildlifefriendly.org/specie/palawan-water-monitor-lizard/>

<sup>3</sup> Acero, L., 2020. *Management by objectives: the Puerto Princesa Underground River, Palawan Philippines*. IOP Conference Series: Earth and Environmental Science, 424, p.012008.

<sup>4</sup> Maclang, E. and Badilla, E. 2020. *op cit*

<sup>5</sup> 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.*

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

**Protected areas:** 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 2km 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 handicraft 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 in 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 under 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

- 
- <sup>1</sup> 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>
- <sup>2</sup> 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>
- <sup>3</sup> Pers comm. with Dilys Roe, IIED staff member and Medard Twinamatsiko, MUST staff member. 28/5/2020.
- <sup>4</sup> Twinamatsiko et al. 2019. *op cit*
- <sup>5</sup> Roe, D. 2019. *Bwindi: Bees baskets and brilliant guided walks*. IIED. London. Available at: <https://www.iied.org/bwindi-bees-baskets-brilliant-guided-walks>
- <sup>6</sup> 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>
- <sup>7</sup> Roe, D. 2019. *Op cit*.
- <sup>8</sup> Pers comm. with Tina Chigo, Change a Life Bwindi staff member. 27/05/2020.

2956 **2.34 SCOTLAND, UK: ABERNETHY NATIONAL NATURE RESERVE**

2957

2958 *Viewing areas for nesting ospreys attract thousands of people every year to Loch Garten, contributing around US\$3.3*  
 2959 *million to surrounding communities and significant local employment.*

2960

2961 **Ecosystem service:** Tourism and employment

2962

2963 **Protected area:** Abernethy National Nature Reserve, Size: 140 km<sup>2</sup>, WDPA ID: 135918, IUCN management category IV

2964

2965 **Adjusted net national income per capita (US\$):** 34,171

2966

2967 **Conservation value**

2968 Abernethy National National Reserve (NNR) is a privately protected area owned and managed by the Royal Society for  
 2969 the Protection of Birds. Around a third of the reserve is Caledonian pine (*Pinus sylvestris*) forest, the largest remnant of  
 2970 old-growth pine forest in the UK. The reserve also supports around 5,000 species, 20% of which are rare or scarce.

2971

2972 **Description**

2973 Loch Garten is part of Abernethy NNR and is the site where in the 1950s ospreys (*Pandion haliaetus*) first returned to  
 2974 the UK to breed after a period of extinction. Ospreys still breed at the site today. Although one of the commonest birds  
 2975 of prey worldwide, the osprey attracted intense interest in the UK and nesting pairs have become a popular visitor  
 2976 attraction in various places around the country.

2977

2978 Loch Garten Nature Centre attracts around 22,000 visitors a year. It supports 12.2 (expressed as full time employment  
 2979 equivalents) jobs directly on the site (wardens/stalkers, scientific researchers, shop staff, information staff, gate  
 2980 attendants, forestry workers and hospitality staff) and an estimated 76 more through increased tourism locally.<sup>1</sup> Other  
 2981 sources of employment connected with the site include various local contractors working on maintenance, and local  
 2982 timber and venison dealers. Woodland management is shared between reserve staff, locals employed on winter  
 2983 contracts and larger forestry companies. To support the diversification of the local economy, the reserve produces,  
 2984 processes and markets goods, including forestry products and venison.<sup>2</sup>

2985

2986 Overall value from osprey nesting sites in protected areas in the UK was estimated to be US\$4.6 million a year in 2006;  
 2987 estimates in Loch Garten vary from US\$1.8 million in 2002 and US\$2.5 million in 2004;<sup>3,4</sup> and has likely increased since  
 2988 then. A refurbished nature centre due to open shortly is expected to increase visitor experiences and understanding of  
 2989 the forest, the ospreys and the conservation work that takes place at the site; it is expected to help increase visitor  
 2990 numbers and income for the reserve.

2991

2992 **Tangible benefits**

2993 Income and jobs: estimates are US\$2.5 million in 2004 (about US\$3.3 million today), with a total of 87 direct and  
 2994 associated jobs through management and increased tourism.

2995

2996 **References**

2997

2998

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<sup>2</sup> 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

<sup>3</sup> Dickie, I., Hughes, J. and Esteban, A. 2006. *Watched Like Never Before...The local economic benefits of spectacular bird species*. RSPB, Sandy, Beds.

<sup>4</sup> Poole, A.F. 2019. *Ospreys: The Revival of a Global Raptor*, John Hopkins University Press, USA

2999 **2.35 USA: GREAT SMOKY MOUNTAINS NATIONAL PARK**

3000

3001 *Tourism spending supports the local economies of a handful of park gateway communities to the tune of US\$1 billion*  
 3002 *a year, reducing unemployment rates and fuelling job growth exceeding national and state averages.*

3003

3004 **Ecosystem service highlighted:** Tourism

3005

3006 **Protected area:** Great Smoky Mountains National Park, Size: 2,098.24 km<sup>2</sup>, WDPA Code: 369223, IUCN management  
 3007 category: II

3008

3009 **Adjusted net national income per capita (US\$):** 51,485

3010

3011 **Conservation value**

3012 Stretching across the Southern Appalachian Mountains, the relatively untouched Great Smoky Mountains National Park  
 3013 (GSMNP) is home to not only around 1,500 of the emblematic black bear (*Ursus americanus*), but also 3,500 plant  
 3014 species including the largest remaining block of red spruce (*Picea rubens*), and many endangered wildlife species  
 3015 including the world's greatest variety of salamanders.

3016

3017 **Description**

3018 It is estimated that for every dollar invested into the National Park Service by American taxpayers, US\$10 are returned  
 3019 to local economies.<sup>1</sup> This is certainly the case for GSMNP which attracts 11 million visitors each year to the park  
 3020 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  
 3021 2018, visitors spent a total of US\$953 million locally at camping facilities, hotels, restaurants, transport and fuel,  
 3022 recreation businesses, retail and groceries (in order of largest to smallest).<sup>4</sup> In 2019, GSMNP experienced a 10%  
 3023 increase on the visitor numbers of 2018.<sup>5</sup> Extrapolating from the above figures 2019 tourist spending would have been  
 3024 in excess of US\$1 billion.

3025

3026 Over 45% of this spending is used to pay salaries for the 13.7 thousand jobs created by GSMNP tourism locally; almost  
 3027 66% of the Gatlinburg working population are employed in industries dependent on the tourism generated by GSMNP.<sup>6</sup>  
 3028 This economic activity puts Gatlinburg's job growth over the last year (2%) ahead of national averages (1.6%) and  
 3029 unemployment rate (3.3%) below both national (3.7%) and state (Tennessee - 4.3% and North Carolina – 3.9%)  
 3030 averages.<sup>7</sup>

3031

3032 **Tangible benefits**

3033 Income: 11 million tourists visiting GSMNP each year generates around US\$1 billion for the local economy, directly  
 3034 funding 13.7 thousand jobs.

3035

3036 **References**

<sup>1</sup> Soehn, D. 2019. *Park Tourism Generates \$953 Million in Visitor Spending*. Great Smoky Mountain Association. Available at:  
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## 2.36 USA: YELLOWSTONE NATIONAL PARK

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

**Ecosystem services:** Tourism

**Protected areas:** Yellowstone National Park, United States of America, 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.

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3076 **1.13 References**

3077 **[note in the final design these should go at the end of section 1.12 in the designed version; it is not possible to move**  
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