Solutions for development challenges

Insights from protected and conserved areas

Edited by Marie Fischborn and Trevor Sandwith

INTERNATIONAL UNION FOR CONSERVATION OF NATURE

PANORAMA
SOLUTIONS FOR A HEALTHY PLANET

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Preface

Protected and conserved areas are established, governed or managed to maintain their significant values for society. While always having outcomes that include the persistence of ecosystems, species and genes both locally and in the wider landscape and seascape, they also have a diversity of ecosystem functions that are valuable for human livelihoods, health and well-being. In many cases, the rationale for their existence is precisely because they are so valuable to people. The world faces many challenges, not the least of which is the ongoing catastrophic loss of biodiversity and its associated life-support systems. The destruction and degradation of nature also occasions the disruption of water supplies, food security, climate stability, security in the face of natural disasters, and undermines human health and well-being. Protected and conserved areas when effectively governed and managed can avert these negative consequences, and provide evidence and lessons for ecosystem management across the production landscape and seascape. Conservation managers and stewards of nature face direct threats and challenges to the integrity and persistence of the areas for which they are responsible. Among the arguments for addressing threats and investing in conservation practice are the wider social and economic values of these areas.

Using the framework of the Sustainable Development Goals, the many direct and indirect contributions of protected and conserved areas can be assessed systematically. But it is also important to understand how effective governance and management of protected and conserved areas enable their intrinsic and productive value to be maintained. **PANORAMA – Solutions for a Healthy Planet** offers a rigorous means to deconstruct and summarize specific cases where conservation practice is patently successful, and to better understand what factors influence and are associated with success. In this volume, a suite of case studies has been examined to derive common principles for understanding the extent to which protected and conserved areas can contribute more broadly to sustainable development among a range of sectors, and how the specific nature of dedicated governance and management enables this. It is hoped that these insights will inspire the collation and examination of new examples of solutions, and a more strategic approach to investing in and enabling protected and conserved areas to fulfil their potential.

Marie Fischborn and Trevor Sandwith

Executive summary

Alongside their contribution to biodiversity conservation, **protected and conserved areas** (hereafter: protected areas) are increasingly recognised as important sources of a wide range of benefits, or ecosystem services, that humans gain from intact, natural ecosystems. Well-governed and well-managed protected areas are among the most effective tools for maintaining ecosystems – such as forests, natural grasslands, coastal areas and freshwater wetlands – and their associated ecosystem services.

The **Sustainable Development Goals (SDGs)**, adopted by the United Nations in 2015, will be the driving force behind global efforts for sustainable development and conservation over the next decade. Analysis by the IUCN World Commission on Protected Areas found that 34 of the 169 targets of the seventeen SDGs link back to ecosystem services supplied at least in part by protected areas.

This report explores how protected areas contribute to achieving the SDGs. It does this by analysing case studies from **PANORAMA – Solutions for a Healthy Planet**, an initiative of IUCN and several partners that aims to provide knowledge and facilitate exchange and learning on successful approaches in conservation and sustainable development, and to support the broader application of proven solutions.

HOW THE STUDY WAS CARRIED OUT

PANORAMA includes what is currently the world's most extensive case-study portfolio of successful approaches – solutions – that illustrate the role of protected areas in delivering both biodiversity conservation and human development outcomes. Each solution is described in a standardised format, including information about the *context* it arose from, the *process of its operation*, and its *impacts*.

In total, 106 protected areas solutions were reviewed for this report. They were clustered according to the SDG to which each contributed the most, aside from SDG 14 (Life Below Water) and SDG 15 (Life on Land), since all protected areas contribute to one or both of these SDGs, considering their primary objective of nature conservation.

The solutions reviewed for this study were clustered under the following SDGs:

- SDG 1 (No Poverty)
- SDG 2 (Zero Hunger)
- SDG 3 (Good Health and Well-Being)
- SDG 5 (Gender Equality)
- SDG 6 (Clean Water and Sanitation)
- SDG 8 (Decent Work and Economic Growth)
- SDG 13 (Climate Action)
- SDG 17 (Partnerships for the Goals)

KEY FINDINGS

This study confirms that protected areas are already **contributing to all of the SDGs (Figure 1)**. Unsurprisingly, SDG 15 (Life on Land), SDG 14 (Life below Water) and SDG 13 (Climate Action) are among the goals to which the solutions reviewed contribute most frequently. Still, contributions to SDG 17 (Partnerships for the Goals), SDG 8 (Decent Work and Economic Growth) and SDG1 (Poverty Alleviation) also feature prominently, underlining the fact that protected areas are important in social and economic dimensions.

The finding that protected areas contribute positively to the achievement of all SDGs strengthens the relevance of protected areas and provides

governments with clear evidence to support their reporting on the SDGs. It also provides additional arguments for further expansion of protected areas in national and global conservation and development strategies.

Mangroves and wetlands, including swamps, marshes and peatland, are the ecosystems most frequently covered by the solutions. This is not surprising, as they are threatened in many parts of the world and also supply multiple ecosystem services. Nevertheless, the emphasis on relatively few ecosystem types is a concern, in that many critical conservation issues may not be receiving the attention they deserve. A key focus of PANORAMA is identifying the 'building blocks', such as key success factors, of each solution. This study found that the most commonly described building blocks of protected area solutions fell into three categories: *alliance and partnership development*; closely followed by *education, training and other capacity development activities*; and, thirdly, *communication, outreach and awareness building*.

An overarching observation on the process is that many of the 106 solutions illustrate that success was achieved through careful engagement of a broad group of people over more extended periods, allowing for flexibility throughout all stages of implementation.

A theme that emerges throughout this summary of PANORAMA solutions is that getting conservation right means first getting the **contextual governance, social and economic issues** right. Textual review of the impact descriptions of the solutions found that *community/communities* is by far the most

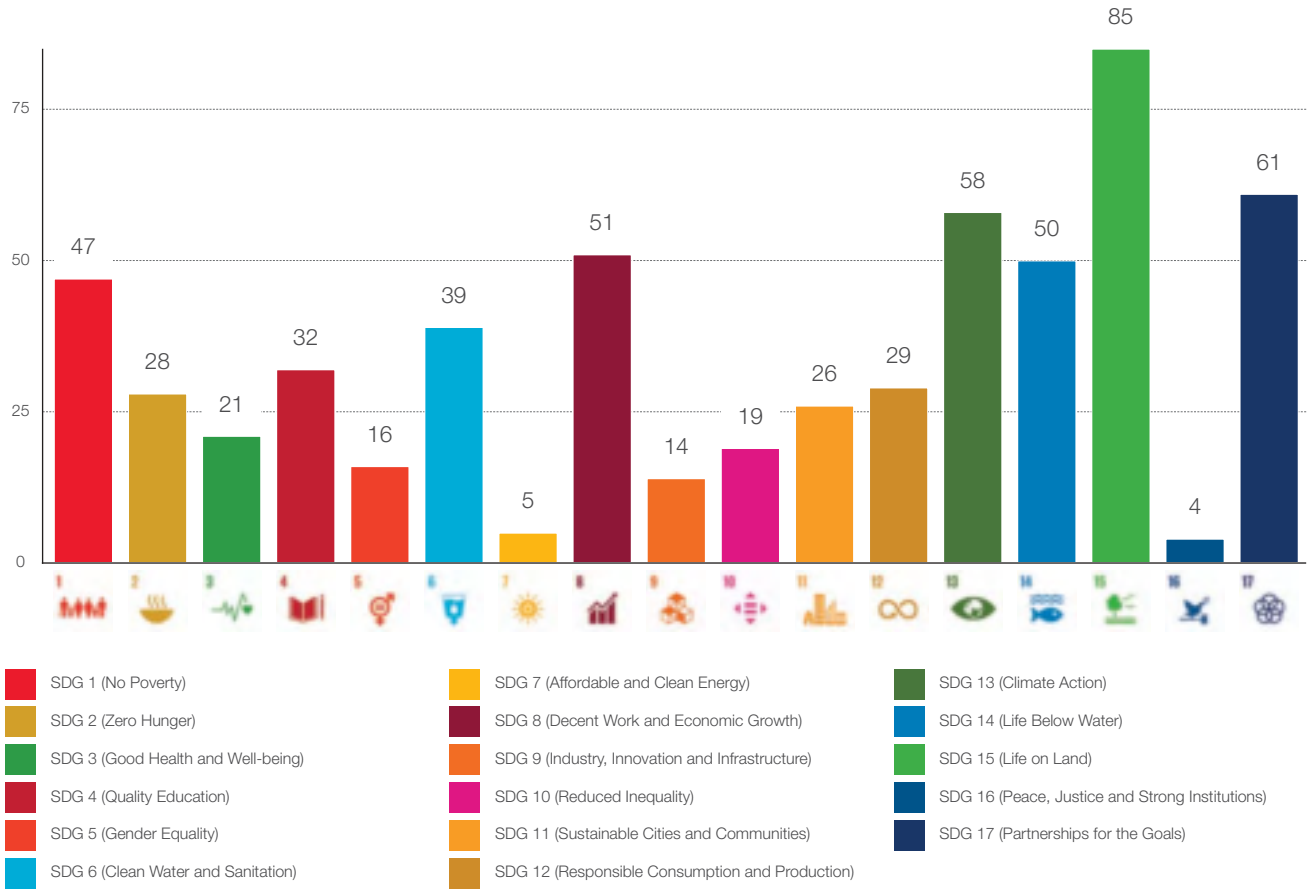

Figure 1. Number of solutions contributing to each of the SDGs (NB: a solution generally contributes to multiple SDGs). Compiled by the report editors

Arakwal elder and ranger at Tallow Creek – Arakwal National Park, Australia. © David Young.

commonly appearing term. This points to the importance of **working closely with local communities to find** mutually satisfactory options for management of protected areas if there is a reasonable chance of success, such as a "solution" outcome. The emphasis on local communities is not simply a way of addressing any concerns they have about a protected area – it is shifting to sharing responsibility with communities as actively engaged stakeholders in the process, as well as being beneficiaries of the outcomes of solutions. Future efforts could focus on closer examination of such inclusive cooperation models.

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Main contributors

CHAPTER 1
Nigel Dudley [1], Sandeep Sengupta [2]

CHAPTER 3
Section 3B: Dr. Jonathan Davies [3], James Hardcastle [4], Ludovic Larbodière [5]
Section 3C: Jo Hopkins [6], Christopher Lemieux [7], Rob Wolters [8]
Section 3D: A. Emmett Boyer [9]
Section 3E: Ian Harrison and Harmony Patricio [10]
Section 3F: Dr. Sue Snyman [11]
Section 3G: Mathias Bertram, Leonard Lemke, Luise Richter [12], Sandeep Sengupta, Risa Smith [13]

CHAPTER 4
Cécile Fattebert [14]

CHAPTER 5
Nigel Dudley

OTHER CONTRIBUTORS
Collaboration on conceptualisation, literature review, data review
Kaleigh Carlson, Rhiana Fullan, Céline Kahn, Aditya Pant [15]

Peer review
Mirjam de Koning [16], Nick Salafsky [17]

Data, graphs, references, proofreading
Cécile Fattebert, Zhanna Levitina [18]

Substantive editing
Eoghan O'Sullivan [19]

Copy editing and proofreading
Patricia Teixidor [20]

Graphic design and layout
José Carlos Cámara [21]

[1] Co-chair, IUCN WCPA Specialist Group on Natural Solutions
[2] Global Coordinator, IUCN Climate Change Portfolio
[3] Global Coordinator, Drylands, IUCN Global Ecosystem Management Programme
[4] Deputy Director, IUCN Global Protected and Conserved Areas Programme
[5] Senior Expert for Agriculture and Environment, IUCN Global Ecosystem Management Programme
[6] Manager National and International Engagement, Parks Victoria / Chair, IUCN WCPA Health and Well-being Specialist Group
[7] Associate Professor & John McMurry Research Chair in Environmental Geography / Director, Canadian Council on Ecological Areas, Wilfrid Laurier University
[8] Executive, Nature For Health Foundation
[9] Independent Consultant, for IUCN Global Programme on Governance and Rights
[10] Co-chairs, IUCN WCPA Freshwater Specialist Group
[11] Research Director, School of Wildlife Conservation, African Leadership University
[12] All: Advisors, Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)
[13] Co-chair, IUCN WCPA Climate Change Specialist Group
[14] Programme Officer, Solutions, IUCN Global Protected and Conserved Areas Programme
[15] All: Students, Graduate Institute of International and Development Studies, Geneva
[16] Executive Director, Prespa Ohrid Nature Trust
[17] Director, Foundations of Success
[18] Student, University of Cambridge
[19] That Comms Guy
[20] Motuproprio Editions – motuproprioeditions.com
[21] infoycomunicación

1: Introduction

PROTECTED AND CONSERVED AREAS AS NATURAL SOLUTIONS

On an increasingly crowded, stressed planet, where the growing demand for resources by a burgeoning population outstrips the ability to provide them, there is a need to achieve efficiency and equity in the way they are allocated to deal with the many challenges facing humanity. The same need exists with regard to nature conservation and the governance and management of protected and conserved areas. Protected areas, such as national parks and nature reserves, as well as areas conserved by indigenous peoples and local communities, are usually established to protect wild nature and associated cultural and spiritual values. However, the nature they safeguard also has other values and benefits, some of which are still scarcely recognised. A significant component of these is a range of *ecosystem services*.

Ecosystem services are the benefits that humans gain from the natural environment and properly-functioning ecosystems. They can be classified in different ways, with a common typology distinguishing *supporting, provisioning, regulating* and *cultural services* (de Groot et al., 2002). Supporting services include photosynthesis, primary production, nutrient recycling and habitat provision, and are the fundamental building blocks of a living planet. Provisioning services include services to people: food, water supplies, raw materials and medicines. Regulating services are those that ensure stability and help human communities resist sudden calamities. They include protection against climate-related disasters, regulation of the world's climate and contributions to food and water security. Cultural services relate to a complex array of cultural, spiritual and aesthetic benefits, both tangible and intangible that humans derive from nature (MEA, 2005).

Protected and conserved areas (hereafter called protected areas unless the context demands more specificity) are increasingly recognised as important sources of a wide range of ecosystem services, together with their contribution to biodiversity conservation, with biodiversity itself being a critically important ecosystem service (Stolton & Dudley, 2010). Known about by protected area managers and researchers for years, these ecosystem service values are attracting increasing levels of interest. Among the first landmark publications to make a case for solutions derived from protected areas and nature more generally were the World Bank's book *Convenient solutions to an inconvenient truth: ecosystem-based approaches to climate change* (2009) and *Natural Solutions: Protected areas helping people cope with climate change*, published by IUCN's World Commission on Protected Areas (IUCN-WCPA), The Nature Conservancy (TNC), United Nations Development Programme (UNDP), Wildlife Conservation Society (WCS), World Bank and WWF in 2010.

An outcome of the IUCN World Parks Congress 2014, **The Promise of Sydney** – presented under the theme "Parks, people, planet: inspiring solutions" – emphasised the role of protected and conserved areas in supporting human life and fighting climate change, among other services. Since then, the PANORAMA initiative has promoted a solutions-orientated message, achieving increasing resonance in several sectors. In 2015, the 18 countries of Latin America and the Caribbean issued a declaration at the UN Climate Change Conference in Paris, noting that "Protected areas are a powerful strategy for

climate change adaptation and mitigation and a great opportunity for a climate-resilient and sustainable development." In 2016, the Convention on Biological Diversity (CBD) supported the publication of "Mainstreaming of protected areas and other effective area-based conservation measures across sectors to contribute, inter alia, to the Sustainable Development Goals and as natural solutions to combat climate change." (CBD, 2016) Ecosystem services are moving into the mainstream and protected areas are being recognised as critical tools for their delivery, as part of a wider narrative on nature-based solutions to address societal challenges (Cohen-Shacham et al., 2016).

Many ecosystem services provide direct benefits to society and individual well-being. For example, many forest and freshwater protected areas are sources of pure drinking water for downstream communities. A smaller number, including tropical mountain rainforests, Andean *paramos* and other specialised vegetation types, also increase net water flow. A third of the world's hundred largest cities draw a substantial proportion of their drinking water from protected areas (Dudley & Stolton, 2003), and nearly two thirds of the global population live downstream of protected areas as potential users of freshwater supplied by these areas (Harrison et al., 2016). Some municipal water suppliers recognise these benefits and work closely with protected areas agencies, for example in Bogotá, Melbourne and New York. However, many others remain largely unaware of their reliance on protected areas, which may consequently be damaged or degraded in the absence of properly funded management.

Protected and conserved areas (hereafter called protected areas unless the context demands more specificity) are increasingly recognised as important sources of a wide range of ecosystem services, together with their contribution to biodiversity conservation.

Some protected areas also provide important sources of food. Marine protected areas (MPAs) have a critical role in supporting local fisheries. Without safe places for fish to spawn and for young fish to develop, fish stocks can quickly be depleted. Fish in MPAs tend to be both healthier and larger, which means they are more productive. Furthermore, research indicates a spillover effect beyond the borders of an MPA, so that setting aside one area of the ocean can result in a greater supply of fish overall (Roberts & Hawkins, 2000). Many terrestrial protected areas provide managed supplies of minor but important food sources for local people, including honey, mushrooms and herbs. Protected landscapes that incorporate traditional farming or grazing areas can be critical for local food security and the survival of culture. Protected areas also support species critical for pollination. They often maintain important stocks of crop wild relatives, sources of genetic material for crop breeding that are becoming particularly important in the face of rapid environmental change (Maxted & Kell, 2009).

A third group of ecosystem services relate to human health and well-being. Most of the world's people still rely primarily on medicines collected from the wild. As natural ecosystems retreat or become degraded, herbal medicines are increasingly sourced under management agreements with protected areas. Pharmaceutical companies also depend heavily on genetic material collected from the wild. A few have paid substantial sums to protected areas for exploration rights through access and benefit-sharing arrangements of genetic resources. More generally, the *Healthy Parks Healthy People* movement is encouraging the use of nature reserves and national parks for physical exercise and mental relaxation. This helps to combat global crises in non-communicable diseases, including diabetes, cancers, pulmonary and cardiac disorders, as well as obesity and mental health problems (Parks Victoria, 2015). Evidence shows that the likelihood of people reporting good health or enhanced well-being is significantly greater if they spend at least two hours

per week in nature, as compared to having no contact with nature (White et al., 2019), while nature reserves are also safe places to exercise.

As the world's climate becomes more unstable, the number and intensity of some extreme climate and weather events continues to increase (IPCC, 2018), leading to a corresponding increase of what we still often inaccurately refer to as "natural disasters", such as flooding, tidal surge, fires and landslides. Healthy natural ecosystems often provide effective disaster-risk reduction: forests and floodplains slow floodwaters and allow space for them to spill over without damaging lives or property; trees on steep slopes buffer against avalanches and landslides; coastal reefs and mangroves reduce the impact of typhoons, storm surges and sea-level rise; and dryland vegetation slows desertification and controls dust storms (Murti & Buyck, 2014).

Finally, but perhaps most importantly, most natural ecosystems are effective at sequestering and storing carbon. Conversely, ecosystem loss or degradation can release much of this carbon into the atmosphere, thus increasing the rate and severity of climate change. Peatlands, forests, grasslands, seagrass beds, kelp and marine plankton are all vitally important for carbon capture, and protected areas are among the most effective ways of keeping carbon locked up in vegetation and soils (Dinerstein et al., 2019). The belated recognition that protected areas should be eligible for REDD+ funding and other voluntary carbon markets is evidence that these values are increasingly recognised (Dudley et al., 2010b).

Why protected areas?

Any healthy natural or semi-natural ecosystem offers these benefits, but protected areas come with particular advantages. Although the definition of a protected area stresses the primacy of nature conservation, they also have an acknowledged role in supplying ecosystem services as long as this does not directly undermine conservation; the IUCN definition of a protected area recognises "associated ecosystem services and cultural values." (Dudley, 2008). Other effective area-based conservation measures (OECMs) defined by the Convention on Biological Diversity (CDB, 2018), complement protected areas in that they result in outcomes for biodiversity, notwithstanding their establishment for other reasons. They represent a very specific form of "conserved area" given this recognition by the CBD. Both protected and conserved areas (including OECMs) depend on effective and equitable governance and management [1], themselves contributing to a just society and accountable institutions, to maintain the flows and equitable sharing of benefits. While there can be tension between the objectives of nature conservation and the supply of ecosystem services, such as fuelwood gathering and collection of non-timber forest products, the ecosystem services that are most significant on a global scale – including carbon, water and disaster risk reduction – are generally compatible with protected area objectives and can be an integral function of OECMs. At a local level, provided they are sustainable within the production capacity of the ecosystem, traditional uses can enhance community support for protected areas and contribute to livelihoods (Stolton & Dudley, 2010). The solution case studies considered for this publication include examples that have been developed both in protected areas, as well as on sites that might qualify as OECMs.

Many research findings demonstrate that well-managed protected areas offer some of the most effective tools for maintaining ecosystems, such as forests, natural grasslands, coastal areas and freshwater wetlands, which are among the richest sources of ecosystem services. Indeed, in areas of substantial land-use change, or where there has

[1] Protected area management is about what is done in pursuit of given objectives, i.e. the means and actions to achieve such objectives. Governance is about who decides what the objectives are, what to do to pursue them, and with what means (how those decisions are taken; who holds power, authority and responsibility; who is – or should be – held accountable) (Borrini-Feyerabend et al., 2013).

Well-managed protected areas offer some of the most effective tools for maintaining ecosystems, such as forests, natural grasslands, coastal areas and freshwater wetlands, which are among the richest sources of ecosystem services.

been serious degradation of terrestrial and aquatic ecosystems, these areas may now represent some of the only remaining examples of natural ecosystems (Stolton et al., 2015). Their role is, therefore, irreplaceable.

Nearly all countries in the world have established protected area policies and a protected area network, managed in a diversity of ways and with varying degrees of effectiveness (UNEP-WCMC et al., 2018). Most protected areas also have trained managers and staff, working to implement management plans as required by national legislation and international agreements, along with other forms of capacity, such as infrastructure, vehicles and boats, and other technology. Field rangers ensure that rules are enforced, including to address threats and other serious problems such as the poaching of high-value species. Even well-established and otherwise effective national parks, such as Kruger National Park in South Africa, are losing significant numbers of animals to poaching (Ferreira et al., 2015). While critically serious from a conservation perspective, paradoxically this often has relatively little direct impact on many of the most important ecosystem services, such as carbon storage, water security and disaster-risk reduction, which rely predominantly on retention of healthy vegetation. These are, however, threatened by other factors such as invasive alien species, fire risk and erosion, caused ultimately by human use of the environment. Techniques for assessing the effectiveness of protected area management are well advanced and, even though they are not yet widely applied (UNEP-WCMC et al., 2020), can provide a framework for determining whether ecosystem services are being exploited sustainably. Some modifications to existing protected area management effectiveness systems may be needed to achieve this, but the basic structures are in place.

Protected areas are also important because they have agreed systems for establishing and codifying land tenure agreements, including delineated boundaries, thus creating clear and permanent areas for management of ecosystem services (Stolton et al., 2015). Flexible management systems allow for a variety of management approaches that are appropriate for different conditions, ranging from strict protection of virtually intact ecosystems to much more flexible arrangements suitable for long-settled cultural landscapes. They embrace a variety of tenure systems and governance models, with an increasing number under the control of indigenous peoples, other local communities, or private entities, or with governance shared among different authorities. Involving people who produce or benefit from ecosystem services directly in decision-making for management is an important way to ensure that these services are properly reflected in management plans (Borrini-Feyerabend et al., 2013). This includes not only local communities, but those responsible for the broader governance of natural resource sectors. The last few decades have seen increasing cooperation between protected area managers and municipal water and hydro energy companies, and there has been an upsurge of REDD+ and other schemes for carbon retention and restoration within national protected area systems (Dudley & Stolton, 2003; Brandon & Wells, 2009).

Social costs and benefits

Protected areas do not come without costs. They are a societal choice to use land and other natural resources, which could be used for other things, for conservation, sometimes with direct impact on the human populations that have traditionally lived in the area. In the past, there were many instances of people being denied access to natural resources that they had traditionally relied upon and in extreme

cases also being forcibly relocated, often with little by way of compensation. Although there are policies in place to prevent such things happening today, abuses still occasionally surface. Ensuring that protected areas are established and managed in ways that do not disadvantage local communities is a priority, and this includes how ecosystem services from protected areas are utilised (Dudley et al., 2016). Putting emphasis on the management of ecosystem services that benefit people can help to secure public support, particularly local support, for protected area management. Furthermore, this offers a mechanism whereby indigenous peoples and local communities applying traditional knowledge and self-governance can be engaged in the wider objectives of ensuring conservation of biodiversity and benefit flows.

NATURE AND THE SUSTAINABLE DEVELOPMENT GOALS

Nature and natural ecosystems are now a critical part of the development debate, coming in from the margins over the last couple of years, spurred on by high-profile reports detailing the dire state of the planet's ecosystems. Nature featured heavily for the first time at the 2019 World Economic Forum, and the biodiversity crisis was highlighted by a major report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019), which had unprecedented coverage around the world. Mounting scientific evidence and growing social movements seem to be shifting the debate on climate change and its impacts on nature.

The *2030 Agenda for Sustainable Development* and its associated Sustainable Development Goals (SDGs), agreed in 2015, will be the driving force behind global work on sustainable development and conservation over the next decade (United Nations, 2015). The hierarchy of the SDGs, illustrated by the "wedding cake" model first developed by the Stockholm Resilience Centre (**Figure 2**), acknowledges the biosphere as the foundation of societal and economic welfare, with

Figure 2. The SDG "wedding cake". (Illustration: Azote for Stockholm Resilience Centre, Stockholm University).

SDGs 14 (Life Below Water), 15 (Life on Land), 6 (Clean Water and Sanitation) and 13 (Climate Action) providing the basis for the achievement of all other SDGs.

Protected areas are both part of the SDGs and the means to achieve them. While SDGs 14 and 15, relating to terrestrial and marine conservation, are closely supported by the development, governance and management protected area systems, analysis by the IUCN World Commission on Protected Areas found that 34 of the sub-targets of the various SDGs link back to ecosystem services supplied at least in part by protected areas (Dudley et al., 2017). The SDGs are important, aspirational goals, but the consensus is that current progress towards their achievement is still far too slow. The 2019 *Sustainable Development Report* from the United Nations (Sachs et al., 2019) concluded that while some countries are moving forward slowly with SDG-focused policies, they are not implementing the major changes necessary to achieve the goals by 2030.

While the SDGs are the umbrella, many other bodies, including the United Nations agencies and international conventions, have targets closely linked to or embedded within them. SDGs 14 and 15 are based on the corresponding Aichi Biodiversity Targets of the Convention on Biological Diversity, set from 2011-2020, with the understanding that these SDGs will need to take into account the revised targets of the CBD for the subsequent period. The CBD has also long recognised the wider values of protected areas, outlined in decisions of the Conference of the Parties. A reference to ecosystem services appears in Aichi Biodiversity Target 14, which states: "By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable." The target, however, is very general, hard to measure, and has received comparatively little attention. As debates about the post-2020 targets intensify, agreeing an ambitious, measurable and achievable target related to the delivery of ecosystem services is seen as a priority, with protected areas as an important vehicle for success. Such a target needs to be rooted in existing local solutions. If approached in the correct way, ecosystem services can be an ideal vehicle for building accord between protected areas and local communities, but good, inclusive governance is essential. If managed in a top-down fashion, with local people seeing few of the benefits, ecosystem services can simply be a cause of discontent.

Analysis by the IUCN World Commission on Protected Areas found that 34 of the sub-targets of the various SDGs link back to ecosystem services supplied at least in part by protected areas.

In relation to climate change, SDG 13 calls for taking urgent action to combat climate change and its impacts, while also recognising that the United Nations Framework Convention on Climate Change (UNFCCC) is the primary intergovernmental forum for negotiating the global response to climate change. The Paris Agreement that was adopted under the UNFCCC in 2015 explicitly notes the importance of ensuring the integrity of all ecosystems and the protection of biodiversity, when taking action to address climate change. It also calls on countries to appropriately conserve and enhance all sinks and reservoirs of greenhouse gases, including ecosystems, recognising their valuable role, both in limiting global warming to below two degrees Celsius and in building socio-economic resilience (UNFCCC, 2015).

Similarly, the UN Convention to Combat Desertification (UNCCD) supports SDG 15 (Life on Land). In 2017, the UNCCD published its first *Global Land Outlook* – a study of the state of land throughout the world – which identified alarming rates of degradation (UNCCD, 2017). Its associated Land Degradation Neutrality (LDN) target – for all

countries to reduce net land degradation to zero by 2030 – is directly reflected in the SDGs.

All three of the Rio Conventions – signed in Brazil in 1992 – are deliberately and directly supportive of the SDGs. The UN has adopted the SDG framework as applicable to all multilateral environmental agreements – e.g. the Convention on Wetlands of International Importance (Ramsar) – the Convention on Migratory Species, and many more. The world's nations have already agreed on much of what they need to do to achieve sustainability. Debates in the CBD towards the formulation of the post-2020 Global Biodiversity Framework will set a new ambition that comprehensively supports the attainment of the SDGs. The real challenge is in implementation. So far, the optimism shown in global debates and agreements has been woefully mismatched with achievements on the ground; the CBD concluded in 2020 that not a single Aichi target had been achieved (CBD, 2020).

While governments clearly need to take a positive lead and noting that some are currently leading in the wrong direction, success must also be built from the ground up, the result of hundreds of thousands of individual projects, actions and commitments around the world. One positive development in the implementation of the many conventions and programmes of work is a constant reference to practice: to the scientific and technical capacity to achieve successful implementation and impacts, and to document and share these. In this publication, we present case studies of how protected and conserved areas are contributing positively towards achievement of the SDGs.

WHY FOCUS ON SUCCESS IN NATURE CONSERVATION?

There are good reasons for ringing alarm bells about the state of the natural world. The situation is indeed of great concern.

The first IPBES Global Assessment Report on Biodiversity and Ecosystem Services highlighted a number of worrying global trends, including the fact that multiple human drivers have significantly altered 75% of the land surface of the globe, with the great majority of ecosystem and biodiversity indicators showing rapid decline. These declines mean that most international societal and environmental goals, such as those embodied in the Aichi Biodiversity Targets and the 2030 Agenda for Sustainable Development, will not be achieved based on current trajectories (IPBES, 2019). Indeed, the latest Global Biodiversity Outlook report from the UN (Secretariat of the Convention on Biological Diversity, 2020) shows that none of the twenty Aichi targets agreed in 2010 have been achieved, and only six have been partially achieved. Scientists have announced that the sixth mass extinction event in Earth's history is underway – the first one caused by human beings (Carrington, 2017).

Many funding investments in nature conservation and protected areas have emphasised the need to learn lessons from practice and to share these more broadly as a means to scale up impact.

As a logical consequence, conservation organisations – IUCN included – have long pointed out the gravity of the situation, using mostly alarmist, negative messaging to highlight the urgency of addressing it. Coupled with this, many commentators have pointed out that current conservation practices, including the establishment and management of protected areas, are not proving effective in stemming biodiversity loss, and even suggesting that protected area systems are outdated and redundant (Norton-Griffiths, 1995). Measuring global conservation impact is not simple, since biodiversity is not easily quantified, resources for measuring it are scarce, and conservation activities are so diverse that their cumulative impact cannot be summed up easily (Rodrigues, 2006). At the same time, there is extensive evidence that conservation works, and that protected areas can contribute towards halting the decline of threatened species and habitat loss (e.g. Geldmann et al., 2013; Andam et al., 2008; Gaston

et al., 2008). Charismatic species that have bounced back from the brink of extinction include the snow leopard, the Arabian oryx, the giant panda and the Steller sea lion. The "alarm bells" are now typically balanced with "success story" messaging in press releases on new updates to the IUCN Red List of Threatened Species. New initiatives, such as the IUCN Green List of Protected and Conserved Areas, take a solution-oriented approach by recognising and encouraging best practices, relying on a set of quality criteria and indicators that address the complexity of successful approaches by reflecting a number of "key ingredients" for achieving success.

There is also a clear rationale for optimism, without downplaying the challenges or diluting the message around the urgency to act. Some problems facing the natural world, such as climate change, are extremely complex and will require time and potentially wide-ranging societal shifts to be addressed. There are, however, many successes at smaller scales – sharing these will inspire replication and upscaling, leading to tangible impact while buying time for tackling the most complex problems (Balmford & Knowlton, 2017). Many funding investments in nature conservation and protected areas have emphasised the need to learn lessons from practice and to share these more broadly as a means to scale up impact. It has become increasingly clear that knowledge transfer and adoption are not automatic processes, and that there is a need to better understand how lessons are learned, understood, communicated and adopted if the value of such investments is to be fully realised.

One area of great opportunity involves applying some of the latest thinking in behavioural science to the conservation sector. Traditional conservation approaches rely heavily on rules and regulation, information sharing or awareness-raising and material incentives, such as financial awards and penalties, as ways of driving change. Yet emerging research in the fields of evolutionary biology, social psychology, behavioural economics, cultural anthropology, neuroscience and more have indicated that decision-making is far more complex and often actually relies on less conscious influences when driving action. Emotions can be more powerful than reason. The need to be accepted by a peer group and achieving affirmation of one's social identity matter. Moreover, the context in which people make a decision can have a profound impact on outcomes.

The academic literature supports these new insights and their application to the conservation sector.

For example, studies have found that positive messaging on environmental issues is more effective in stimulating behaviour change (Van de Velde et al., 2010), whereas messages that harness negative emotions like guilt and fear can backfire, leading to disengagement and "eco-anxiety." Positive emotions such as pride, curiosity, compassion, and a sense of agency encourage change without inviting defensiveness (Rare and The Behavioural Insights Team, 2019).

Hope, in particular, is a key ingredient of change. Martin Luther King famously said, "I have a dream", rather than "I have a nightmare". An increasing number of environmental initiatives and movements recognise this. One initiative being developed by IUCN and many partners is **PANORAMA – Solutions for a Healthy Planet**, that aims to harness a better understanding of learning, behaviour change and action that will help to leverage greater impact. The main purpose of the present publication is to demonstrate this. While the development of PANORAMA is a work in progress, this is one of the first attempts to capture lessons derived so far on the methods and results and better understand how to develop the methodology further. A description of the current form of PANORAMA is a necessary foundation for this purpose.

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About PANORAMA

PANORAMA – Solutions for a Healthy Planet promotes solutions that demonstrate how well-protected biodiversity and well-managed ecosystems help address societal challenges, thereby achieving development benefits. It is a global multi-actor partnership initiative, which identifies and promotes applied, replicable 'solutions' and enables their wider application by offering peer-to-peer exchange opportunities across topics, geographies and sectors.

PANORAMA serves a range of audiences, including:

- Conservation practitioners, planners and managers, who learn from peers facing similar challenges to inform their day-to-day work.
- Policy makers, donors and programme developers, who can understand current trends and good practice, inform the design of new initiatives and achieve visibility and validation for their investments.
- Advocates, who use solutions to provide real-life, positive alternatives to support their positions.
- Businesses and investors, who use PANORAMA to inform responsible investment and CSR strategies.
- Academic researchers, for whom PANORAMA offers a database of curated and peer-reviewed case studies, with field-tested insights into determinants of success in conservation and development.
- Journalists and communicators, who use PANORAMA as a source of inspiring success stories.

The PANORAMA approach and format

For PANORAMA, a solution is a tool, method, process or approach that works and can inspire action. It can be a project, certain aspects of a project, or a longer-term initiative. Solutions have yielded positive impacts on nature conservation and sustainable human development in an integrated manner, and elements of the solution have the potential for being applied in other geographic or sectoral contexts, and/or at a larger scale.

PANORAMA uses a standardised modular case study format that identifies replicable key success factors when documenting solution case studies. Apart from this 'full solution' format, users also have the option to contribute a 'snapshot solution' using an abbreviated version of the template, which does not contain a description of the building blocks, nor some of the other sections that the full template contains.

Each full solution description includes information about the context in which the solution was developed, its environmental and socio-economic impacts, and between two and six 'building blocks' that describe the elements of the solutions, what has been learned and what were the enabling factors. All PANORAMA solutions adhere to defined quality standards and are peer-reviewed by subject matter experts before publication (*see* Chapter 2 for further details).

PANORAMA uniquely combines online and offline learning and sharing through exchange events, training, webinars, publications, contests, communication products, and its state-of-the-art online platform. Practitioners from a wide range of national and international NGOs, technical and

Box 1 What is PANORAMA?

PANORAMA:

- Contributes to global policy goals by channelling support into locally led solutions, thus facilitating their replication, but also by providing summaries of key insights from solutions, including through this publication.
- Enables learning from successful practice, leading to long-term improvement in conservation and sustainable development. This results in better decision-making about planning and implementation of project interventions and policies.
- Creates impact at the practical and at the political level by disseminating ideas across sectors and disciplines, so that more people may adopt better practices.
- Includes one of the world's leading online platforms dedicated to curating and showcasing proven solutions that work for nature and people across different sectors. Visits to the web platform doubled in 2019 and the number of returning visitors increased by 50% from 2018 to 2019.
- Takes a partnership-driven approach, bringing together leading development and environmental organisations – currently including IUCN, GIZ, GRID-Arendal, UN Environment Programme, Rare, World Bank Group, UNDP, ICCROM, IFOAM-Organics International and ICOMOS, with substantial investments mainly from the German Ministry for the Environment, Nature Conservation and Nuclear Safety – in a powerful alliance.

Exploring solutions in PANORAMA. © Marie Fischborn.

Figure 3. Illustration of the PANORAMA approach and incentives for solution providers and seekers. (© Unit Graphics, 2018).

multilateral agencies, government institutions and academia are involved in PANORAMA and are invited to contribute solutions at any time. The PANORAMA partners aim to provide an inclusive platform for knowledge provision, exchange and networking that will serve a real need and amplify the opportunities for knowledge transfer and uptake. Solution providers gain visibility and recognition for their work and their institutions while being guided through a process of structured self-reflection, unpacking what made their work successful in a relatively light format. They become part of a community of PANORAMA users and contributors, including workshop, training and webinar participants, web platform visitors and case study reviewers, giving others access to their innovative work, and promoting exchange and review among a wider community of practice (**Figure 3**).

To help users find the most relevant solutions for their situation, PANORAMA groups its solutions by key topics relevant to improving conservation in today's world, tagged by thematic, geographic and technical identifiers. Each thematic community is coordinated by one or multiple PANORAMA partners,

Box 2 Related initiatives

PANORAMA is one of several like-minded initiatives, platforms and organisations that aim to identify and promote good practice in conservation and sustainable development, spreading a sense of hope, shining a light on existing successes and inspiring their replication in the design of new initiatives. These like-minded efforts include:

- The **Equator Initiative** brings together the United Nations, governments, civil society, businesses and grassroots organisations to recognise and advance local, sustainable development solutions for people, nature and resilient communities.
- **Solution Search**, an innovative contest created by Rare, that is designed to surface, spotlight and disseminate what is already working, such that practitioners around the world can expand their impact as they replicate proven success. The contest recently refined its focus to identifying proven solutions that leverage behavioural science to target conservation and development challenges.
- The **Conservation Measures Partnership (CMP)** unites conservation organisations seeking better ways to design, manage, and measure the impacts of their conservation actions. CMP members work together on impact assessment and accountability issues, such as its 'Threats and Actions Classification' and the 'Conservation Actions & Measures Library'. CMP strives to promote innovation in monitoring and evaluation, serving as a catalyst within the conservation community.
- **Conservation Evidence** is a free, authoritative information resource designed to support decisions about how to maintain and restore global biodiversity. It summarises evidence from the scientific literature about the effects of conservation interventions, such as methods of habitat or species management.
- The **IUCN Green List of Protected and Conserved Areas** is the first global standard of best practice for area-based conservation. It is a programme of certification for protected and conserved areas – national parks, natural World Heritage sites, community conserved areas, nature reserves and so on – that are effectively managed, fairly governed and achieve biodiversity and social outcomes.
- The **Earth Optimism** movement that celebrates a change in focus from problem to solution, from a sense of loss to one of hope, in the dialogue about conservation and sustainability. It provides a space for sharing stories of conservation success, particularly on social media and through events during Earth Day.

who identify, curate and promote solutions relating to that topic. Its technical architecture, based on a relational database, allows not only a search facility but also a means to associate and understand the relationships between solutions, their different building blocks and implementation contexts. PANORAMA grows continuously and increases its relevance as new organisations join and set up new thematic communities, increasing the opportunity for cross-sectoral and intersectoral learning and engagement.

ABOUT THIS PUBLICATION

At the time of the systematic review that underlies this publication, PANORAMA's Protected Areas thematic community contained 309 solution case studies from at least 80 countries and a great diversity of "solution provider" individuals and institutions. These case studies had been solicited and curated over the previous five years, adding up to a large portfolio of documented, structured success stories on how nature, if well protected, can provide a range of societal benefits. At the date of publication, 423 solutions are relevant to protected areas.

Studying these solutions can provide valuable insights on common success factors and lessons learned, that is the processes leading to successful outcomes. It can show trends, in terms of the context in which a solution plays out, and the socio-economic impact it creates, in addition to its ecological impact. The PANORAMA solutions database is thus an ideal resource for understanding the broader societal benefits that protected areas can have. For this publication, PANORAMA solutions were synthesised according to these three groups of parameters: processes, context and impact.

The intended audience for this effort is the wider development community, including international organisations and non-governmental organisations (NGOs) advocating for nature conservation as an essential part of the development imperative, as well as governments, site managers and custodians in charge of, or supporting, protected and conserved area management.

In Chapter 3, the publication will consider the most important SDGs to which nature contributes. Each section is dedicated to presenting and discussing the results of the synthesis of PANORAMA solutions relating to one SDG. The insights derived from summary of the solutions will be placed into the context of the current state of knowledge on protected areas and how they address the respective development issue.

The primary management objective of protected areas is always the long-term conservation of nature (Dudley et al., 2013). Likewise, conserved areas, including other effective area-based conservation measures (OECMs), will achieve long-term conservation of biodiversity (CBD, 2018). SDGs 14 (Life Below Water) and 15 (Life on Land) are concerned with the protection, restoration and sustainable use of marine and terrestrial ecosystems. Consequently, all of the protected areas solution case studies included in this publication contribute to either, or both, of these SDGs. Our focus has, therefore, not been on SDGs 14 and 15, although there are many solutions in PANORAMA that address the factors of success for achieving biodiversity conservation. The main purpose of this publication is to address the human development benefits of protected areas, beyond, and supported by, their biodiversity conservation outcomes. The focus is hence on those SDGs where protected areas are playing a significant role, and where lessons for scaling up and expanding evidence for enhanced implementation is most needed.

Fisherman in Nusa Penida MPA, Bali, Indonesia.
© Marie Fischborn

2: Methodology

This publication is based on the synthesis of solution case studies published on the PANORAMA web platform under the Protected Areas thematic community.

DEFINING THE RELEVANT SOCIETAL BENEFIT CLUSTERS

The first step was to understand and define which societal benefits, and in consequence which SDGs, are of particular interest in the context of this publication, based on insights from the literature.

The SDGs identified to be most relevant were: SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-Being), SDG 5 (Gender Equality), SDG 6 (Clean Water and Sanitation), SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), and SDG 17 (Partnerships for the Goals). It is important to note that this work is not a comprehensive overview of all of the linkages between protected areas and the SDGs; rather it is a detailed description of specific societal benefit clusters of particular relevance to protected areas.

CREATING A SHORTLIST OF SOLUTIONS

In a second step, the solutions most relevant to the topic of this publication were identified. Several of the PANORAMA protected area solutions focus primarily, or even solely, on activities and outcomes for biodiversity conservation – such as protection of endangered species – without strong consideration of the impacts on, and benefits for, humans. Such cases were excluded from the shortlist.

To come up with an initial longlist of solutions most relevant to the chosen SDGs, and thus potentially for inclusion in that particular cluster, either one of the existing thematic filters on the PANORAMA web platform and/or a free text search was used. The decision on whether to select a filter or a free-text search was based on the nature of the benefit for a given cluster and the suitability of the existing filters on the platform.

The solutions on this longlist were then examined in more detail to decide on their suitability for inclusion in one or several of the SDG clusters. Each solution was given a priority rating on a scale of 1–3, with 1 being the highest priority. To avoid bias, each solution was reviewed by a minimum of two reviewers. In cases where the first and second reviewers disagreed, a third, and potentially fourth reviewer added their judgment.

From the ratings and reviews, a tentative shortlist was defined. For solutions that appeared in more than one SDG cluster, a decision was taken on the most relevant SDG for that particular solution, such as the cluster in which it should be included. The decision to include each solution in only one cluster was taken considering that all solutions contribute more or less centrally to most of the SDGs. Consequently, we assumed that including a solution in all clusters to which it is, even marginally, relevant, would dilute the results of the synthesis for each cluster. However, all *other* SDGs to which a solution contributes *as well* were identified for each solution, and these “SDG co-benefits” formed part of the description of “impact” parameters within each cluster.

In the decision-making about inclusion of solutions in the shortlist and assignment to a specific SDG cluster, we considered the full scope and specific intention of each SDG, as evidenced by its targets. The “summary” and “impacts” sections of each

solution in particular, provided the basis for understanding to which SDGs a solution contributes. SDG tags assigned by the solution providers also contributed to the decision to which SDGs a solution contributes, both for assigning it to a cluster and for identifying its "SDG co-benefits". We considered these tags assigned by the solution provider in combination with our own assessment of whether the solution contributed to a minimum of two target indicators of a given SDG, as defined in the 2030 Agenda (UN, 2018). This dual approach was taken to account for the fact that the SDG tags are not assigned by the solution providers in a standardised, comparable way.

This approach resulted in a final shortlist of **106 solutions** across the nine SDG-related clusters. Of these nine clusters, six were directly selected for inclusion in the summary; the other three – related to SDG 5 (Gender Equality), SDG 8 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and Communities) – did not have enough relevant cases to allow for a thorough review. A call for additional solutions to be submitted to PANORAMA, and outreach to specific potential solution providers, resulted in further submissions relevant to SDG 8, but not the other two SDGs. Thus, solution clusters relating to seven of the SDGs were included in the final shortlist:

- SDG 1 (No Poverty)
- SDG 2 (Zero Hunger)
- SDG 3 (Good Health and Well-Being)
- SDG 5 (Gender Equality)
- SDG 6 (Clean Water and Sanitation)
- SDG 8 (Decent Work and Economic Growth)
- SDG 13 (Climate Action)
- SDG 17 (Partnerships for the Goals)

SDG 5 (Gender Equality) was treated differently: owing to the small number of relevant case studies, no summarizing of the solutions was conducted. However, cross-cutting aspects in solutions assigned to the other clusters and relating to gender equality are examined in **Chapter 3**, Section D of this publication. SDGs 14 (Life Below Water) and 15 (Life on Land) were deliberately excluded, as explained in **Chapter 1**.

SUMMARISING THE SOLUTIONS

The third and final step was the actual summary of the solutions, within each SDG cluster as well as across them, looking for patterns and trends

Figure 4. SDGs identified to be most relevant. Compiled by the report authors; SDG icons copyright of United Nations.

between parameters describing the context, process, and impact of the solutions.

Context parameters that were examined included:

- ecosystem
- geographical region
- challenges addressed.

Process parameters that were examined included:

- scale of implementation
- building block categories [2].

Impact parameters that were examined included:

- the 'impacts' section of the solution case study template
- the 'beneficiaries' section of the solution case study template
- contributions to SDGs other than the one to which the solution has been assigned.

All information was extracted directly from the PANORAMA platform based on the case study text and tags submitted by the solution providers (e.g. summary, beneficiaries, impacts), with the exception of the SDG tags, as explained above.

The content of solutions written in Spanish or French was translated using Google Translate. Maps were produced based on Google Maps.

Depending on the richness of the insights derived, not all results for all parameters are included in the respective thematic sections in **Chapter 3** of this publication.

[2] The building blocks are categorised into 12 broad approaches, ranging from *alliance and partnership development,* through *enforcement and prosecution* to *technical interventions and infrastructure*. It should be noted that a solution could contain several building blocks of the same category, and a building block could be assigned to multiple categories.

LIMITATIONS

The research underlying this publication was a 'pilot' effort of conducting meta-summary of the PANORAMA solutions portfolio, so the methodology is necessarily limited and needs to be sharpened further for future efforts, for example, by devising more specific hypotheses of (in the case of this publication's topic) how good practice in protected area management and governance contributes to a given SDG.

The portfolio of solutions available on the PANORAMA web platform is a function of voluntary contributions by "solution providers", rather than a representative, randomised sample. It is also impacted by the priorities of donors and institutions – particularly the PANORAMA partner organisations – investing in systematic documentation of knowledge through submission of solution case studies. Thus, insights derived from looking across the solutions portfolio might be skewed rather than expressing general global trends.

For some of the topics covered, or touched on, in this publication, such as the link between protected areas and food and agriculture, more comprehensive case study databases may exist, making PANORAMA not the ideal source of information.

After carefully weighing the advantages of either option, a deliberate decision was taken to assign each solution to only one SDG cluster as opposed to assigning it to all SDGs to which it contributes, even if marginally. The reasons for this decision are explained above, but it can be assumed that some analytical "power" was lost by not including all solutions that contribute to the respective SDG in a cluster.

Finally, the solution clusters for some of the SDGs – such as SDG 1 (No Poverty) and SDG 2 (Zero Hunger) – contained only a small number of cases, limiting the scope of insights that could be derived.

Standing girl in Ethiopia. © Gregoire Dubois.

3

Section A: Sustainable Development Goal 1

ABOUT PROTECTED AREAS AND POVERTY

The relationship between protected areas and poverty is multifaceted and controversial. The restrictions that are often imposed in relation to protected areas have caused poverty. Yet protected areas have also brought benefits to people's livelihoods and secured the rights of people to land and valuable natural resources that they risked losing to more powerful groups, companies or the state (Brockington & Wilkie, 2015).

Although access to nature is in many cases an essential component of the economy and the livelihoods of local communities, in some parts of the world protected areas were established in such a way that they restricted access to communities, with consequent negative impacts (Brockington et al., 2008). Most contemporary conservation, however, strives for a more harmonious and sustainable interaction with nature. It recognises the important role of communities in the establishment and governance of protected areas, working towards a balance between their essential role in conserving biodiversity and in maintaining ecosystem services on which many communities depend.

Recent research has shown that protected areas may have no negative impact on poverty in local communities (Andam et al., 2010), and have, in several cases, had a positive effect on poverty alleviation, for example through ecotourism and the provision of various ecosystem services (Ferraro & Hanauer, 2014; Canavire-Bacarezza & Hanauer, 2013; Oldekop et al., 2015). In particular, protected areas are associated with poverty alleviation when sustainable use of natural resources is permitted (Oldekop et al., 2015; Brockington & Wilkie, 2015). Local people may also rely on protected areas for food, shelter and medicine, following natural disasters or war (Dudley et al., 2017). Several country-level studies have found strong connections between poverty alleviation and protected areas in places where nature-based tourism is well developed (Andam et al., 2010; Ferraro & Hanauer, 2014). These studies do not allow for a detailed analysis of the specific processes behind *how* protected areas contribute to poverty alleviation; the interplay of more complex interactions is likely (Andam et al., 2010; Ferraro & Hanauer 2014).

The review of relevant PANORAMA case studies where poverty alleviation is cited as one of the outcomes can yield more insight.

Table A. Solutions included in the SDG1 cluster.

1. Improving financial stability through conservation-based tourism in protected areas in Belize (Belize)
2. Assessing economic impacts of visitor spending in protected areas of Brazil (Brazil)
3. Addressing resource degradation to enhance climate change resilience (Senegal)
4. Supporting the promotion of Imraguen fishery products in Banc d'Arguin NP (Mauritania)
5. Sustainable management of Morocco's marine resources (Morocco)
6. Forest protection and livelihoods improvement in Ekuri, Nigeria (Nigeria)
7. The Community Conservation Social Enterprise Development (CoCoSED) initiative (Cameroon)
8. Providing scientifically credible technical services in protected areas (Namibia)
9. Una tourism cluster – raising awareness on the importance of preserving natural resources by linking them to people's livelihood (Bosnia and Herzegovina)
10. **Community marine conservation. The start of the Locally Managed Marine Area movement in Kenya in response to the decline of fish in Kuruwitu, on the North Kenya coast (Kenya)**, **see p. 22**
11. Lewa, from a rhino sanctuary to a renowned conservancy: Conservation for people and wildlife (Kenya)
12. Community conservancy model of conservation and income generation for local people (Kenya)
13. Local community engagement and support for conservation: Ecotourism at Andasibe, Madagascar (Madagascar)
14. The vulture's return: Community managed vulture safe zones in Nepal (Nepal)
15. Creating direct incentives through ecotourism for protecting wildlife (Lao PDR)
16. Net-Works (TM) (Philippines, Cameroon)
17. Tree Kangaroo Conservation Program (TKCP): A successful initiative to finance conservation & community well-being in Papua New Guinea (Papua New Guinea)

Figure 5. Geographic distribution of solutions in the SDG 1 (No Poverty) cluster. Map compiled by the graphic designer, using data from the report.

SOLUTION REVIEW: RESULTS AND TRENDS

From the 46 results generated by a free text search for 'poverty' in PANORAMA, 17 were found to be relevant for our review. Solutions included in this cluster.

Context

The sample of solutions in this cluster are predominantly sourced from Africa (**Figure 5**).

The challenges most commonly addressed by solutions in this cluster include unemployment/poverty, loss of biodiversity, land and forest degradation, conflicting uses/cumulative impacts, lack of alternative income opportunities, and poor governance and participation.

Process

The solutions in the poverty cluster are mostly implemented at a local scale.

Out of the 12 building block categories, *sustainable livelihoods* occurs most frequently, i.e. in 12 out of 17 solutions, while the categories *collection of baseline and monitoring data and knowledge* and *management planning* featured in 8 solutions.

Impacts

The terms most commonly used in the impacts section across solutions in this cluster are: *community/communities* (27x), *conservation* (19x), *tourism* (17x), *local* (16x), *through* (13x), *wildlife* (11x), *increased* (10x), *area* (10x), *people* (10x) and *cluster* (9x) (see **Figure 6**).

The solutions were listed as contributing to a number of other SDGs, apart from SDG 1, in particular SDG 15 (Life on Land), SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), SDG 10 (Reduced Inequalities) and SDGs 14 (Life Below Water) (**Figure 7**).

The most commonly named beneficiaries include local communities, particularly fishers, farmers, and women.

Figure 6. Word cloud of the stated impacts of solutions in the SDG 1 (No Poverty) cluster. Compiled by the report editors.

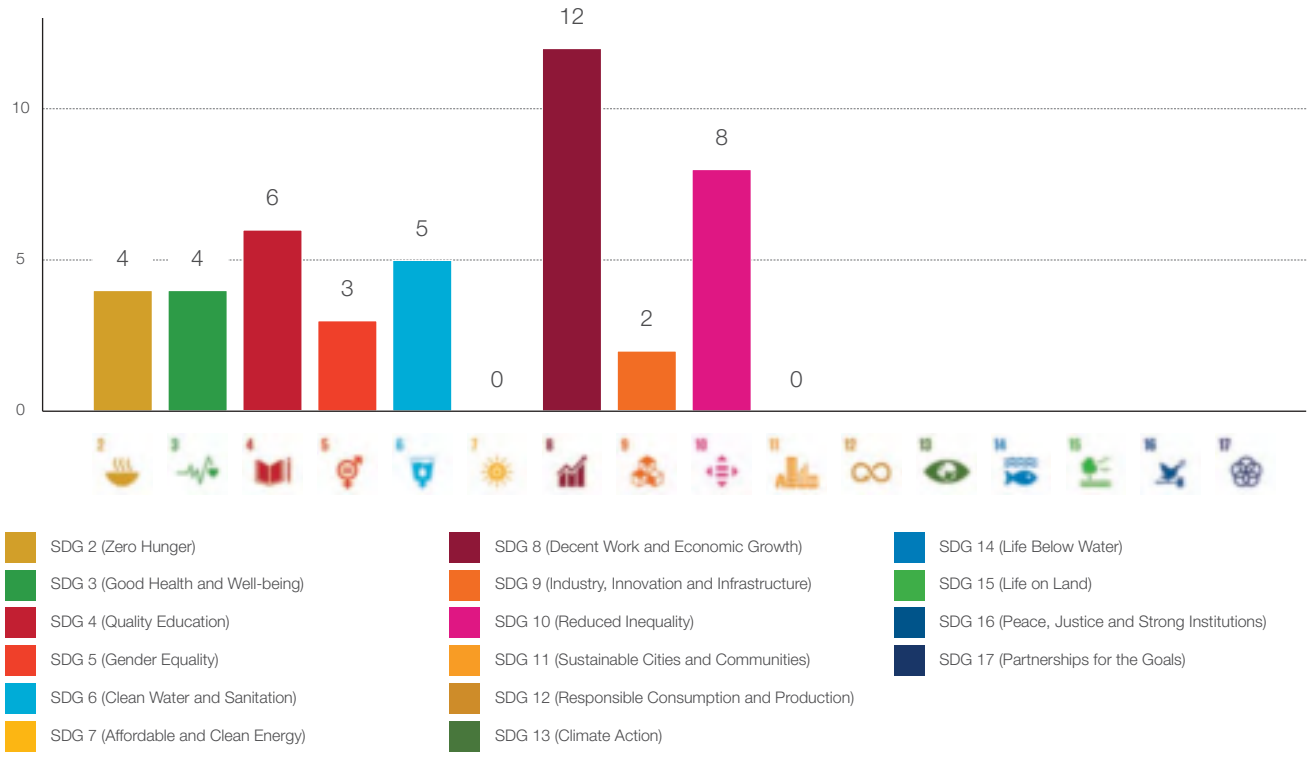


Figure 7. Co-benefits for other SDGs (number of solutions in the SDG 1 – No Poverty – cluster that deliver benefits in relation to each of the other SDGs). Compiled by the report editors.

Family of cocoa producers in Cameroon. © Gregoire Dubois.

Fishermen at Kuruwitu LMMA. © Des Bowden.

SPOTLIGHT SOLUTION

Community Marine Conservation. The start of the Locally Managed Marine Area movement in Kenya in response to the decline of fish in Kuruwitu, on the North Kenya coast

Kuruwitu Conservation and Welfare Association (KCWA) was set up in 2003 by members of the community concerned about the degradation of their seas. In 2005, fishermen and concerned residents took the unprecedented step of setting aside a 30-hectare marine protected area (MPA). This was the first coral-based Locally Managed Marine Area (LMMA) in Kenya. With fishing prohibited within the MPA, fish grew in abundance, size and diversity. Local livelihoods improved with growing fish catches, and funding helped KCWA set up alternative income-generating enterprises, training fishermen and their families and creating employment, thus reducing pressure on the marine environment. Kuruwitu has become a model for sustainable marine conservation. The KCWA engaged youth in non-marine based income activities and training. A women's group was set up, and a marine-based education programme was established for local children.

From the PANORAMA solution provider:

Up and down the Kenyan coast, a new generation of fishers is looking for ways to responsibly manage their resources to ensure not only their own future but that of their descendants. “We never questioned how we lived. Our fathers and grandfathers were fishermen, and in our village, it was the only path we knew. When our nets began to fail, we were faced with an unknown future,” said Dickson Juma, fisherman. Following an in-depth consultation, in 2006 the KWCA voted to close off part of the lagoon. Fifteen years later, visitors are happy to pay to snorkel within the healthy and vibrant marine protected area. In 2017, the KCWA was the proud winner of the UNDP's Equator Prize, awarded for outstanding community efforts to reduce poverty through the conservation and sustainable use of biodiversity. Kuruwitu has been chosen to pilot a co-management initiative working with various stakeholders covering an area of approximately 100 km^2 on the Kenyan coast.

Building Blocks:

- Marine protected area (MPA)
- Institutional framework, legal requirements and management
- Community welfare
- Importance of conservation

DISCUSSION OF RESULTS

As highlighted in the introduction to this cluster, the relationship between protected areas and poverty is a long-running debate in academic and policy circles (Brockington & Wilkie, 2015). The solutions in this section illustrate that, in the best of cases, protected areas can address social issues such as poverty and unemployment alongside environmental challenges like biodiversity loss, and land and forest degradation. These solutions confirm the importance of protected area tourism as a contributor to poverty alleviation.

The strong geographic focus on Africa reflects a particular focus of programmes that work on the nexus of nature conservation and poverty alleviation in this region (e.g. Roe, 2010; van Wilgen, 2016; Zabala & Sullivan, 2017; Diga et al., 2015)

An emphasis on community involvement and active participation figures heavily in solutions within this cluster, both in terms of the process used to design and implement the solutions, and with regard to the impact that the solutions have on local livelihoods. They show that successful approaches to local development often rely on the concerned communities leading or co-leading the process, that is not only being involved in implementation of management decisions, but in the decision-taking process itself. This is well-illustrated through the spotlight solution: the community group KWCA voted to close off part of the lagoon in 2006, which turned out to be a major success factor.

Concretely, looking at the solutions' most important success factors, we find that developing sustainable livelihood options among the targeted communities is critical, coupled with assessment of baseline data and management planning.

The co-benefits of these solutions in relation to other SDGs are reflective of the multi-faceted and complex nature of both what constitutes 'poverty', and the various approaches to alleviate poverty.

CONCLUSIONS AND RECOMMENDATIONS

In countries dealing with high rates of rural poverty, sources of livelihoods are highly dependent on natural resources. Therefore, threats to biodiversity and loss of ecosystems have a direct impact on people's access to subsistence and income (Lee & Neves, 2009; Angelsen et al., 2014).

The solutions included in this cluster demonstrate the importance of embracing a holistic approach to conservation and of engaging key actors in working together. The active participation of communities is a constant enabling factor, including the establishment of community-structured organisations and benefits-sharing mechanisms. Sustainable financing of protected areas often implies partnerships with business actors, mostly from the tourism sector, but not exclusively. A few of the solution providers have partnered with companies that recycle waste into goods for sale. Benefits from these activities are partly invested in funding elementary needs, such as health and education access, addressing underlying causes of poverty.

Other key stakeholders are the national and local governments. Their support is essential in providing legal frameworks and policies that formalise community-led conservation areas.

In conclusion, these solutions demonstrate that poverty reduction among rural communities can go hand in hand with biodiversity conservation. Understanding communities' needs while fostering accountability among communities for natural resources management are essential initial steps to rebalance the relationship between humans and their environment.

Section B: Sustainable Development Goal 2

ABOUT PROTECTED AREAS AND FOOD SECURITY

The seemingly opposing objectives of using land for preserving nature and ensuring economic development give rise to a key tension in relation to food security: how can we ensure that we meet the need for sufficient, safe and nutritious food, for a constantly growing global population, without transforming ever more natural ecosystems into agricultural land or depleting resources such as fish stocks?

According to the Food and Agriculture Organization of the United Nations (FAO, 2014), food security is defined as "a state where all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." Food security refers to more than just the quantity of food produced but is built on four pillars: availability, access, utilisation and stability. Stability should include considerations of long-term sustainability, which is often neglected in humanitarian interventions. Access is a critical parameter as well – globally, enough food is currently being produced to provide sufficient food to the entire human population (HLPE, 2017) – yet more than 800 million people remain undernourished, underlining the immense challenge in meeting SDG 2 by 2030 (FAO, IFAD, UNICEF, WFP and WHO, 2019). The SDG, particularly in its target 2.4, specifically recognises the need for ensuring food security while simultaneously maintaining ecosystems, strengthening resilience against climate change and disasters, and improving land and soil quality (UN, 2020). However, increased agricultural production and productivity, if not sustainable, can result in deforestation and land degradation, jeopardising not only long-term food security but also the achievement of SDG 15 (Life on Land). An analysis of interactions between different SDGs, conducted by the International Council for Science (2017), found that there are 61 positive and 35 negative interactions between SDG 2 and SDG 15 at the target level.

Protected areas have an important role to play in rising to this challenge: at a global level, millions of people depend on them as a means of subsistence and have done so for thousands of years. Some of these benefits are derived directly, through the consumption of food produced and livestock reared in or around protected areas. Some forms of agriculture or aquaculture are practised in protected areas, typically falling within IUCN Categories V (**protected sandscape/seascape**) and VI (**protected area with sustainable use of natural resources**). Further, food may be gathered in the form of fish, honey, plants, mushrooms, fruits, seeds

Table B. Solutions included in the SDG2 cluster.

1	Restoration of mangroves for food security in the Gancho Murillo Coastal State Reserve Chiapas, Mexico (Mexico)	3	Restoration of moist tropical forest (Fandriana-Marolambo landscape in Madagascar) (Madagascar)	4	**Ensuring fish and the lives of those who depend on them (Philippines), see p. 27**
2	Integral sustainable farms in the Amazon (Peru)			5	Food security and climate change adaptation in an atoll community (Marshall Islands)

Figure 8. Geographic distribution of solutions in the SDG 2 (Zero Hunger) cluster. Map compiled by the graphic designer, using data from the report.

and insects. Protected areas can serve as "natural gardens," safeguarding and cultivating biodiversity, including crop wild relatives. Perhaps most important, in terms of the cumulative contribution and future potential of protected areas, is that they also provide vital ecosystem services such as pollination and pest control (FAO, IFAD, WFP, 2014). Sustainable agricultural practices inside and outside of protected areas can maintain and restore soil biodiversity, a critical determinant of ecosystem services such as carbon storage, water and nutrient cycling and productivity (FAO, 2020). Other, indirect benefits from protected areas include employment and income, which contribute to sustaining livelihoods, which in turn enables people to purchase food (FAO, IFAD, WFP, 2014).

SOLUTION REVIEW: RESULTS AND TRENDS

A free text search on 'food security' on the PANORAMA web platform brought up 15 results, of which 5 were found to be directly relevant for this effort. The small sample size is surprising given the importance of protected areas to food security, and the ever-increasing conflict over land-use for agriculture and for nature conservation. This means that trends cannot be clearly identified or be considered representative or overarching in any way.

Solutions included in this cluster:

Context

The solutions, though few in number, cover a broad geographic range: two are from the Americas, one from Africa, one from Asia and one from Oceania.

Three of the solutions cover marine or coastal ecosystems (mangroves, coral reefs, estuaries), while the other two are implemented in terrestrial tropical ecosystems.

Only three of the five solutions specifically mention lack of food security as a challenge they address. Other commonly named challenges are loss of biodiversity and unsustainable harvesting, including overfishing.

Process

The five most commonly occurring building block categories in this cluster are *alliance and partnership development; collection of baseline and monitoring data and knowledge; communication, outreach and awareness-building; education, training and other capacity development activities*; and *evaluation, effectiveness measures and learning*.

The most common scale of implementation is the local level – four out of five solutions are implemented at that level, with the other implemented at sub-national level.

Impacts

The terms most commonly used in the impacts section of the solutions in this cluster include *species* (7x), *through* (6x), *fish* (5x), *water* (5x), *food* (4x) and *restoration* (4x).

The beneficiaries named for all solutions in this cluster are local communities. One solution specifies community-based organisations and partner associations as beneficiaries, while another one benefits fishermen and their families more specifically.

All solutions in this cluster provide co-benefits in relation to SDG 15 (Life on Land), in addition to their contribution to SDG 2 (Zero Hunger). Four solutions contribute to SDG 13 (Climate Action), and three each to SDG 1 (No Poverty), SDG 4 (Quality Education), SDG 14 (Life Below Water) and SDG 17 (Partnerships for the Goals) (see **Figure 9**).

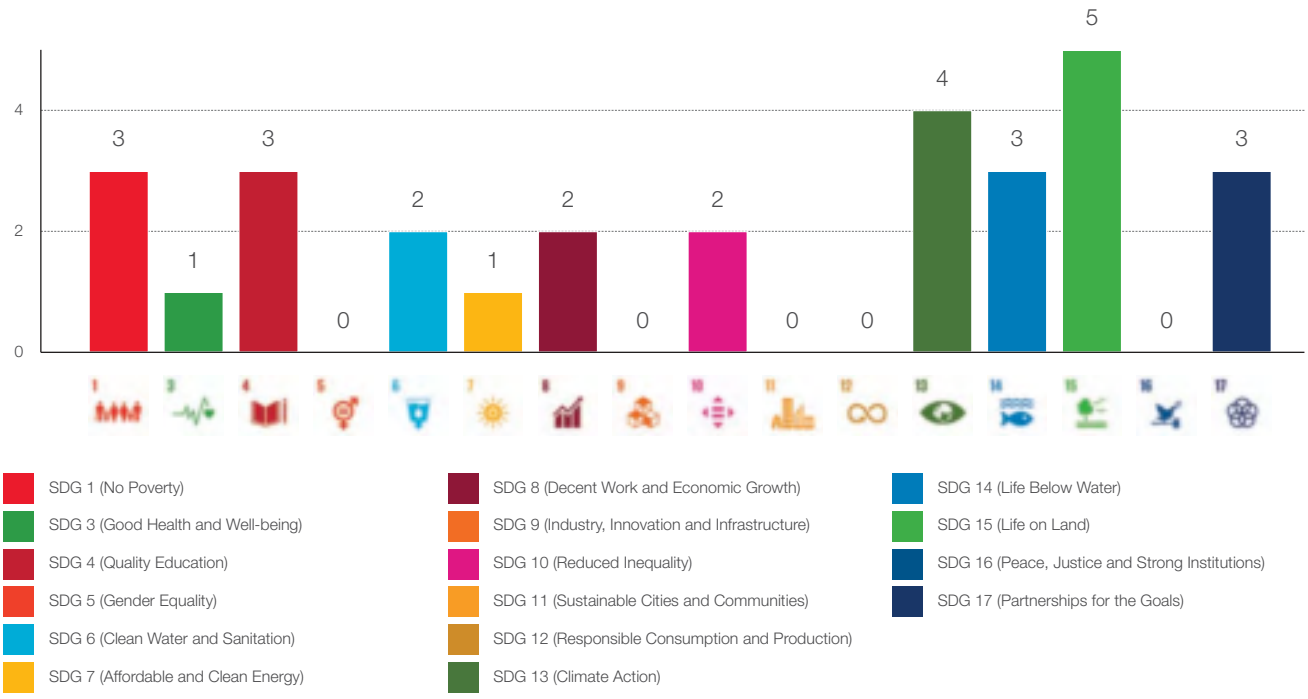


Figure 9. Co-benefits for other SDGs (number of solutions in the SDG 2 – Zero Hunger – cluster that deliver benefits in relation to each of the other SDGs). Compiled by the report editors.

Fishermen in Pilar Municipal Marine Park, Philippines. © Vincent Lumbab/Rare.

SPOTLIGHT SOLUTION

Ensuring fish and the lives of those who depend on them

Pilar Municipal Marine Park (PMMP) is on Ponson Island, Philippines between the villages of Lower Poblacion and Villahermosa. Located in what is considered a priority conservation area for reef fishes, the region was previously threatened by compressor fishing and illegal intrusion of commercial fishing boats. To address these threats, PMMP established an innovative multi-stakeholder management scheme with a no-take zone, driving people and nature impacts.

From the PANORAMA solution provider:

As a result of the scheme, there has been a significant increase in the number of fish per 500 m^2 within the sanctuary's no-take zone: 372 in May 2005 to 640 in May 2009. Fish biomass within the zone grew from 1.33 ton^3/km^2 in 2005 to almost four times as much in 2009. The zone also protects the surrounding mangroves, which provide a habitat for fruit bats, reptiles and migratory birds.

There has also been a positive outcome for livelihoods. Previously, the fish catch averaged 2.6 kgs/fisher/day, and 18% of school-aged children were malnourished. Six years later, fish catch has increased to 5.5 kgs/fisher/day, and the proportion of malnourished school-aged children decreased to 10%.

Building Blocks:

- Transparent co-management
- Fair enforcement
- Participatory monitoring of threats
- Participatory governance
- Behaviour change through social marketing

DISCUSSION OF RESULTS

The small number of solutions in the cluster limits the depth of the insights. They describe initiatives where protected area management results in food security benefits as a 'side effect' of biodiversity conservation. The Agriculture and Biodiversity thematic community on PANORAMA features solutions geared directly towards biodiversity-friendly farming practices.

The solutions considered here typically play out at the local, community level. This is reflective of the importance of 'smallholder farmers' who usually hold less than 2 hectares of agricultural areas, collectively cultivating about 12% of the world's agricultural land. There is a large overlap between this group and so-called 'family farmers', i.e. situations where most of the permanent labour on the farm is provided by the family. However, there is a small percentage of family farmers who are not smallholders but cultivate larger patches of land – they account for about 6% of farms but 75% of agricultural land (Lowder et al., 2016). Such family farmers preserve traditional food products, contribute to a diverse and balanced diet and safeguard the world's agrobiodiversity, forming one of the largest groups influencing the use of natural resources (FAO, 2014). Similarly, small-scale fisheries make an important contribution to local food security, particularly in developing countries (FAO, 2020): three of the five solutions are implemented in marine or coastal areas, relating to small-scale fisheries or aquaculture.

Our results in relation to how the solutions contribute to other SDGs broadly align with the findings of an International Council for Science analysis on interlinkages between different SDGs. That report showed that SDG 2 (Zero Hunger) links to all other SDGs and directly affects SDG 13 (Climate Action), since agriculture directly accounts for about 14% of greenhouse gas emissions. Notably, four of the five solutions in this cluster contribute to SDG 13. Sustainable food production systems that strengthen capacity for adaptation and that progressively improve soil and land quality will reinforce the pursuit of resilience and adaptive capacity to climate change and risks. Food from fisheries, for instance, is also reinforced by protecting the climate, because that limits ocean warming and ocean acidification and, indirectly, the loss of marine biodiversity and fish resources (ICSU, 2017).

The co-benefits in relation to SDG 15 (Life on Land) are not surprising given PANORAMA's overall focus on solutions relating to nature conservation and sustainable natural resource use. Specifically, sustainable agriculture practices can contribute to the conservation and restoration of degraded land and soils, and to combating desertification (ICSU, 2017); and solutions that support a shift towards such more sustainable practices can help avoid further deforestation and ecosystem degradation.

Even though only two of the five solutions contribute strongly to SDG 6 (Clean Water and Sanitation), the term *water* is often mentioned in the impacts sections of the solutions. In fact, water is essential to food security and nutrition and plays a key role in food production. Ecosystems and landscapes retain water resources (HLPE, 2015) – when land health is improved, and agroecosystems are rehabilitated, they store more water. This not only benefits production but also improves regulation of water supply, in turn reducing flood and drought risk, recharging aquifers, etc., which is a crucial outcome of sustainable farming (Laban et al., 2018).

CONCLUSIONS AND RECOMMENDATIONS

The *Sustainable Development Report* (Sachs et al., 2019) notes the interlinkage between sustainable food, land, water and oceans as one of the six transformations that are required to achieve the SDGs. Important trade-offs exist between interventions aiming to make food and other agricultural or forest production systems more productive and resilient to climate change impacts, and efforts to conserve and restore biodiversity. In addition, promoting healthy diets and reducing food waste and losses will be critical in achieving SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-Being), SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), SDG 14 (Life Below Water) and SDG 15 (Life on Land) collectively (Sachs et al., 2019). A report on water for food security and nutrition,

prepared by the FAO's High-Level Panel of Experts on Food Security and Nutrition (HLPE, 2015), lists "ensure sustainable management and conservation of ecosystems for the continued availability, quality and stability of water for food security and nutrition" as its top recommendation.

The solutions in this cluster and our review confirm that provision of food and water is intricately linked to biodiversity conservation. The solutions provide examples of how sustainable management and use of ecosystems can provide food locally.

The role of local actors, including smallholder farmers and artisanal fishers, is evident in all five solutions. The role of protected areas in providing local livelihoods – not only for food but also for shelter, social, cultural and religious practices and other uses – is directly dependent on access to and control over land and other natural resources. It is therefore essential to recognise, respect and safeguard legitimate tenure and use rights, including through their formal recognition, reconciliation of competing interests, transparent, participatory and gender-sensitive decision-making, and adaptive protected area management and governance (FAO, 2014).

Two of the recommendations from the IUCN World Parks Congress 2014 in relation to protected areas and food security relate to this point as well, that is focus on solutions that can accommodate different governance mechanisms, systematically putting local stakeholders in the centre of protected area planning and management; as well as the application of a human rights based approach to conservation in the management of protected area systems (IUCN, 2014).

Market in Madagascar. © Gregoire Dubois.

Section C: Sustainable Development Goal 3

ABOUT PROTECTED AREAS AND HEALTH AND WELL-BEING

In recent years, a growing body of evidence linking parks (and natural areas more broadly) to improved physical, mental, social, spiritual and emotional health and well-being has emerged (e.g., Maller et al., 2005; Hartig et al., 2014; Romanelli et al., 2015; Townsend et al., 2015; Twohig-Bennet and Jones, 2018). The contributions of nature to human health and well-being can be categorised as follows: (i) by providing ecosystem benefits and services that sustain life and regulate against detrimental health effects from climate, floods, infectious diseases, etc.; (ii) as botanical sources for both traditional and modern medicines; and (iii) by providing direct benefits to physical, spiritual and mental health through time spent in nature (MacKinnon et al., 2019). In this section, we look particularly at categories (ii) and (iii), since the human well-being impacts relating to ecosystem service provision are treated in other sections.

In a world characterised by rapid and widespread urbanisation, environmental degradation and lifestyle changes, human contact with nature has diminished in many societies and regions. Nature within cities, in particular, should therefore have a central role in addressing not only environmental degradation but in the management of global public health challenges associated with urbanisation (Shanahan et al., 2016).

However, the role of nature as an important contributor to the prevention and treatment of many human health conditions is currently under-recognised. According to the World Health Organization (WHO, 2016), nearly a quarter of deaths worldwide are due to environmental factors.

The *Healthy Parks Healthy People* (HPHP) approach, developed by Parks Victoria (Australia), acknowledges that contact with nature is essential for human emotional, physical and spiritual health and well-being, and reinforces the crucial role that parks and protected areas play in nurturing healthy ecosystems. It aligns with the concept of *Planetary Health, EcoHealth* and other related concepts, a new trans-disciplinary field, which calls for new efforts to simultaneously safeguard human health and the natural systems that underpin it (UNDP,2017). Several countries have now adopted HPHP programmes, including national parks in the USA, Canada, Colombia, Finland and New Zealand.

The IUCN World Parks Congress 2014 explored the diverse health benefits provided by nature through a dedicated thematic stream. It resulted in a number of recommendations, including “Continue to build the

Table C. Solutions included in the SDG3 cluster

1	**Herbanisation (South Africa), see p. 34**	3	Green Active – practical engagement in nature for community health (Australia)	5	Cross sector partnerships enhancing community volunteering in nature (Australia)
2	Working beyond boundaries improving health/employment outcomes for refugees (Australia)	4	Park Walks programme (Australia)		

Figure 10. Geographic distribution of solutions in the SDG 2 (Zero Hunger) cluster. Map compiled by the graphic designer, using data from the report.

evidence base on the connections between health and nature through knowledge and research (…)" (IUCN World Parks Congress, 2014). PANORAMA contributes to this recommendation. While there is strong and building evidence for a range of human health benefits from contact with nature, questions have arisen about whether this leads to improved conservation outcomes. A growing body of research has addressed this issue (Charles et al., 2018).

The knowledge and experiences that have emerged through the 2014 Parks Congress and other events have influenced global policy processes: the Convention on Biological Diversity (CBD) COP13 Cancun Declaration on Mainstreaming the Conservation and Sustainable Use of Biodiversity for Well-being indicates that the Parties commit to "promote the conservation, sustainable use, and where necessary, restoration of ecosystems as a basis for achieving good health." (CBD, 2016) Similarly, at the IUCN World Conservation Congress in Hawai'i Resolution 64 was adopted to strengthen cross-sector partnerships to recognise the contributions of nature to health, well-being and quality of life (IUCN, 2016).

Many indigenous cultures have long understood the healing and regeneration value and benefits of nature, viewing nature as a balance to life, including coexisting with the land and waters and the other

species that inhabit them (Her Majesty the Queen in Right of Canada, 2018; Kothari et al., 2012).

Protected areas, urban parks and other green and blue spaces can often achieve significant cost savings in delivering both physical and mental healthcare. Recent figures include Londoners avoiding £950 million a year in NHS health costs, thanks to accessible public green spaces or parks (Vivid Economics, 2017).

SOLUTION REVIEW: RESULTS AND TRENDS

Context

Five solutions were identified as being relevant for this cluster, three of them being 'snapshot' solutions. The solutions typically describe initiatives that contribute to physical, mental and community well-being by involving volunteers in practical management activities in and around protected areas, or engaging people in outdoor exercise. As in the case of the SDG 2 (Zero Hunger) cluster, the small sample size limits the scope to identify overarching trends and means that any trends identified are not necessarily representative.

Four of the solutions describe initiatives in Oceania – specifically Australia – and one describes an initiative in Africa. Interestingly, four out of the five providers of solutions in this cluster selected green spaces (parks, gardens, urban forests) as the ecosystem category.

Process

As three of the five solutions are snapshots (which don't include the building blocks section), little insight can be gained from analysing the building blocks of the two full solutions. Both include at least one building block each in the categories *communication, outreach and awareness building*, and *technical interventions and infrastructure*.

Interestingly, all building blocks across both these solutions mention similar lessons learned. They reflect on the importance of partnerships (for example between park agencies and NGOs) and of making connections within the community, developing relations with humility, patience and a long-term vision in mind, while designing the initiative based on the needs of the

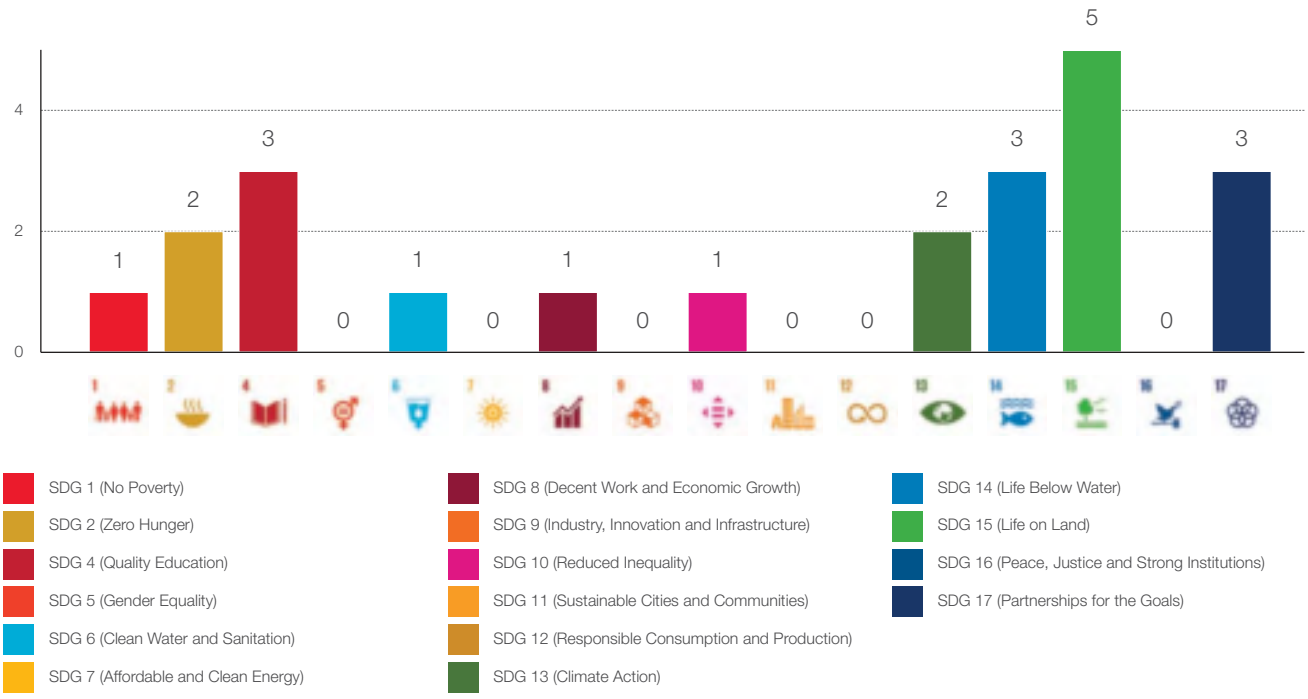


Figure 11. Co-benefits for other SDGs (number of solutions in the SDG 3 – Good Health and Well-Being – cluster that deliver benefits in relation to each of the other SDGs). Compiled by the report editors.

concerned community and their behaviour patterns – and soliciting feedback from them.

Three of the five solutions are implemented at a local scale.

Impacts

Most of the solutions report clear impacts on the physical and mental health of the participants, including through increased physical activity and (for the Herbanisation solution) self-treatment through the use of medicinal plants. Reported mental health impacts relate mainly to reduction of social isolation and improved body image, motivation and confidence following physical activity.

The solutions also improve "park health", with participants supporting restoration activities such as removal of weeds and tree planting, wildlife monitoring and recovery, and other park management needs, such as event planning and trail maintenance.

Social impacts include increased knowledge of local flora, fauna and parks; improved job-relevant skills and employment opportunities (for the solution titled "Working beyond boundaries improving health/employment outcomes for refugees"), and engagement between different members of the community (for Herbanisation).

All solutions in the cluster provide co-benefits in relation to SDG 15 (Life on Land), which is not surprising, considering they all describe terrestrial initiatives. Providers of four of the five solutions indicated that their case contributed to SDG 4 (Quality Education) (*see* **Figure 11**).

The beneficiaries that are mentioned include, in particular, programme participants/volunteers and local residents and communities.

Hikers in Cape Byron State Conservation Area, Australia. © John Spencer. DPIE.

Herbanisation planting team. © Sustainable Livelihoods Foundation.

SPOTLIGHT SOLUTION

Herbanisation

Herbanisation is an open access, medicinal street garden project in Cape Town, South Africa. The project aims to green streetscapes in economically marginalised areas while contributing to the livelihoods of local Rasta/Khoi herbalists and reconnecting community members with medicinal plants. By 2015, Herbanisation gardens in Seawinds, Cape Town included 4,500 plants.

From the PANORAMA olution provider:

The Herbanisation planting event in July 2014 brought together a wide group of herbalists, Rastas, conservation professionals, environmental activists and local residents in a collaborative effort to build a lasting positive impact with respect to local nature. Through such linkages, the ongoing processes of conserving unique biodiversity and fostering cultural and economic needs can be addressed. This pilot project demonstrated to participants for the first time that they share more common interests than they initially thought. For Neville and his fellow Khoi-Rastas this has meant, for the first time, that their voices have been considered and that their story as indigenous people can be brought to light. For Rasta individuals such as Benji, who trades medicinal plants every day, it was a chance to see the perspectives of others and gain a better understanding of a country that commonly views their practices and behaviour as eccentric or criminal. Conversely, the planting day revealed to conservation officials the true nature of the identity and life of the Khoi-Rastas, and how their cultural outlook has a positive impact compared to the rife social decay and criminality surrounding their communities. Herbanisation has taken a powerful voice in the Khoi community and given it reach into mainstream Cape Town, which brings about the kinds of changes necessary for building an inclusive South Africa and sows the seeds of genuine efforts towards sustainable development.

Building Blocks:

- Work with local champions
- Use gardens as vehicles
- Apply open access principles

DISCUSSION OF RESULTS

While the cluster is small, the solutions within it still illustrate all three categories of health benefits provided by nature, as mentioned in the introductory section.

The HPHP concept and movement, with its strong roots in Australia, resulted in Australian park management agencies and other partners having many lessons to share, some of which have been published on PANORAMA. This explains the strong representation of Australian solutions in this cluster.

Urban green spaces are the ecosystem that was selected for most of the solutions in this cluster, underlining the importance of such spaces for human physical and mental health. As a result of increasing urbanisation and changing lifestyles in many countries around the world, people spend less time in nature, with negative health effects, including obesity and greater levels of stress. However, access to nature in urban environments can contribute to physical, mental and social health.

In fact, several major cities now have developed protected areas within or directly adjacent to the metropolitan areas (MacKinnon et al., 2019). PANORAMA features success stories from some of these cities and their protected areas, such as LUFASI in Lagos, Nigeria or the London Wetland Centre, UK. Further good examples exist in the USA – such as in New York City and Washington DC – and in Asia.

The solutions in this cluster typically play out at a local level (even if some of them describe programmes that are implemented in multiple locations across one or several states or regions), having a direct impact on the population in target communities.

The impacts described in the solutions confirm the positive effects of nature on human health outlined in the chapter introduction. Several solutions report clear mental health benefits: being in nature reduces stress and anxiety and increases mental stability. Spending even about two hours per week in nature has a significant health effect. These results have

Women in Siquijor, Philippines. © Barbara Clabots.

been confirmed recently by White et al. (2019), who found that the likelihood of reporting good health or high well-being became significantly greater with contact of more than 120 minutes per week.

The solutions also confirm the dual benefits for "park health" alongside human health. These results are encouraging, as they suggest "win-win" scenarios where both the environment and human health benefit.

CONCLUSIONS AND RECOMMENDATIONS

There is a growing body of evidence about the inextricable links between environmental and human health, of which the PANORAMA solutions in this cluster form a part. This evidence needs to be promoted as well as used to inform key policy and practice more widely. At the same time, protected areas health benefits remain understudied and difficult to measure. A meta-analysis of 118 studies on the well-being outcomes of marine protected areas (MPAs) found that only nine, three and twenty papers described physical, mental and emotional health benefits, respectively (Ban et al., 2019).

Our findings confirms that green and blue spaces, including all protected areas situated along the nature continuum, from urban/city parks to national parks and wilderness areas, contribute substantially to human health and well-being, both psychical and mental health. The important role of parks for people's health should be acknowledged and integrated in relevant policies and programmes on public health, well-being, and spatial planning, at local, regional and national levels. The related economic benefits should be quantified.

To be truly effective, strategic, cross-sectoral partnerships are needed. It is vital that the constituency of support for nature be built beyond the traditional conservation sector. Some of these solutions describe local approaches for such cross-sectoral partnerships.

Natural areas, including protected areas, offer a variety of health benefits, which should be communicated to relevant stakeholders, including by initiating learning networks of parks for health at all relevant levels.

The involvement of local people in park management and maintenance, supporting conservation and restoration activities such as tree planting and removal of invasive plants, is critical for reaping local benefits, as demonstrated by all of the solutions in this cluster. There is a need to provide people with opportunities to create meaningful, long-term connections with nature for human health and well-being, as well as for instilling a greater sense of care for the environment. Access for people to green and blue spaces, also in socio-economically weaker parts of urbanised areas and for people with a challenge, should be improved. Effective approaches are those that integrate traditional knowledge and practice, as demonstrated by the Herbanisation solution.

Local level approaches that have demonstrated their health benefits for local societies and local biodiversity – such as those described in the solutions of this cluster – should be scaled up.

Hikers at Nivolet Pass - Gran Paradiso National Park, Italy. © Luca Giordano and Alberto Olivero.

Section D: Sustainable Development Goal 5

ABOUT PROTECTED AREAS AND GENDER

Millions of women and men living in and around protected areas depend on natural resources for their livelihood. Women and men often hold different, sometimes complementary, roles and responsibilities using and managing these resources, deriving unique values and benefits, with important contributions to shelter, health, income and culture (Fortnam et al., 2019; World Bank, 2009). For example, in many forestry and agroforestry systems, men prioritise forest resources for commercial purposes, while women often prioritise those linked with food, nutrition and health (Guarascio et al., 2013).

However, persistent gender-based [3] inequalities in social, cultural and legal norms and customs limit women's access to resources and decision-making opportunities, undermining their potential to contribute to and benefit from biodiversity conservation (Chakrabarti, n.d.). For instance, women typically experience more restrictions in using, managing and controlling land and resources, making up only 13.8% of landholders globally (UN Women & UN DESA, 2019). In many communities, this translates to fewer opportunities for women to make decisions about conservation and management of land and natural resources, resulting in less consideration of their views, experiences and needs in activities (Wederman & Petruney, 2018). Biodiversity loss exacerbates gender inequalities, including by directly impacting sources of sustenance and income for women, which threatens their security and increases levels of poverty, especially as they often have fewer options for an alternative income and livelihood (Bechtel, 2010). Additionally, research from IUCN shows that there is a complex connection between gender-based violence and the environment, demonstrating links where violence against women and girls can be driven by environmental and community hardship due to natural resource scarcity and loss (Castañeda Carney et al., 2020).

Women can be powerful drivers of change for more holistic and sustainable outcomes. When they are a part of the governance, management and user groups for natural resources, such as water and forest resources, studies show that project outcomes

[3] Gender refers to the socially constructed differences and relations between men and women that vary according to situation, place, time and context, and which influence structure and decision making within communities, institutions and families (González & Martin, 2007).

are more effective and successful, with numerous benefits for entire communities (UNDP, 2006; Mommen et al., 2017; Aguilar et al., 2011). Gender equality is not only about women: it is a matter of fundamental human rights that benefits men, women and children by fostering a healthy and safe society, reducing poverty, promoting health and education, and protecting the well-being of all.

There is enormous potential for initiatives in protected areas to break down gender barriers and engage and empower women and men to develop innovative solutions for sustainable development and conservation. While the societal benefits described within each of the clusters defined in this report can help address gender barriers in protected areas, gender equality and women's empowerment can in turn result in multiple, wide-reaching and long-term societal benefits.

For example, women make up most of the rural poor population and often face significant barriers to land rights and lack access to services, resources and opportunities for education, employment and decision making. Globally, women are at a higher risk of experiencing food insecurity compared to men (FAO, IFAD, UNICEF, WFP & WHO, 2019), and worldwide, women and girls spend an estimated 200 million hours daily collecting water as primary managers of household water resources (Farley, 2018). Conversely, there are countless benefits to closing these gender gaps. For instance, women with secure land rights earn up to 3.8 times more income and have savings up to 35% greater than women without secure rights (USAID, 2016). Additionally, secure land rights and access to the same agricultural resources as men could increase farm yields by 20–30%, reducing the number of undernourished people in the world by 12–17% (FAO, 2011). Furthermore, the impact on local to global economies is significant, and it is estimated that closing global gender gaps in the workforce would add US$ 28 trillion to the global GDP (Council on Foreign Relations, CFR, n.d.).

Figure 12. Geographic distribution of solutions in the SDG 5 (Gender Equality) cluster. Map compiled by the graphic designer, using data from the report.

Table D. Solutions included in the SDG5 cluster.

#	Solution title	Country	Gender considerations in the solution	Category I: Women as beneficiaries / direct actors	Category II: Gender mainstreaming into wider conservation activities
1	Mainstreaming the recovery of marine fisheries and ecosystems through collective action and science	Mexico	No specific gender focus, but this solution is nevertheless gender-sensitive: gender-disaggregated data has been collected, and it makes a specific point that activities include "making visible the contribution women make" to the fishing sector.	x	
2	Indigenous forest conservation through Belize's first agro-forestry concession	Belize	This case does not specifically mention women, gender, or a specific 'gender angle'. Since the solution provider indicated that the solution contributes to SDG 5, it can be assumed that both female and male farmers are involved in the solution activities – such as training on climate-smart agriculture methods. However, no evidence is provided of intentional gender considerations, thus it is hard to judge how effective or ineffective this solution is in contributing to SDG 5.	x	x
3	OASIIS: Opening Access to Sustainable Independent Income Streams	UK-based organisation supporting biosphere reserves in South Africa, Italy, Sweden, Finland, Spain, England, Wales, Peru, Vietnam, South Korea	Neither "women" nor "gender" is specifically mentioned, but the solution provider indicated that the solution contributes to SDG 5. It can be assumed that this is achieved by supporting social enterprises in and around biosphere reserves that would often be run by women. Gender-disaggregated data on the percentage of women and men engaged in full-time and part-time employment in participating protected areas and biosphere reserves is provided.	x	
4	Supporting the promotion of Imraguen fishery products in Banc d'Arguin NP	Mauritania	Created cooperatives for women that offered loans at 0% interest. Recognising and respecting the important roles and knowledge women have in fish processing, this project, using different methods, sought to build the capacity of these women to reach a wider market with their products and increase their income (thereby improving household and personal livelihoods).	x	

Table D. Solutions included in the SDG5 cluster.

#	Solution title	Country	Gender considerations in the solution	Category I: Women as beneficiaries / direct actors	Category II: Gender mainstreaming into wider conservation activities
5	The Community Conservation Social Enterprise Development (CoCoSED) Initiative	Cameroon	Women's associations were formed and specific training was provided to women to participate in alternative income generation activities; women are also specifically listed as beneficiaries.	x	
6	Promoting a gender approach in the conservation of Rwanda's protected areas	Rwanda	Helps facilitate 12 cooperatives that ensure women have the right to access funding and benefit from tourism revenues and conservation activities. They create a legal mechanism through which women can exercise their rights and gain access to resources, services and income that would otherwise be limited. This is helping to close gaps in employment, alleviate poverty, and improve women's decision making and bargaining power. The project also includes campaigns to encourage women to participate in conservation activities and offers training opportunities for women in natural resource management.	x	x
7	Community marine conservation. The start of the locally managed marine area movement in Kenya in response to the decline of fish in Kuruwitu, on the North Kenya coast	Kenya	Includes a specific women's group dedicated to developing various biodiversity-based enterprises.	x	
8	**Creating sustainable partnerships and financing for the Kanha Pench Corridor (KPC),** **see p. 44**	India	Incorporates gender impacts within its broad focus. These include improved recognition of women for their contributions to farming and household income, signalling a longer-term change beyond the scope of the project; an increase of women's participation in decision-making; and the involvement of women's self-help groups as actors.	x	x

Table D. Solutions included in the SDG5 cluster.

#	Solution title	Country	Gender considerations in the solution	Category I: Women as beneficiaries / direct actors	Category II: Gender mainstreaming into wider conservation activities
9	Gender dimensions of community-based management of marine protected areas (MPAs) in Siquijor, Philippines	Philippines	Considered gender in marine protected area (MPA) management by analysing gender issues and opportunities in each community through focus groups and interviews. The aim was to build engagement of both women and men, as well as building networks of support among women. This led to recognition of the importance in MPA management and opportunities to build those roles and empower women to maintain community commitment to conservation agreements. Consideration of the local gender dynamics around MPA management in each area, led to different approaches being taken to empower women to be more engaged in community management, which contributed to the overall success of the project.	x	x
10	Gender integration within the Mt. Mantalingahan protected landscape	Philippines	Identified barriers to gender-inclusive decision making and community consultation and implemented actions to overcome those barriers. Initially, community consultations for a protected landscape only involved indigenous leaders, who were all men. When it was time to renew a management plan, it was an opportune moment to address this issue. Additional analysis involved surveying and interviewing both women and men in the community. This produced recommendations to ensure the new management plan was more gender responsive.	x	x

ABOUT THIS CLUSTER

The approach used for selecting relevant solutions and shortlisting them revealed only three that had gender equality and women's empowerment as their main objective. Consequently, this cluster was excluded from the in-depth review examining trends in terms of context, process and impacts of all solutions within a cluster. However, if we look at solutions across all other clusters, we can see that contributions to SDG 5 as a co-benefit appear frequently. Thus, while very few cases have a deliberate focus on gender issues, it is useful to examine more closely the ways in which other solutions contribute to SDG 5.

The SDG 5 cluster in this study is thus composed of two elements: the three original cases found through filtering on the web platform, as well as seven cases from other clusters that list SDG 5 as a co-benefit. Since an in-depth review following the common methodology applied to the other clusters was not

conducted in relation to SDG 5, the structure of this section also differs from that of the other thematic sections.

On closer examination, the solutions in the SDG 5 cluster fit into two main categories (non-mutually exclusive), which provide one useful lens of looking at the cluster: firstly, cases with a specific sub-focus on gender, which include activities at the project level that are directed at or involve women specifically (all ten cases). The second category includes solutions that go beyond benefiting and involving women and advance the mainstreaming of a gender-sensitive approach into wider conservation activities (five cases).

It should be noted that this distinction did not follow defined criteria or a specific methodology but was derived from a subjective reading of the solution profiles.

Women growing bamboo propagation in the Volcanoes National Park, Rwanda. © Association Rwandaise des Ecologistes (ARECO-RWANDA NZIZA).

SPOTLIGHT SOLUTION

Creating sustainable partnerships and financing for the Kanha Pench Corridor (KPC)

Kanha Pench Corridor (KPC) is a vital ecosystem spread across 9,000 km^2, linking two protected area-tiger reserves, Kanha (60–80 tigers) and Pench (40–50 tigers). The KPC is a mix of protected areas, non-protected public areas and private land and provides livelihoods to over half a million indigenous people residing within it. It also provides ecosystem services, like regulating hydrology and sequestering carbon. Over recent decades, the KPC has faced severe degradation due to human activities and climate change. In 2010, the Royal Bank of Scotland Foundation India (RBS FI) began working in the KPC and realised that collaboration and pooling resources was pivotal to ensure the long-term well-being of the KPC and its dependent communities. RBS FI took a leading role in bringing the key stakeholders (government and civil society) together on the same platform, ensuring sufficient resources (US$ 10 million, including US$ 2.56 million from Adaptation Fund) for KPC.

From the PANORAMA solution provider:

RBS FI works on promoting sustainable livelihoods for vulnerable communities that reside in ecologically critical landscapes in India. Initiated in 2007, it has resulted in 125,000 families and 21 ecological units within the country experiencing shared benefits. Its work in the KPC started with 15 villages in 2010, in partnership with the civil society organisation Foundation for Ecological Security (FES). The project developed models of community governance on commons and natural resource management. In one project village, Atarchua, the only source of livelihood was chopping down trees to make and sell charcoal; the villagers there now conserve around 200 ha of village woodlots.

In 135 villages, as part of the wider project, PRADAN (Professional Assistance for Development

Rural family in a village in Rajasthan, India. © Vikram Raghuvanshi. iStock.

Action) focused on gender mainstreaming and promoted livelihoods with women through self-help groups/federations. Women began to gain recognition as farmers and for their economic contributions to the household. In 2015, the project won an award, presented by India's Minister of Environment, Forest and Climate Change to a woman who had benefited from the project. Standing confidently in a New Delhi 5-star hotel, surrounded by intellectuals, bureaucrats and politicians, the woman, Shanti Tekam – a member of a Gond tribe from one of the most remote parts to the country.

Building Blocks:
Working together to optimise efforts and resources in KPC
Sustainable and varied sources of finance to ensure continuity of initiatives
Project Steering Committee to institutionalise partnerships
Civil society organisations – thematic experts and driving implementation
RBS Foundation India – leading the KPC initiative
Community and community institutions

DISCUSSION

Looking at the solutions that contribute to SDG 5 can help reveal key enabling environments and conditions for multi-pronged, integrated action on advancing gender equality and women's empowerment towards the achievement of all SDGs (UN Environment and IUCN, 2018). This will help foster and strengthen collaborative work and knowledge across sectors, sharing on gender-responsive approaches for more effective and successful conservation and sustainable development outcomes.

All gender approaches should be developed in close collaboration with local stakeholders to ensure they are appropriate and feasible within a context. This can also help shift perceptions and assumptions on what women can contribute, resulting in longer-term changes in gender equality and women's empowerment.

Women's groups and associations foster supportive networks of women to facilitate access to resources, income, services, and decision-making opportunities, as in the solution from Rwanda. In protected area management, women's groups and associations can build the capacity of women to engage in management and conservation, including through development of leadership skills and building women's capacity to express themselves. In the case from the Philippines, women's networks provided information and support to build empowerment of women in MPA management. 'Associations', 'women's groups' and 'self-help groups', unlike cooperatives, are not necessarily formalised legal entities.

It is necessary to build women's skills to increase their role in, and income from natural resource management. In the solution from Mauritania, there was recognition of women's important roles and of efforts to build their capacity in business, marketing and processing in order to increase their income. Additionally, access to affordable loans was facilitated, enabling women to build their businesses and adopt new methods for sustainable processing. Many studies show that women tend to spend income on children, education, food and/or health (UN Women, 2015; UNHLP, 2016; ILO, 2019; Women Deliver, n.d.). Thus, increasing their income and ability to reach new markets and build businesses is important for meeting many goals.

There is often a major gender gap in data collection, thus collecting sex-disaggregated data can help reveal information on project adaptations that would reach more women: what methods were effective in engaging women as stakeholders? Or what larger societal change is possible by building the capacity of these women? Many of the solutions report sex-disaggregated information, but some do not explicitly mention it. Importantly, however, beyond just counting women and men, projects should determine what activities are needed to actively involve both women and men, and furthermore, how this is important for better outcomes. As an example, the solution from Mexico consistently used sex-

disaggregated information but is missing information on 'how' and 'why' activities made the contribution of women visible.

The solutions' descriptions leave a lot of questions unanswered on how exactly gender aspects were considered and contributions to SDG 5 achieved. Take, for example, the solution from Cameroon, where from the description it is not clear why women's associations were targeted: was it because women have a major role in forest use? Was it requested by the community or other stakeholders? This kind of information is often key in driving change and convincing people of the need to mainstream gender, but it is often missing if people are not reporting on the why, the how, the results, and the changes of gender considerations within projects. Undoubtedly, there were other gender considerations in the projects included in this cluster that are not explicitly mentioned. It is also highly likely that there are gender considerations in other PANORAMA solutions that are not explicitly mentioned in the write-up on the platform.

CONCLUSIONS AND RECOMMENDATIONS

Gender dynamics are unique to every society, and thus approaches to integrate gender must be specific to the context and opportunities should be developed in close collaboration with local stakeholders to address the needs and priorities of women and men. Without considering the specific gender-related issues and opportunities within a community, conservation initiatives risk unintentionally reinforcing, promoting and reproducing gender inequality, and in some cases can drive instances of gender-based violence (Castañeda Carney et al., 2020).

Based on the insights from the solutions in this cluster, the following recommendations can be made:

- Understand and address gender dynamics specific to the context through a gender and social inclusion analysis. This can include reviewing policies, reports, demographic data, etc., and conducting interviews and focus groups to better understand the context in which the project is occurring. It involves asking questions and trying to better understand women's and men's roles, responsibilities, barriers, opportunities, and priorities in protected area management.
- Engage stakeholders across sectors – if there are women's groups and associations already in place, these are strong groups that can inform feasible ways to engage women in activities and facilitate opportunities to build capacity and promote buy-in for conservation activities and goals.
- In measuring progress on targets under the SDGs, it is important to consider and record sex-disaggregated data and gender-differentiated impact. There are some shortcomings on the SDG indicator framework, but a study from IUCN and UN Environment (2018) provides example indicators to bridge the gap in gender-environment data collection. Bringing attention to the interrelated issues and opportunities of gender equality and women's empowerment within protected area management and the societal benefits of meeting various SDGs helps ensure that projects consider gender even when it is not the main focus, and therefore contribute to overall progress on meeting *all* of the SDGs.

Taking a gender perspective in conservation initiatives means equally valuing the important and diverse experiences, priorities and ideas of both women and men towards improving the well-being of ecosystems and societies. Doing so ensures that important knowledge about natural resources and ecosystem services is not lost, building the resilience of entire communities and strengthening conservation outcomes and the voices of both women and men. This presents an opportunity to benefit biodiversity while at the same time contributing to decreased discrimination and inequality, and progress on SDG 5 – Gender Equality – and women's empowerment.

Dancing girl. © Hanna Morris. Unsplash.

Section E: Sustainable Development Goal 6

ABOUT PROTECTED AREAS AND WATER AND SANITATION

Just like food security, the availability of clean water and sanitation is a great challenge facing a growing population. While great progress has already been made, it is assumed that achieving universal access to even basic sanitation by 2030 would require doubling the current annual rate of progress (UN ECOSOC, 2019). More efficient use and management of water are critical to addressing the growing demand for water, threats to water security and the increasing frequency and severity of droughts and floods resulting from climate change (UN ECOSOC, 2019). Access to safe water contributes to better sanitation and can prevent diseases linked to unsafe water. Integrated water resources management (IWRM) approaches at the broader basin level and the smaller watershed level have evolved to address sustainable management of land and water resources. The concept of total economic value has become one of the most widely used frameworks for identifying and categorising watershed benefits to ensure they are factored into economic statistics and decision-making (Bach et al., 2011).

Protected areas play an essential role in providing clean and safe water to individuals and to many large cities. Two-thirds of today's population lives downstream of protected areas – but 80% of these people are served by water from areas of high threat (Harrison et al., 2016). Protected areas conserve freshwater for biodiversity as well as supporting human needs. Watershed and mountain ecosystems can provide freshwater for domestic, agricultural, sanitation and industrial purposes for human development. Indeed, the availability of water depends on natural freshwater sources provided by well-managed watersheds. Moreover, protected areas provide efficient and cost-effective options for supplying clean water to cities such as New York, Sydney (Dudley et al., 2010b) or Quito, which receives approximately 80% of its water from three protected areas and their buffer zone (Arias et al., 2010). An assessment of the likely source catchments of 4,000 cities, supplying water to as many as 1.7 billion city dwellers, found that 85% of the total area of the catchments overlaps with freshwater ecoregions of high biodiversity value. Source water protection could contribute to conserving important freshwater biodiversity elements in these catchments (Abell et al., 2019).

Table E. Solutions included in the SDG6 cluster

1	Restoring mangroves in communal and private land supported by government management schemes (Mexico)
2	Restoration of mangroves for food security in the Gancho Murillo coastal State Reserve Chiapas, Mexico (Mexico)
3	Food and water security in ejidos around the Tacaná Volcano, Mexico (Mexico)
4	Water-funds (Caribbean, Central America, North America and South America)
5	Indigenous forest conservation through Belize's first agro-forestry concession (Belize)
6	Acuerdos locales para la compensación por servicios ecosistémicos del bosque en la Región Trifinio (Local agreements for compensation for ecosystem services of the forest in the Trifinio Region) (Guatemala, Honduras)
7	Implementation of the Ribeirão Quilombo revitalization project and its floodplain protection areas (PCJ Basin) (Brazil)
8	**Legado das Águas - Reserva Votorantim (Water Legacy) (Brazil), see p. 51**
9	Thriving together: Achieving the Sustainable Development Goals and increasing well-being for animals and people (Kenya)
10	Payment for water ecosystem service at Kikuyu Escarpment Forest, Kenya (Kenya)
11	Good water neighbours: Rehabilitating the Jordan river through transboundary cooperation (Jordan, Israel, Palestine)

Figure 13. Geographic distribution of solutions in the SDG 6 (Clean Water and Sanitation) cluster. Map compiled by the graphic designer, using data from the report.

SOLUTION REVIEW: RESULTS AND TRENDS

In our study, eleven solutions on the PANORAMA web platform were identified as relevant for inclusion in the SDG 6 (Clean Water and Sanitation) cluster. An initial search revealed only eight relevant published solutions. An open call for case studies resulted in the submission of three new solutions that were relevant for this cluster.

Context

The majority of the cases (eight out of eleven) are located in the Americas, one in Asia and two in Africa (**Figure 13**).

Most of the solutions are being implemented in protected areas that cover freshwater, forest and agroecosystems, as well as some relating to grassland, coastal and desert ecosystems. "River, streams" is the ecosystem type selected most frequently.

Process

The most frequent building block categories for solutions in this cluster are *alliance and partnership development, collection of baseline and monitoring data and knowledge*, and *education, training and other capacity development activities*.

All solutions in this cluster – except for one, for which this information has not been provided – are implemented at a local level, or at multiple levels including local.

Impacts

The terms that occurred most often in the impacts section are *water* (33x), *forest/forests* (15x), *community/communities* (14x), *management* (11x), *through* (10x), *areas* (9x), *sustainable* (9x), *conservation* (9x), *services* (7x), *more* (7x).

The most commonly named beneficiaries include individuals at the community level, such as farmers, women's groups, community forest associations or water resource users' associations. Some of the solutions also mention other beneficiary groups, such as local and municipal governments, businesses (including water utility companies) or international visitors.

Solutions that contribute to SDG 6 also often have an impact on other SDGs, most frequently to SDG 15 (Life on Land). Four solutions are identified as having a significant impact in relation to SDG 2 (Zero Hunger); similarly, four solutions contribute substantially to SDG 11 (Sustainable Cities and Communities) and/or SDG 13 (Climate Action) (*see* **Figure 14**).

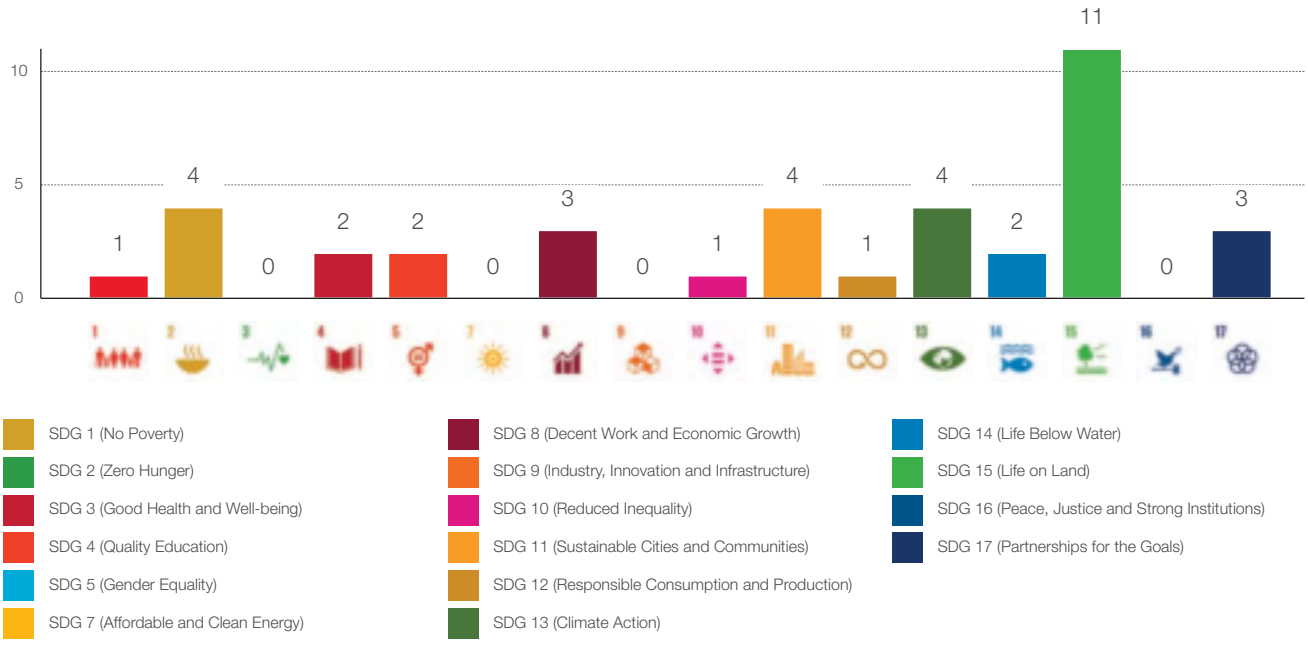


Figure 14. Co-benefits for other SDGs (number of solutions in the SDG 6 – Clean Water and Sanitation – cluster that deliver benefits in relation to each of the other SDGs). Compiled by the report editors.

Research in Legado das Águas. © Reservas Votorantim LTDA.

SPOTLIGHT SOLUTION

Legado das Águas - Reserva Votorantim (Water Legacy)

Legado das Águas (Water Legacy), the largest private reserve of Brazil's Atlantic Forest, at 31,000 ha, is one of Votorantim Group's environmental assets. Located in the Vale do Ribeira region in the south of São Paulo State, the area was acquired in the 1940s and has since been conserved with the objective of guaranteeing, in the long term, the water resource of the Juquiá River water basin. Today, the Legado das Águas reserve is managed by the company Reservas Votorantim LTDA, created to establish and implement a new model of environmental asset management. Legado das Águas was structured in such a way as to promote actions within four central axes: Institutional Management, Human and Social Capital, Economic Capital, and Natural Capital, demonstrating that the sustainable use of natural resources in private protected areas enables investment in the maintenance of the area, as well as social and economic benefits.

From the PANORAMA solution provider:

The Vale do Ribeira, where the Legado das Águas reserve is found, has the largest continuous area of preserved Atlantic Forest in Brazil. However, it also has a Human Development Index (HDI) score below the national average and the worst in the State of São Paulo, which exacerbates other existing problems, such as deforestation, oil palm monoculture and hunting. Legado das Águas has actively contributed to economic development, based on the principle of sustainability, and socio-political engagement in the Vale do Ribeira.

The Legado das Águas reserve was accounted for in the construction of legal landmarks essential for

the territorial development of the municipalities on whose territory it is found. As an example, we can cite the Tapiraí Master Plan, the Regional Integrated Tourism Plan and the Basic Sanitation Plans for Juquiá and Miracatu. These results are the fruit of the work undertaken by the various programmes implemented by the reserve in partnership with public authorities, civil society and other institutions. All reserve activities generate positive externalities for the territory, for the forest and for the people. At meetings and events, the reserve stands as an initiative to protect ecosystem services. The work of the reserve in the municipalities is driving the generation of value. Thus, it invests in programmes for supporting municipal governments, strengthening communities and improving education. These actions aim to harmonise the protection of the forest, the strengthening of society, and the activities of the new economy.

Building Blocks:

Protocol of intentions

Strategic management plan

DISCUSSION OF RESULTS

It is notable that the most frequent building block categories of solutions in this cluster are *alliance and partnership development, collection of baseline and monitoring data and knowledge*, and *education, training and other capacity development activities*. These align with categories of action identified by Dudley et al. (2016) as necessary to maximise the potential of protected areas to contribute to water services, namely: knowledge and capacity building; partnerships; and learning lessons from successful water management. An important point here is the clear need for more data about freshwater status and management in protected areas, to understand how well freshwater is being managed – and the evidence is that there are plenty of cases where the management might not be working too well (Thieme et al. 2012, 2016; Abell et al., 2016; Harrison et al. 2016). However, data alone are not going to work. We must build up examples of conservation evidence and assess which projects and processes work and which do not, and we must transit that information effectively to the stakeholders that need it. For example, Abell et al. (2019), as well as others, call for evaluation of the effectiveness of programmes aimed at accomplishing the shared objectives of water protection and freshwater biodiversity conservation. PANORAMA's repository of solutions, and this publication, can make a contribution. At the same time, scientists must translate their findings into recommendations for action for practitioners and policy makers (Harrison et al., 2016).

The strong co-benefits in relation to SDG 2 (Zero Hunger) can be explained by several factors, including the fact that water is a critical resource for agriculture. Further, freshwater ecosystems with good water quality and quantity are preconditions to achieving the targets of SDG 6 (Clean Water and Sanitation), and these also support the provision of sustainable inland fisheries, which in turn can support food security. Surprisingly, none of these solutions reports a major positive impact in relation to SDG 3 (health and well-being). This can be attributed to the fact that these solutions are not a representative sample. Typically, clean water and sanitation contribute to better human health – in fact, water and sanitation-related diseases remain among the major causes of death in children under five (United Nations, 2018).

The water funds that are presented as a solution in this cluster are conceptually very good. However, it is worth noting that they are also very complex, and the potential for success is highly variable, since experiences from one place are not necessarily transferable to another.

Pagiola et al. (2010) note that there are many constraining factors influencing the potential success of payments for watershed services (PWS) schemes for securing additional funding for protected areas, or for better conservation outside existing protected areas. The potential for success can, regionally, be highly variable; only about a quarter of the biodiversity conservation priority areas they studied were suitable for receiving payments. Nevertheless, they did conclude that these PWS schemes can

make a significant contribution in certain areas. The water funds projects, operated through several parts of South America by The Nature Conservancy and partners, are good examples of successful PWS projects.

The ecosystem types agroforestry, rangeland/pasture and tropical evergreen forest were quite prominent but may represent protected areas that are not specifically designed for freshwater conservation and may not have targeted management strategies in place to support such conservation. Often, protected areas are designed to protect a particular landscape; if they happen to contain a freshwater ecosystem, aspects of the protected area's design and management directed towards freshwater conservation are often an afterthought.

CONCLUSIONS AND RECOMMENDATIONS

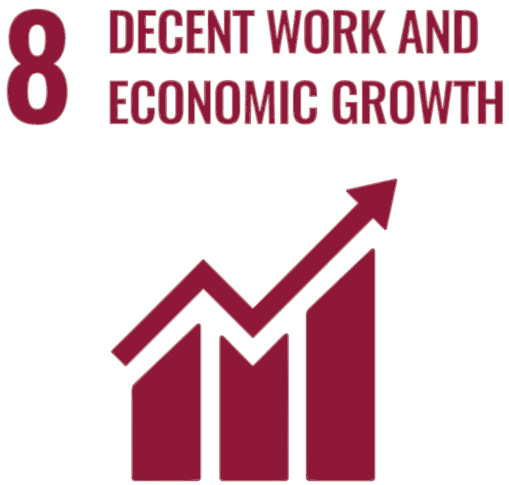
As others have argued (e.g. Harrison et al., 2016) and the solutions in this cluster confirm, protected areas are an underused resource for attaining water security and for maintaining natural infrastructure as a means to achieving that, rather than relying on built infrastructure.

SDG 6, under target 6.6, covers the protection and restoration of water-related ecosystems. Indicators of success against this target should include a measure of how well maintained the natural flows are since this affects the extent and quality of such ecosystems. The solutions in this cluster highlight that managing flows, and natural variation in flows over time, is important. This is particularly true for protected areas where the landscape ecology – and sometimes the reason for the existence of the protected area – is dependent on those flows. An example are some East African protected areas that focus on the timing of migrations of megafauna, which are dependent on climatic seasonality and water availability in watersheds. If one changes those flows, it changes the system.

The health of freshwater ecosystems, and their ability to provide sufficient and high-quality water as a resource for human use, is inextricably linked with the biodiversity native to these systems. There should be more targeted consideration of the need to manage freshwater biodiversity sustainably and to design management strategies for protected areas containing freshwater ecosystems that are specifically focused on biodiversity conservation.

The relatively prominent representation of the ecosystem types agroforestry, rangeland/pasture and tropical evergreen forest highlights the need for design and management strategies that are specifically focused on maintaining and restoring natural freshwater ecosystem processes and native biodiversity, particularly in these ecosystems. There are many opportunities to designate new protected areas and modify existing protected areas with these goals being prioritised. Provision of clean water resources can be substantially enhanced in many parts of the world through expansion of the currently underutilised approach of designing protected areas specifically to conserve and manage freshwater biodiversity. This approach results in additional benefits, such as improved food security, and can enhance ecosystem services. There is a need to mainstream freshwater biodiversity conservation within the protected area field.

Section F: Sustainable Development Goal 8



ABOUT PROTECTED AREAS AND WORK

The contribution of protected areas to SDG 8 is closely related to poverty alleviation – covered in Chapter 3, Section A – as many attempts to address poverty focus on income generation and the creation of employment opportunities. Protected areas can contribute to the creation of employment, for instance through ecotourism and related new employment opportunities, both directly within the protected area system and through local initiatives related to the presence of tourists in the region (Andam et al., 2010; Stolton and Dudley, 2010). Moreover, protected areas can ensure the sustainability of existing sources of income. For instance, if the ecological base upon which people's employment depends becomes degraded, their livelihoods are equally at stake. The establishment and effective management of protected areas can prevent this from happening (Naughton-Treves et al., 2005). Sustainable use of resources within a protected area, such as water for farming activities or harvesting of forest products, can provide the basis for supplementary income (Carret and Loyer, 2003; Clements et al., 2014; Ruiz-Pérez, 2004). Of course, jobs being created directly for managing protected areas also contribute to employment. An example that more broadly illustrates the link between maintenance and restoration of ecosystem services, and SDG8, is South Africa's Working for Water programme (WfW), recognised as one of the most successful integrated land management programmes in the world. WfW is a government-funded initiative with a dual function of controlling invasive alien species of plants – which impact water availability – and providing social upliftment to previously unemployed citizens (Rodricks, 2008; Green Economy Coalition, 2018).

Consequently, the protection of land is often not only motivated by ecological considerations, but also by the positive effects on livelihoods. For example, nearly two-thirds of the poverty reduction associated with the establishment of Costa Rican protected areas is causally attributable to opportunities afforded by tourism (Ferraro & Hanauer, 2014). In rural areas of Africa, research has shown that on average, for every 100 jobs in ecotourism, 700 people are indirectly impacted (Snyman, 2016). Employment in ecotourism can help rural communities in remote areas to move towards an engagement in the market economy, improving financial security and social welfare, as well as positively affect attitudes towards conservation (Snyman, 2012).

However, the case is not always so clear-cut: a study from Sweden found that national parks do

Table F. Solutions included in the SDG8 cluster.

1. An example of governance and participation of indigenous people and nations in the management of the Cuyabeno Wildlife Reserve, Ecuador (Ecuador)
2. Mangrove conservation, climate change and food security (Guinea Bissau)
3. Forest protection and livelihoods improvement in Ekuri, Nigeria (Nigeria)
4. Pioneering Africa, Menongue Game Reserve, Angola (Angola)
5. Responsible marine and coastal tourism business cluster development (South Africa)
6. Employment initiatives to improve protected areas and community livelihoods (South Africa)
7. Establishment of a financially sustainable model of private MPA management through ecotourism (Tanzania)
8. Dana Biosphere Reserve: Creating socio-economic development opportunities for nature conservation (Jordan)
9. **Caucasus Wildlife Refuge: Pioneering private conservation in Armenia (Armenia), see p. 59**
10. Local community engagement and support for conservation: Ecotourism at Andasibe, Madagascar (Madagascar)
11. Profiting from eco-tourism in Cambodia (Cambodia)
12. Working beyond boundaries improving health/employment outcomes for refugees (Australia)

Figure 15. Geographic distribution of solutions in the SDG 8 (Decent Work and Economic Growth) cluster. Map compiled by the graphic designer, using data from the report.

have a positive effect on tourism employment but, at the same time, forest sector employment decreases. The lack of a significant relationship between the positive development in tourism employment and the negative development in forest industry employment indicates that tourism employment does not automatically follow from unemployment in forest sectors (Lundmark et al., 2010). This illustrates that

the impact protected areas have on employment is dependent on the implementation of corresponding measures in cases where people's income-generating activities may be reduced through the establishment of a protected area (Andam et al., 2010). Further, tourism per se does not necessarily contribute to poverty reduction and employment. It is essential that the tourism business links to the local economy (Job & Paesler, 2013); that communities do indeed reap direct benefits in exchange for potential restrictions and loss of access rights resulting from protected area establishment and management (Appiah-Opoku, 2011); and that there is a link made between the tourism benefits and the related protected areas (Snyman, 2012).

SOLUTION REVIEW: RESULTS AND TRENDS

Of the 28 results that come up in a free text search for 'employment' on the PANORAMA web platform, 12 were found to be directly relevant for this effort and were thus included in this cluster.

Context

There is a good geographic spread among the solutions in this cluster. They stem mainly from Asia and Africa, with at least one implemented in each of the five IUCN regions – Africa, America, Asia, Europe, and Oceania.

The most common challenges addressed by solutions in this cluster include unemployment/poverty, lack of alternative income opportunities, poaching, and land and forest degradation.

Process

Around two-thirds of solutions in the SDG 8 (Decent Work and Economic Growth) cluster are implemented at a local level, with the remaining third

Sun - Swiss National Park, Switzerland. © Swiss National Park.

Figure 16. Word cloud of the stated impacts of solutions in the SDG 8 (Decent Work and Economic Growth) cluster. Compiled by the report editors.

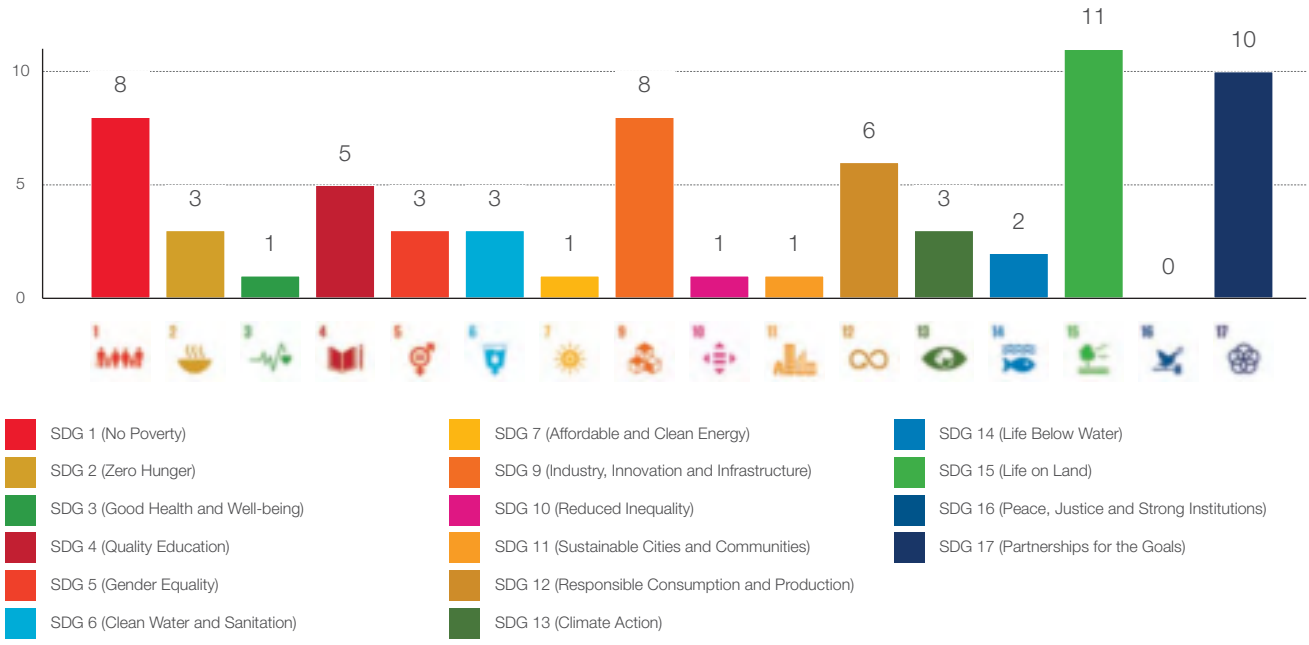


Figure 17. Co-benefits for other SDGs (number of solutions in the SDG 8 – Decent Work and Economic Growth – cluster that deliver benefits in relation to each of the other SDGs). Compiled by the report editors.

being implemented either at a sub-national or national level.

Looking at the building blocks for solutions in this cluster, we find that *education, training and other capacity development activities* is the most frequently occurring category, followed by *alliance and partnership development* and *sustainable livelihoods*.

Impacts

In looking at the described impacts of the solutions in this cluster, the most frequently occurring words are *community/communities* (25x), *local* (23x), *area/areas* (16x), *tourism* (14x), *reserve* (12x), *conservation* (10x), *through* (10x), *wildlife* (9x), *employment* (9x) and *nature* (8x) (**Figure 16**).

In terms of contributions to the SDGs, aside from SDG 8, those that are most often impacted by solutions in the current cluster are SDG 15 (Life on Land) and SDG 17 (Partnerships for the Goals), followed by SDG 1 (No Poverty) and SDG 9 (Industry, Innovation and Infrastructure), which comes up for the first time in a major way in this solutions cluster (**Figure 17**).

Local communities are most frequently mentioned as beneficiaries.

Going to fish in Senegal. © Gregoire Dubois. Flickr.

Women working in a social enterprise created by the FPWC in the framework of an EU-funded poverty reduction project in the Urtsadzor community. ©FPWC.

SPOTLIGHT SOLUTION

Caucasus Wildlife Refuge: Pioneering Private Conservation in Armenia

The objective of the Caucasus Wildlife Refuge (CWR) is to contribute to efficient biodiversity protection by interlinking sustainable community development, conservation and behaviour change. The Foundation for the Preservation of Wildlife and Cultural Assets (FPWC) manages the reserve and maintains a permanently manned ranger station in the area. Six rangers are employed from the community, equipped to protect the territory from any negative human impact. The rangers are patrolling the 8,000 ha on a 24/7 regime, preventing any illegal activity in the area. FPWC's holistic approach targets rural communities, children and youth, women, local and state authorities, farmers, and scientific and educational institutions.

From the PANORAMA solution provider:

In 2017, Vardahovit, a small village in south-eastern Armenia, donated 2,000 ha of community lands to the FPWC in perpetuity. This case is noteworthy because geoprospecting works for polymetallic ores were carried out on the community lands in 2016 by a major mining company. The community made a participatory decision to turn down the company's financial offer for land leasing and donate the lands to the FPWC for conservation. FPWC will be developing sustainable tourism, organic farming, and small businesses in the community by increasing the capacity of locals and enhancing new income opportunities for farmers and community members. An eco-lodge built in the CWR offers accommodation for ecotourism and international students or scientists conducting research in the area. Rural communities are involved in FPWC's conservation efforts and obtain direct benefits, such as annual lease funds into the community budget, (self)employment opportunities, renewable energy solutions installed in communal buildings, an improved water supply network and access to drinking or irrigation water, and development of organic farming.

Building Blocks:

Regenerating sustainable communities

Amending the law

DISCUSSION OF RESULTS

As highlighted in the introduction to this section, contributions of protected areas in alleviating poverty and creating employment often go hand in hand, since employment that guarantees a stable, sufficient income is a key determinant of avoided poverty: earning less than around US$ 2 per day is the most widely held and understood definition of absolute poverty (World Bank, 2020).

The solutions in the chapter clearly illustrate this, since all of them describe holistic approaches to local development and employment, coupled with nature conservation activities. Clear employment and income benefits are key to securing community buy-in for conservation in these solutions, ultimately leading to positive outcomes for both local residents and ecosystems.

Most of the solutions describe successful ecotourism models, as illustrated by the frequency of the term *tourism* in the descriptions of solution impacts. Ecotourism, if done well, can indeed be a powerful driver of local development while at the same time creating incentives for conservation of the natural values of the area that attract the visitors, and generating revenue that can be invested in implementing and monitoring conservation activities (Ormsby & Mannle, 2009; Anup et al., 2015). In some cases, a direct connection between these factors is created by linking the price that tourists pay to the species that they see, as in the case of the solution describing birdwatching tourism in **Kulen Promtep Wildlife Sanctuary, Cambodia**. Other solutions illustrate how direct job creation in protected area management can lead to social upliftment while also promoting gender equality and societal integration of other marginalised groups (e.g. solution "**Employment initiatives to improve protected areas and community livelihoods**").

The close link between conservation impacts (SDG 15, Life on Land), poverty alleviation (SDG 1, No Poverty) and employment (SDG 8, Decent Work and Economic Growth) is also illustrated by the consideration of co-benefits for other SDGs provided by the solutions in this cluster. The co-benefits for other SDGs further underline the importance of partnerships, for example between private sector ecotourism and companies – such as in the **case of the Damaraland Camp in Namibia** – as evident from the strong contribution these solutions make to SDG 17 (Partnerships for the Goals). Interesting to note that SDG 9 (Industry, Innovation and Infrastructure) is among the top four co-benefiting SDGs cited by the solutions in this cluster, in contrast with other clusters. This is perhaps an indication that the creation of protected area employment often comes with development of small-scale industrial and other enterprises as well as construction of infrastructure such as tourism facilities and roads (Pickering et al., 2008; Hoole, 2009). The establishment and development of the value chain related to tourism, in terms of the use of local suppliers of goods and services, could also be related to innovation, industry and infrastructure: investing in the tourism sector can boost numerous industries within the value chain, including for example accommodation, agriculture and public transport (WTO, 2018).

It is surprising that none of the solutions state a contribution to SDG 16 (Peace, Justice and Strong Institutions), as tourism is frequently promoted as a tool to promote peace (Becken & Carmignani, 2016). However, peacebuilding is not explicitly mentioned as an objective or an impact in the description of any of the solutions. It would be interesting for PANORAMA to deliberately seek out solutions that highlight the role of tourism as a driver of peace.

The most frequently occurring building block types again underline the holistic approach applied by many of these solutions, with education and local capacity development, as well as a partnership approach, being determinants for longer-term sustainability of the development opportunities that have been created, as well as for the lasting success of conservation efforts.

CONCLUSIONS AND RECOMMENDATIONS

These solutions underline the important role of protected areas in creating local employment, particularly through sustainable ecotourism. There

are a range of associated benefits, including reduction of poverty, generating funding for protected area management – if the tourism revenues are reinvested in the protected area – and building buy-in and appreciation for nature and nature conservation both within communities as well as with visitors.

The solutions also illustrate the importance of holistic approaches that create "win-win" situations for local development and protection of ecosystems and their values. Stakeholders involved in ecotourism, including private enterprises, park managers and communities should bear these connections in mind and ensure early dialogue and proper engagement when setting up ecotourism operations. The solutions in this chapter highlight some good practices for such processes.

The solutions demonstrate that building local value chains, employing local people, and building the capacity of local communities to engage in protected area management and tourism more equitably, through employment opportunities as well as equity (joint venture business) arrangements, are also important in ensuring long-term success.

Park ranger in Yosemite National Park, USA. © Brian Mann. Unsplash.

Section G: Sustainable Development Goal 13

ABOUT PROTECTED AREAS AND CLIMATE CHANGE

The climate crisis, biodiversity loss and sustainable development are so intricately entwined that none can be effectively addressed without attention to the others. This requires protected areas policy to expand beyond its original objective to conserve biodiversity, with an enhanced focus on maintaining carbon sinks and stores, building resilience, and protecting livelihoods dependent on natural ecosystems (Rockström et al., 2017; Dinerstein et al., 2019; Diaz et al., 2019; Smith et al., 2019; IPCC, 2018; Smith et al., 2020).

Terrestrial protected areas have been estimated to store about 15.2% (312 billion tonnes) of terrestrial carbon stocks (Campbell et al., 2008) (when 12.25 of the land surface was protected) and to sequester annually, about 20% (0.5 billion tonnes) of the carbon sequestered by all land ecosystems (Melillo et al., 2016). The carbon stored in coastal and marine protected areas is also believed to be significant, although it has not yet been quantified. Oceans have absorbed 20–25% of atmospheric carbon dioxide since 2008 (Le Quéré et al., 2018), and blue carbon – the carbon stored in mangroves, tidal marshes and seagrass meadows – accounts for half of the carbon stored in marine sediments (Duarte et al., 2013; The Blue Carbon Initiative, 2017). Carbon-rich ecosystems, such as primary forests, grasslands, peatlands, drylands and blue carbon systems, are irreplaceable and are being lost at an alarming rate. For example, from 2014–2018, tropical primary forest loss accelerated by 44% compared to 2002–2013 (NYDF Assessment Partners, 2019). The global extent of seagrasses has declined by 29% since 1980 (Waycott et al. 2009); the extent of saltmarshes and freshwater tidal marshes has declined by 25% compared to their historical coverage (Crooks et al. 2011); and mangrove extent has declined by 20-35% since the 1960s (Polidoro et al. 2010) (Herr & Landis, 2016).

Ecosystems also provide crucial benefits for adaptation and disaster risk reduction. For example, one hectare of mangroves in Jamaica provides, on average, more than US$2,500 per year of direct flood reduction benefits from tropical cyclones (World Bank, 2019). Mangrove forests in Florida have provided significant flood damage reduction benefits annually, across multiple storms, and during catastrophic events like Hurricane Irma (Narayan et al., 2019). Forests in the Alpine parts of Switzerland are managed mainly for their protective functions against landslides, avalanches, erosion, floods and rockfall (Schönenberger, 2001).

Finally, protected areas play an important role in protecting biodiversity under climate stress by

Table G. Solutions included in the SDG13 cluster (continues in page 66).

1 Canada's ecological integrity system: Monitoring conditions of parks (Canada)

2 Restoring mangroves in communal and private land supported by government management schemes (Mexico)

3 Restoration of mangroves for food security in the Gancho Murillo Coastal State Reserve Chiapas, Mexico (Mexico)

4 Food and water security in ejidos around the Tacaná Volcano, Mexico (Mexico)

5 A multi-actor alliance to reduce the risks of cascading hazards in Sian Ka'an (Mexico)

6 Restoration of mangroves in the Sian Ka'an biosphere reserve (Mexico)

7 Collective impact: Fisheries and inter-sectoral collaboration (Mexico)

8 **Changing climate patterns, changing flows, changing minds: Restoration of mangroves and hydrological flows (Mexico), see p. 70**

9 Conservación de páramos y bosques altoandinos para recuperar la regulación hídrica en la cuenca (Conservation of high Andean páramos and forests to recover water regulation in the basin) (Peru)

10 Forest conservation in the communities of Boca Isiriwe, Masenawa and Puerto Azul, Amarakaeri Communal Reserve (Peru)

11 Integral sustainable farms in the Amazon (Peru)

12 Indigenous forest conservation through Belize's first agro-forestry concession (Belize)

13 Land purchase for water and biodiversity conservation in the Trifinio region, Honduras: Successful experience of mitigation and adaptation to climate change (Honduras)

14 Coastal communities combat climate change (Costa Rica)

15 Colombia subsystem of marine protected areas (SMPA) (Colombia)

16 Climate smart conservation for marine protected areas (Colombia)

17 Sacred headwaters of the Amazon (Ecuador, Peru)

18 Restoration of mangroves at the "Refugio de Vida Silvestre Manglares Estuario Río Esmeraldas" (Ecuador)

19 Noel Kempff Mercado National Park, an innovative management model of co-management and a pioneer in the mitigation of carbon dioxide worldwide (Bolivia)

20 Increasing coastal resilience and social development opportunities: Guyana Mangrove Restoration Project (GMRP) (Guyana)

maintaining ecosystem resilience and reducing other threats and stressors (Dudley et al., 2010b).

The establishment of protected areas that are focused on conserving carbon-rich or high biodiversity ecosystems is particularly important leading up to 2030, because protected areas provide an immediate benefit for climate change mitigation and adaptation, whereas other actions, such as restoration, can take decades to deliver measurable results (IPCC, 2019).

Climate change is one of the top five direct drivers of biodiversity loss and is predicted to become even more of a threat over time. Protected areas should be managed to enhance ecological resilience, protect stored carbon and maintain their capacity to respond to the challenges presented by climate change (Gross et al., 2016). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) recommends that expanding and strengthening ecologically representative, well-connected protected area networks and other effective area-based conservation measures (OECMs) can help address the challenges of biodiversity loss and climate change simultaneously (Diaz et al., 2019).

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Mauritania
Mali
Niger
Venezuela
Brazil
Bolivia
Chile
Argentina
North Atlantic Ocean
South Pacific Ocean
South Atlantic Ocean

Figure 18. Geographic distribution of solutions in the SDG 13 (Decent Work and Economic Growth) cluster. Map compiled by the graphic designer, using data from the report.

Table G. Solutions included in the SDG13 cluster (continues from page 63).

21 Integration of ecosystem-based adaption into protected area management planning (Brazil)

22 Financing solutions that protect nature and wildlife through pooling CSR - Green Farm CO2FREE (Brazil)

23 Mangrove conservation, climate change and food security (Guinea Bissau)

24 Addressing resource degradation to enhance climate change resilience (Senegal)

25 Forest protection and livelihoods improvement in Ekuri, Nigeria (Nigeria)

26 Public-private partnership to develop a climate-proof PA network (South Africa)

27 Waterevolution: an integrated approach to maritime cluster sustainability (Italy)

28 Blue carbon credits financing community-based mangrove management (Kenya)

29 Park agencies collaborate to comprehensively tackle climate change impacts (Kenya)

30 Forest landscape restoration in the Shouf: A comprehensive solution (Lebanon)

31 Integrating climate change aspects in protected areas management planning in Zambia (Zambia)

32 Integrating climate change aspects in protected areas management planning in Tanzania (Tanzania)

33 Pioneering climate change adapted MPA management in Madagascar (Madagascar)

34 Lauru ridges to reefs protected area network (Lauru PAN) (Solomon Islands)

35 Restoring the vegetation cover and the native forests of biodiversity hotspots in Mauritius (Mauritius)

36 Mangrove restoration for sustainable fishery in Palk Bay, India (India)

37 Adaptive, community-driven and resilient co-management plan (Cambodia)

38 MPAs as part of the solution towards a resilient eco-city (Vietnam)

39 Engaging multi-sectoral partners for climate resilience (Philippines)

40 Community-based mangrove conservation and rehabilitation (Philippines)

41 The Palau National Marine Sanctuary: Protecting a nation's entire marine territory to ensure sustainable development, enhance food security, boost tourism and enrich biodiversity conservation (Palau)

SOLUTION REVIEW: RESULTS AND TRENDS

Context

Of all the clusters in the sample, the SDG 13 (Climate Action) cluster has the greatest number of solutions, i.e. 41 solutions. This is consistent with the well-demonstrated benefits of protected areas in contributing to climate change adaptation and mitigation (Stolton and Dudley, 2010).

Since this sample is sizeable, it is interesting to note the variations in geographic distribution of the PANORAMA cases that contribute towards climate benefits, bearing in mind the general factors that impact the composition of the PANORAMA portfolio (*see* Chapters 2 and 5): more than 50% of the included cases are from Africa and South America.

Many of the solutions in this cluster describe mangrove restoration projects and initiatives. Consequently, mangroves are the most commonly covered ecosystem in the solutions of this cluster, followed by wetlands, seagrass, coral reefs and rivers/streams (**Figure 19**).

To understand which challenges are being addressed by the solutions in this cluster, it is useful

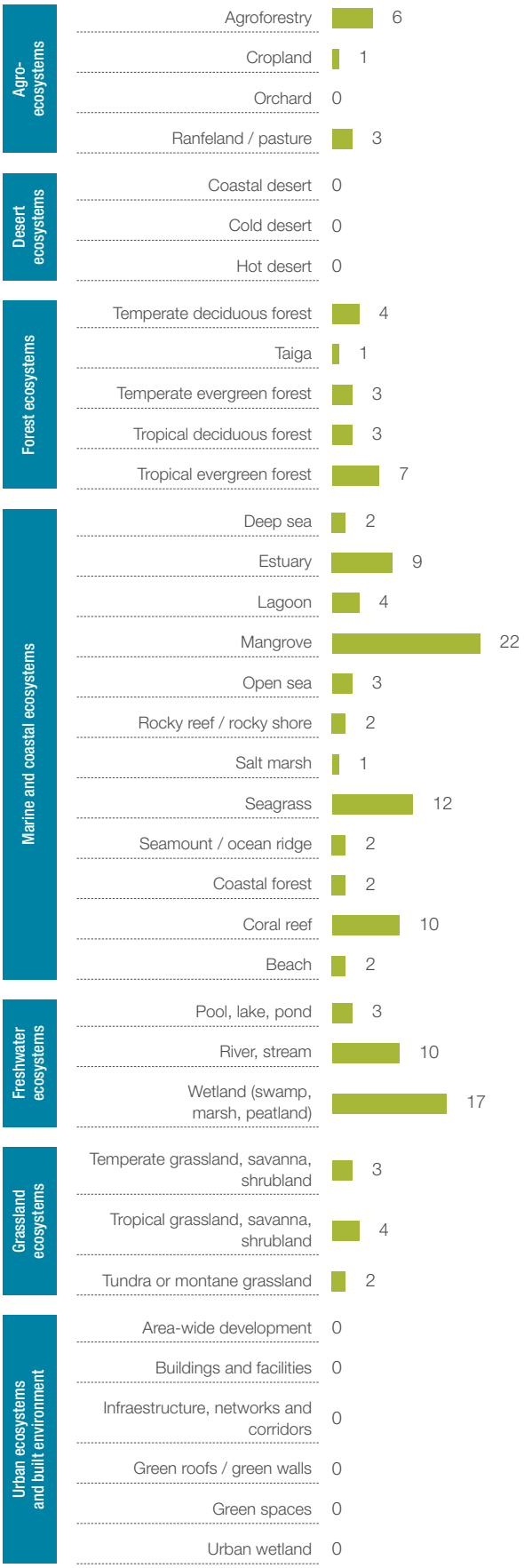

Figure 19. Ecosystems covered by solutions in the SDG 13 (Climate Action) cluster. Compiled by the report editors.

to differentiate between climate-related and non-climate-related challenges.

The most common climate-related challenges are land and forest degradation and loss of biodiversity. It is important to note that, in the solution entry form, both are listed under the heading “climate challenges”, i.e. should be selected if the solution addresses biodiversity loss or land degradation as a result of climate change. However, both of these issues can of course also have non-climate-related causes, thus solution providers might select them even if they are not strictly caused by climate-related factors, resulting in possible distortion of the data. Other commonly addressed climate-related challenges include floods and drought (**Figure 20**).

Of the challenge types that are listed under the headings ecological, economic and social challenges, the one that was most commonly selected is ecosystem loss, followed by lack of public and decision-maker’s awareness, poor governance and participation, and poor monitoring and enforcement (**Figure 21**).

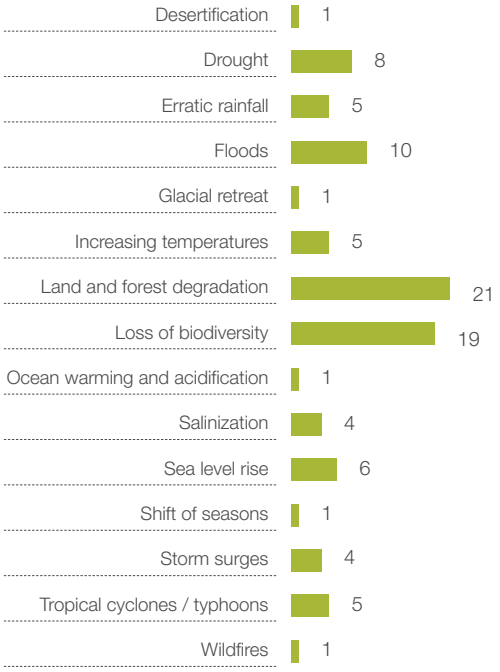

Figure 20. Climate-related challenges addressed by the solutions in the SDG 13 (Climate Action) cluster. Compiled by the report editors.

Process

Looking at the building blocks that make up the solutions in this cluster, we find that the categories *education, training and capacity development activities, collection of baseline and monitoring data and knowledge*, and *alliance and partnership development* occur most frequently.

If we drill deeper into the building blocks within the three most common categories, further trends emerge.

Looking at building blocks within the category *education, training and other capacity development activities*, we find that these often relate to building literacy and capacity of local actors – such as fishers, small-scale farmers and people's organisations – in relation to climate resilience, targeting both individuals and institutions. Action learning and technical training, for example on patrolling and enforcement, mangrove restoration, or use of nurseries, is another recurring theme.

The building blocks relating to *collection of baseline and monitoring data and knowledge* particularly include assessment of climate change vulnerability and land use, biodiversity monitoring, conservation planning, and formulation of adaptation actions in the face of climate change.

In the building blocks under the category *alliance and partnership development*, the term *governance* features strongly. Analysing the building block titles, it becomes apparent that designing participatory processes engaging diverse stakeholders is a critical component of many solutions in the climate change cluster. These stakeholders include those at local level (villagers, people's organisations, private landowners, "citizens to control the spread of invasive species", …), the private sector, and government agencies. Judging from the building block titles, these engagement processes typically aim to ensure: long-term sustainable financing for climate-related initiatives; institutional anchoring; awareness-raising and knowledge building; strengthened governance and empowerment for adaptation; development of protected area climate management strategies and plans; and good coordination across sectors.

Examining the SDG 13 (Climate Action) cluster through the lens of the scale of implementation reveals that around half of these solutions are implemented solely at a local scale. All of the solutions that are implemented at multiple scales (31%) include the local level, which means that in total, 79% of the solutions in this cluster include the local scale. A total of 86% of solutions are implemented at local and/or sub-national scale.

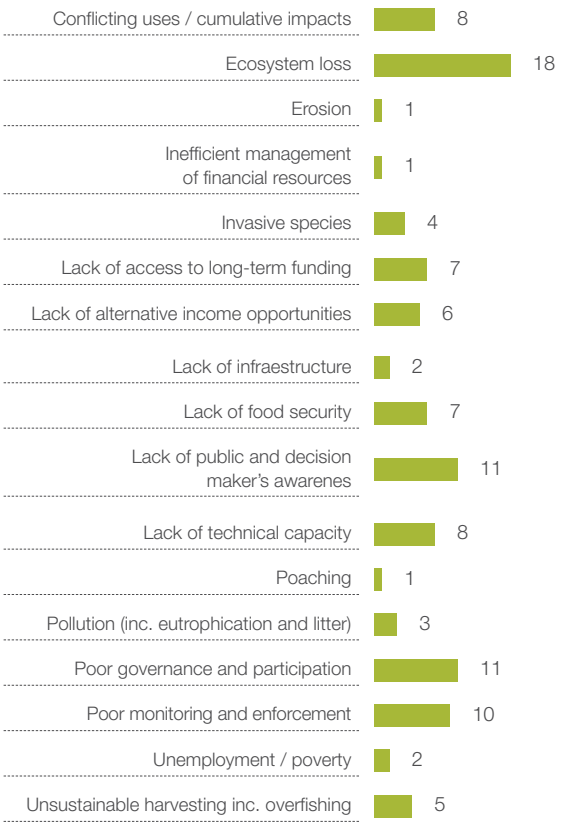

Figure 21. Non-climate-related challenges addressed by the solutions in the SDG 13 (Climate Action) cluster. Compiled by the report editors.

Impacts

Analysis of the text reveals that the most commonly used terms in the impacts section of solutions in this cluster include *community/communities* (59x), *local* (57x), *mangrove/mangroves* (47x), *climate* (35x), *areas* (33x), *management* (32x), *change* (30x), *conservation* (27x), *through* (25x) and *biodiversity* (25x) (**Figure 22**).

Figure 22. Word cloud of the stated impacts of solutions in the SDG 13 (Climate Action) cluster. Compiled by the report editors.

The most commonly named direct or indirect beneficiaries include local/indigenous communities, national authorities, farmers, protected area managers, fishers, and tourists.

Looking at co-benefits that solutions in this cluster deliver in relation to other SDGs, we find that SDG 14 (Life Below Water), SDG 15 (Life on Land), SDG 17 (Partnerships for the Goals), SDG 6 (Clean Water and Sanitation), SDG 8 (Decent Work and Economic Growth) and SDG 11 (Sustainable Cities and Communities) are the goals to which solutions in this cluster contribute most frequently, in addition to SDG 13 (*see* **Figure 23**).

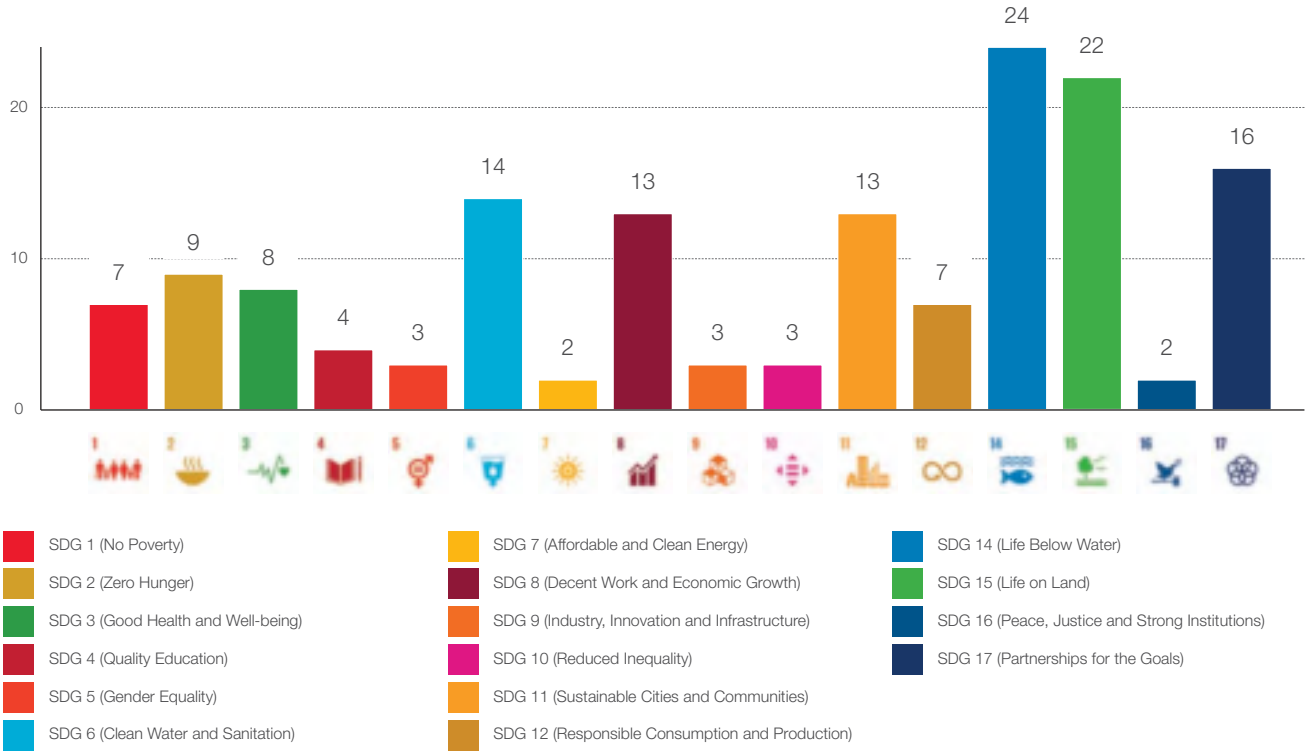

Figure 23. Co-benefits for other SDGs (number of solutions in the SDG 13 – Climate Action – cluster that deliver benefits in relation to each of the other SDGs). Compiled by the report editors.

SPOTLIGHT SOLUTION

Changing Climate Patterns, Changing Flows, Changing Minds: Restoration of mangroves and hydrological flows

When Marismas Nacionales, Nayarit, Mexico, was declared a biosphere reserve, there was community resistance to changing their existing productive practices. CONANP (National Commission of Natural Protected Areas) developed a long-term strategy for changing perceptions of climate change impacts, focused on raising awareness, capacity development, and continual technical support. A specific measure has been the rehabilitation of mangrove ecosystems through the re-establishment of natural salt and freshwater flows.

From the PANORAMA solution provider:

Marismas Nacionales Biosphere Reserve is one of the newest protected areas in Mexico. Most of its territory is under either community or private ownership, rather than federal control. This has compelled CONANP to take a different approach when working with communities to adapt to climate change from an ecosystem-based perspective. The reserve and its communities are under threat from hurricanes, phenomena that cause losses of mangrove ecosystems and fish nurseries. The reserve also suffers from changes in rainfall patterns, causing economic losses in productive activities such as oyster and shrimp production, and agriculture. These threats have increased due to climate change, making the reserve more vulnerable.

CONANP did not focus solely on financial support linked to payments for ecosystem services or subsidies. The goal was that communities would change because they believed in the ecological and long-term value of livelihoods and their work, not just because they were paid for it. CONANP

Aerial view of mangroves. © Angel Omar Ortiz Moreno.

has provided more opportunities for local communities by implementing flexible policies about the use of mangroves. This has allowed communities to adopt a range of secondary productive activities based on the sustainable use of the mangrove ecosystems, which buffer climate threats to fisheries. As a result, local fishing communities have been responsible, with CONANP's support, for rehabilitating local mangroves, leading to a win-win for both biodiversity and livelihoods.

Building Blocks:

- Transforming perceptions on ecosystem-livelihood connection
- Using natural processes in mangrove rehabilitation
- Integrating payment programmes into a larger strategy to promote sustainable livelihoods and long-term ecosystem conservation
- Using a flexible approach for defining conservation and production areas based on local knowledge
- Adoption of innovative technology

DISCUSSION OF RESULTS

The wide geographic spread of protected area solutions that address climate change highlighted in PANORAMA shows that there is political momentum and a variety of opportunities from mountains to oceans and from industrialised to developing countries. Small Caribbean islands are existentially threatened by climate change (UNDP, 2017), leading to strong investments and innovation in the development of nature-based solutions (UNDP, 2018). This could be one of the reasons behind the disproportionately high number of cases (13%) in this geographically small region.

It is apparent in many of the cases that adaptation and mitigation measures are interlinked.

The fact that many of the solutions play out in coastal and marine ecosystems also suggests the importance of '**blue solutions**'. However, it should be noted that the PANORAMA portfolio has a generally strong focus on marine and coastal ecosystems, representing an inherent bias. Mangroves are the ecosystem that is represented most strongly, speaking to their immense potential for supporting both climate change mitigation through storing large amounts of carbon (Murdiyarso et al., 2015), as well as adaptation and disaster risk reduction by stabilising soil and coastlines, and acting as "natural sea walls" protecting coastal settlements (Powell et al., 2011; Chow, 2017).

The solutions address various interrelated challenges, including biodiversity loss, climate change and human needs.

In many cases, it is very difficult to differentiate between climate-related and non-climate-related challenges (e.g. land and forest degradation and loss of biodiversity), which shows that they are intertwined, human-caused phenomena, underscoring that climate change, biodiversity loss and human needs are inseparably linked. Under the headings of ecological, economic and social challenges, the one that was most commonly selected is ecosystem loss. This is followed by lack of public and decision maker's awareness, poor governance and participation, and poor monitoring and enforcement. This indicates that in many instances, the key to success is to strengthen effective governance systems for ecosystems and natural resources. This confirms other recent findings (GIZ, 2019), where barriers to climate adaptation action are traced to power relationships, economic privileges and decision-making processes.

The integrated character of Ecosystem-based Adaptation (EbA), addressing both the climate-related and the non-climate-related challenges, provides opportunities to understand the role of protected areas in climate mitigation and adaptation debates. However, this is not yet expressed sufficiently in climate change and biodiversity policies. According to WWF, very few countries included explicit plans to use current or future protected areas for helping people adapt to climate change (i.e. EbA) in their nationally determined contributions (NDCs) to the Paris Agreement. Only eight countries (4%) – Antigua and Barbuda, Belize, Guinea Bissau, Jordan, Kuwait, Mongolia, Saudi Arabia, and St. Vincent and the Grenadines – stated or implied that ecosystem services provided by protected areas could reduce the vulnerability of people to climate change impacts (Hehmeyer et al., 2019).

In the parameters describing the process to achieve the solutions, the focus on building blocks that are categorised under *education, training and capacity development activities* and *alliance and partnership development* emphasises the central role of knowledge exchange, learning and long-term thinking in building climate resilience. This refers not only to technical solutions but also to networks for collaboration. Strong prevalence of the building block category *collection of baseline and monitoring data and knowledge* emphasises the continuous need for effective monitoring and evaluation processes of adaptation strategies.

The solutions are often implemented at, or at least include, the local scale and emphasise local participation. A people-centric approach to EbA should include indigenous and/or local people in the governance structure and rely on local knowledge and institutions (FEBA, n.d.). With around one-third of the solutions including multiple scales of implementation, the need for multi-level governance

of climate change as a multi-scale and complex issue is evident.

The impacts named in the solutions are predominantly local and diverse, showing the cross-cutting nature of nature-based solutions in addressing climate change and biodiversity challenges, contributing to goals under international frameworks relating to climate (UNFCCC, UNDRR), sustainable development (UN Agenda 2030) and nature conservation (CBD). Impacts are felt at various governance levels from local to national, which suggests a correlation between participatory processes and a wider spectrum of beneficiaries. Climate solutions may support national adaptation plans and global targets, while simultaneously bringing local livelihood benefits, including diversified income sources, although it is difficult to measure adaptation success quantitatively.

CONCLUSIONS AND RECOMMENDATIONS

Nature-based Solutions (NbS), and Ecosystem-based Adaptation (EbA) as a subset of these, constitute a very promising response mechanism to many challenges, both climate-related and others. Holistic and low-regret, such approaches are inclusive and local in nature, addressing not only ecological but also economic and social challenges (*see* also **EbA qualification criteria**, developed by IUCN, GIZ, IIED under the FEBA Framework). Although used in many of the solutions in this cluster, they may need to become a stronger part of the communication around protected areas.

While the evidence base for the mitigation and risk reduction potential of mangroves is well established, it is crucial to establish a similarly strong evidence base for the value of other ecosystems in relation to climate change. Grasslands, wetlands, forests, seagrasses and other ecosystems are key, not only for protecting biodiversity but also for climate change mitigation and adaptation (Erwin, 2009). The climate-related benefits of these ecosystems are not yet sufficiently reflected with examples in PANORAMA, even with land and forest degradation as the most commonly addressed challenge.

The frequent references to governance are a good indicator for its central importance and potential for mainstreaming and sustainability of NbS. When discussing governance, it is important to not only take the diversity of actors into consideration but to also discuss aspects of quality, equity, and the characteristics of good governance, as well as barriers and opportunities for successful governance (*see* also **Governance for Ecosystem-based Adaptation: Understanding the diversity of actors & quality of arrangements**). There is a need to continue to assemble and communicate examples of well-functioning governance systems underpinning NbS.

The building block category *education, training and capacity development activities* also occurs frequently; targeting of both individuals and institutions, as described in the solutions, is important. However, keeping the required mainstreaming and upscaling of NbS in mind is important to go beyond the oft-mentioned literacy and capacity building for local actors and to also increase knowledge, awareness and capacities of political stakeholders.

The building block category *collection of baseline and monitoring data and knowledge* particularly includes the assessment of climate change vulnerability and land-use. Importantly, long-term monitoring strategies need to be taken into consideration and planned for. Without outcome and impact indicators, often left aside in favour of output indicators, it is barely possible to understand the effectiveness of measures. It would be valuable to collect experience on long-term monitoring and evaluation through PANORAMA and to make this knowledge available for other projects and initiatives.

Section H: Sustainable Development Goal 17

ABOUT PROTECTED AREAS AND PARTNERSHIPS

SDG 17 can be described as the 'umbrella SDG', binding the other goals together. It outlines the partnerships needed to achieve the other SDGs, through resource mobilisation and financial support, transfer of technology and knowledge, as well as capacity building, trade, policy coordination and coherence, and multi-stakeholder cooperation.

As the previous chapters have illustrated, protected areas are often valued and utilised for several functions and ecosystem services simultaneously, which calls for cooperation between stakeholders with different interests. In this way, protected areas can provide an opportunity to form partnerships between otherwise competing parties (Rutagarama & Martin, 2006).

However, many protected areas have long followed an exclusionary approach as per the "Yellowstone model" [4], failing to take account of social, cultural and political issues. This has often created conflicts and adverse social impacts, since most protected areas have people living inside or around them, rather than being uninhabited wilderness. Such approaches not only disenfranchise local communities but can also undermine conservation objectives (Andrade & Rhodes, 2012; Stolton & Dudley, 2014).

A meta-analysis of 55 published studies from developing countries found that local community participation in the protected area decision-making process was the only variable that was significantly related to the level of compliance with protected area policies. In general, the higher the level of participation, the higher the level of compliance (Andrade & Rhodes, 2012).

Beyond local community engagement in decision-making and management, the success of protected areas is often dependent on partnerships between conservation and other major sectors, such as forestry, fisheries or tourism; and between groups such as government actors, businesses, NGOs and private landowners. Site managers may also collaborate with institutions such as zoos, aquaria and botanical gardens (McNeely, 1995). Collaborations with academic institutions can inform

[4] The US national park model has often been criticized as being protectionist: "The 'Yellowstone model' of national parks, a model 'in which strict nature protection is the primary goal' has become the world's standard while provoking disregard for human rights and cultural insensitivity and being ineffective or even counterproductive for conservation." (Stevens, 1997).

Table H. Solutions included in the SDG17 cluster (continues in page 76).

1 Conserving biodiversity in Chiapas natural protected areas through an innovative financial mechanism (Mexico)

2 Mainstreaming the recovery of marine fisheries and ecosystems through collective action and science (Mexico)

3 Better alliances, better forests (Mexico)

4 A regional sustainable financing architecture for conservation (Caribbean)

5 **Creation and planning of the Yaigojé Apaporis Indigenous Reserve and Natural National Park from an indigenous cosmovision (Colombia),** **see p. 79**

6 Colombia subsystem of marine protected areas (SMPA) (Colombia)

7 Waterevolution: an integrated approach to maritime cluster sustainability (Italy)

8 OASIIS: Opening Access to Sustainable Independent Income Streams (South Africa, Italy, Sweden, Finland, Spain, England, Wales, Peru, Vietnam, South Korea)

9 Improving protected area management through business skill-sharing partnerships (Africa)

10 Prespa Ohrid Nature Trust (PONT) – an innovative partnership enhancing conservation and cooperation (Albania, Greece, North Macedonia)

11 Ensuring marine protection through locally managed marine area at Vamizi Island in Mozambique (Mozambique)

12 Promotion of sustainable forest products from biosphere reserves in Ethiopia – a unique case for business partnerships (Ethiopia)

13 Funding the Aldabra Clean Up Project through corporate sponsorship and crowdfunding (Seychelles)

14 Creating sustainable partnerships and financing for the Kanha Pench Corridor (KPC) (India)

15 Effective protection and rational utilization of geological heritages (China)

Figure 24. Geographic distribution of solutions in the SDG 17 (Partnerships for the Goals) cluster. Map compiled by the graphic designer, using data from the report.

Table H. Solutions included in the SDG17 cluster (continues from page 75).

16 Protected areas, development and climate change in the lower Mekong river region (Laos, Vietnam, Cambodia, Thailand, Myanmar, China)

17 Community based natural resource management in Altai Sayan Mountains (Mongolia)

18 Harnessing collective responsibility to address deforestation and protect biodiversity (Indonesia)

19 Engaging multi-sectoral partners for climate resilience (Philippines)

20 Micronesia Challenge: A regional commitment for protected area management (Palau, Federated States of Micronesia, Marshall Islands, Guam, Northern Mariana Islands)

protected area management decisions, for example, in the case of fish stock assessments in Californian marine protected areas (Wendt & Starr, 2009).

Furthermore, partnerships are an essential tool for building public interest, as they provide space for consensus and learning to communally establish and implement actions. Taking the example of tourism partnerships in protected areas, these partnerships are characterised by representativeness, a sense of ownership, a learning focus and attention to relationships. This is often facilitated by contextual factors and processes such as trust, political and economic power, and equitable access to knowledge (McCool, 2009).

Arakwal Dolphin Dreaming Edu Prog. Arakwal National Park, Australia. © David Young.

Consequently, protected area managers and agencies are increasingly required to collaborate with a diversity of stakeholders, moving away from a top-down, regulatory style to one that relies on close and diverse partnerships with a range of other groups and actors.

SOLUTION REVIEW: TRENDS AND RESULTS

Context

Most of the solutions stem from Asia (7) and Africa (5). The cluster also includes three cases from Mexico and two from Colombia, as well as examples from the Caribbean, Europe and Oceania.

The most common challenges that were addressed by solutions in this cluster include land and forest degradation, unsustainable harvesting, including overfishing, lack of public and decision maker's awareness, and poor governance and participation.

Beyond the pre-defined challenges from which solution providers can select, the descriptions on PANORAMA mentioned other key challenges, most notably the need to secure long-term funding, ensuring participation, and raising public awareness.

Process

Alliance and partnership development is by far the most frequently chosen building block category among the solutions in this cluster. Of the 20 solutions, 17 contain one or several building blocks falling within that category. Other common building block categories include *education, training and other capacity development activities* and *sustainable financing* (**Figure 25**).

In many of the solutions, the first building block, i.e. the first step in the process of implementing that solution, related to securing funding through a partnership.

Around a third of the solutions are implemented at the local level, with a quarter implemented at national level.

Impacts

The terms most frequently mentioned under the impacts section of the solutions are *area/areas* (25x), *community/communities* (23x), *conservation* (21x), *management* (20), *through* (15x), *local* (15x), *activities* (14x), *other* (13x), *marine* (13x), *sustainable* (12x) (**Figure 26**).

Besides SDG 17, the solutions in this cluster most commonly contribute to SDG 15 (Life on Land) – 14 out of the 20 solutions are relevant to this goal. Other SDGs were mentioned in fewer than half of the solutions; most notably SDG1 (No Poverty), SDG4 (Quality Education), SDG 12 (Responsible Consumption and Production), and SDG 14 (Life Below Water) (**Figure 27**).

The most commonly mentioned beneficiaries of the solutions include communities, farmers and indigenous groups.

Figure 25. Occurrence of building block categories within solutions of the SDG 17 (Partnerships for the Goals) cluster. Compiled by the report editors.

Figure 26. Word cloud of the stated impacts of solutions in the SDG 17 (Partnerships for the Goals) cluster. Compiled by the report editors.

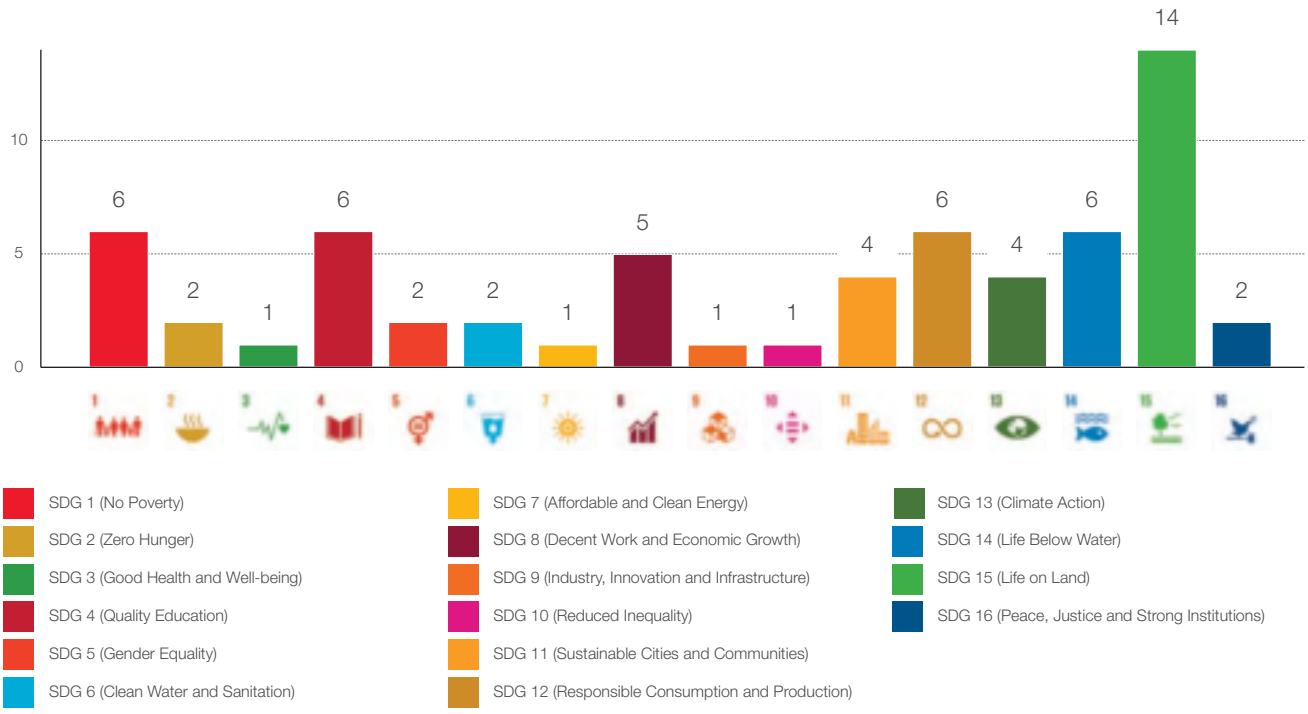

Figure 27. Co-benefits for other SDGs (number of solutions in the SDG 17 – Partnerships for the Goals – a cluster that deliver benefits in relation to each of the other SDGs). Compiled by the report editors.

Yaigojé Apaporis Indigenous Reserve and Natural National Park. © Fundación GAIA Amazonas.

SPOTLIGHT SOLUTION

Creation and planning of the Yaigojé Apaporis Indigenous Reserve and Natural National Park from an indigenous cosmovision

Seven indigenous peoples inhabit the Yaigojé Apaporis Indigenous Reserve in an area of great cultural diversity in the Colombian Amazon. Due to the fact that mining activities jeopardise its complex of sacred sites, the Indigenous Traditional Authorities requested the Colombian National Natural Parks (PNNC) to create a protected area overlapping the reserve. In this context, the GAIA Amazonas Foundation developed a methodology for the indigenous communities themselves to manage the creation, planning, and zoning of the Yaigojé Apaporis Indigenous Reserve and Natural National Park.

From the PANORAMA solution provider:

GAIA has been working with the indigenous people of the Amazon for 25 to 30 years, including with the inhabitants of the Apaporis Indigenous Reserve. In the 1980s the goal was to achieve legal recognition as an indigenous reserve. Thereafter the focus shifted to strengthening the organisational and governmental systems, which helped decentralise the delivery of basic services such as education and healthcare, always respecting cultural, environmental and territorial aspects.

With the mining threat identified in 2007–2008, work began, with the indigenous population, on joint strategies for the conservation of their territory. The creation of a natural park and coordination with PNNC strengthened the existing management systems through the recognition of indigenous people as an Environmental Authority. Furthermore, the processes of local or endogenous research were improved, connecting young leaders with the traditional knowledge

of the indigenous peoples inhabiting the territory. There were complementarities with other organisations and indigenous communities with regard to the comprehensive management of territory in the context of a bio-cultural macro-territory. Therefore, the mission was to find complementarities from environmental, ecosystemic and cultural viewpoints as well. This work has translated into a successful exercise of coordination among the indigenous peoples recognised as environmental authorities, PNNC, and an NGO that has persisted and been constant over the years, building strong trust with indigenous peoples and with the government authorities.

Building Blocks:

Local social organisation and national governmental support for the creation of the protected area

Planning the management of the Yaigojé Apaporis Indigenous Reserve and Natural National Park from an indigenous cosmovision

DISCUSSION OF RESULTS

The solutions confirm that protected areas can make a strong contribution to the intent of SDG 17 to revitalise the global partnership for sustainable development. They do this by providing "focal points" for collaboration at different geographic levels, ranging from local to international scales of collaboration (Miller, 1994), and, in the best of cases, enabling conservation and human development objectives to be met in conjunction.

In line with the indicators for SDG 17, protected areas can create, and in turn often rely on, multi-stakeholder partnerships that can generate sustainable financing (e.g. the Caribbean Biodiversity Fund, which helps to generate and channel funding for conservation and sustainable development across the Caribbean) and support knowledge sharing (e.g. the case of the Earth Skills Network for skill sharing and mentoring between conservation and business professionals). As SDG 17 suggests, these partnerships, illustrated by the solution case studies, might rely on North-South, South-South or triangular collaboration (e.g. the case of OASIIS, an online platform developed by a UK-based organisation, which supports social enterprises in biosphere reserves, including in the global South). The solutions in this chapter also illustrate well the various geographic scales of partnerships that protected areas can catalyse. The thorough review revealed that indeed the solutions collectively span all geographic levels: from multi-actor collaboration at site level – as in the case of the Yaigojé Apaporis Indigenous Reserve and Natural National Park; to regional collaboration frameworks in support of sites across several countries – such as the cases of the Prespa Ohrid Nature Trust, the Micronesia Challenge and the Caribbean Biodiversity Fund or to solutions that have a global element – such as the crowdfunding campaign for Aldabra Atoll.

Protected area partnerships can involve many different constellations of actors: OASIIS is a remote, mostly web-based support mechanism to strengthen site-level collaboration between the private sector, the public sector and civil society in biosphere reserves; the Aldabra Atoll solution describes how a foundation and an academic institution generated funding for this World Heritage site in Seychelles; whereas the solution from Siargao Island, Philippines involved a broad alliance of communities, the private sector, academia and NGOs to develop climate change adaptation strategies. The analysis of commonly named beneficiaries also underlined this wide range of actors involved across the solution cases – ranging from fishers and farmers to other community members, citizens, entrepreneurs, government authorities and businesses.

There is a clear link between the partnership-based solutions described in the case studies and some of the most common challenges they can help overcome, particularly social challenges such as lack of awareness among the public and decision makers, poor governance and participation levels, and limited access to long-term funding. Many of the solutions deliberately address and counter these challenges, by including targeted awareness-raising, fostering collaborative governance mechanisms and community engagement, and relying on partnerships to ensure

long-term sustainability of protected area operations, particularly the availability of financial resources.

CONCLUSIONS AND RECOMMENDATIONS

SDG 17 on "strengthening the means of implementation and revitalising the global partnership for sustainable development" actually covers a broad range of issues that are critical to enabling implementation of the other goals, such as finance, technology and capacity building, along with a number of systemic issues including policies and institutions (Faul, 2020). The special edition report of the Secretary-General on progress towards the Sustainable Development Goals (2019) notes that there is rapid progress on some of the SDG 17 targets, but that significant challenges remain, for example, due to the continuous decline of official development assistance.

As the solutions in this chapter illustrate, protected areas can contribute at least indirectly to part of the intent of SDG 17, by strengthening relationships and fostering collaboration at site level between actors that share an interest in the site and its values. In doing so, they can be "focal points", for example, for stimulating capacity building and investment in the sustainable development of developing countries.

Protected areas, in turn, benefit from such collaboration, including collaboration at the geographic scales that are most relevant for SDG 17, i.e. between countries, as the examples at regional level and those showcasing North-South collaboration in this chapter illustrate.

The solutions also underline that the success of protected areas often depends on collaboration across sectors, such as conservation, fisheries and tourism, both at the level of local implementation as well as at the political level, in line with target 14 under SDG 17, "Enhance policy coherence for sustainable development."

A recommendation in relation to protected areas and SDG 17 needs to be twofold. Firstly, donors and private investors, particularly in the global North, with an interest in advancing sustainable development of developing countries should continue to invest in protected area systems, particularly in high biodiversity countries. And secondly, they should do so in a way that strengthens protected area management approaches that rely on partnerships at local, national and regional level, aligning conservation with poverty alleviation and other human development objectives while respecting human rights and ensuring true participation of all concerned actors in site management.

Open Air Museum - Wadi Al-Hitan (Valley of the Whales). © UNESCO World Heritage, Egypt.

4: Overarching trends across the solutions portfolio

While Chapter 3 of this publication described and interpreted the results of the synthesis of PANORAMA solution case studies clustered around individual SDGs, this chapter will look at findings across the entire portfolio of 106 protected area solutions that were included in the review. This will reveal cross-benefits of the solutions to deliver multiple outcomes.

In this chapter, we also take a closer look at key findings across those solutions that relate specifically to terrestrial protected areas and marine and coastal protected areas, respectively. This will allow for a better understanding of the contribution of the solutions to SDG 14 (Life Below Water) and SDG 15 (Life on Land).

The targets of SDG 14 all have direct links to marine protected areas (MPAs) and their various benefits. While SDG 15 is less directly linked to the existing global policy agenda on protected areas (Dudley et al., 2017), it is clear that well-managed terrestrial protected areas directly contribute to the various targets under this SDG, such as those relating to sustainable forest management, land and soil restoration and halting extinction of threatened species.

The results of this overarching review and summary of trends across all solutions are subsequently discussed in the final chapter of the publication.

FINDINGS ACROSS THE ENTIRE PORTFOLIO

Context

Looking at a continental scale, the highest number of solutions are located in the Americas (41), followed by Africa (38) and Asia (20). Almost 90% of the solutions are found in the so-called global South (Mexico, Central and South America, Caribbean, Africa, Asia).

Considering sub-regions as per the categories used to classify solutions on the PANORAMA platform (in turn aligned with IUCN regions), 26 of the solutions featured in this publication are located in East and South Africa, followed by 18 from South America, and 13 from North America (including Mexico). A total of 12 solutions come from Southeast Asia, and 10 from both Oceania, and West and Central Africa. The least represented region is North Europe with only one case study, and North and Central Asia with no solutions (*see* **Figures 28 and 29**).

Nearly 60% of the solutions (=63 solutions) selected for the report relate to terrestrial protected areas, while 36% (=38 solutions) relate to marine and coastal protected areas. A little more than 4% (=5 solutions) concern both marine/coastal and terrestrial protected areas – these are typically solutions that are implemented in more than one individual site (*see* **Figure 30**).

The addressed challenges that were most cited in the solutions, between 30 and 42 times, are spread

Figure 28. Number of solutions per region. Map compiled by the graphic designer, using data from the report.

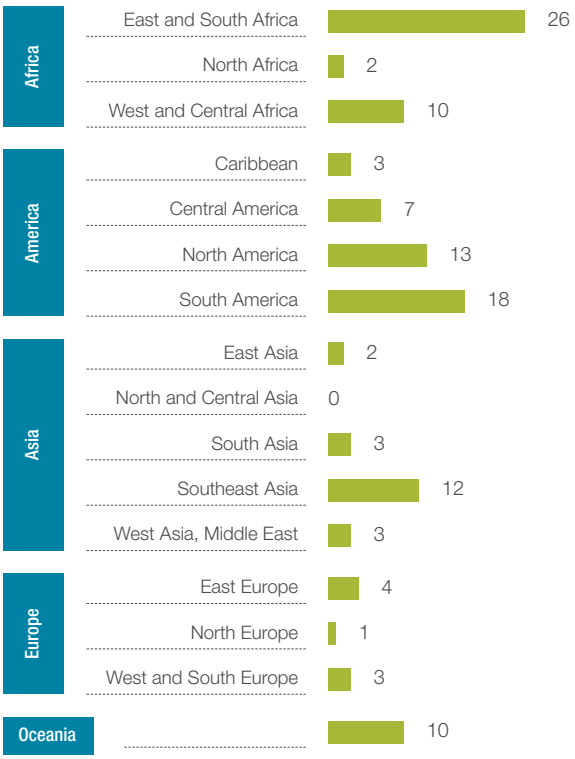

Figure 29. Number of solutions per region. Compiled by the report editors.

across all four challenge categories, namely social, economic, ecological and climate. Land and forest degradation, as well as loss of biodiversity, are the most recurrent issues that solutions aim to address. Ecosystem loss, lack of public and decision-makers' awareness, and poor governance and participation come just behind in terms of the number of times they were cited. The lack of access to long-term funding is also cited as a challenge more than 30 times.

Unemployment and poverty, as well as the lack of alternative income opportunities, are other

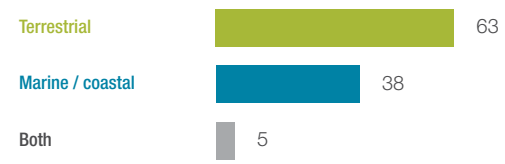

Figure 30. Number of solutions relating to marine/coastal and/or terrestrial protected areas. Compiled by the report editors.

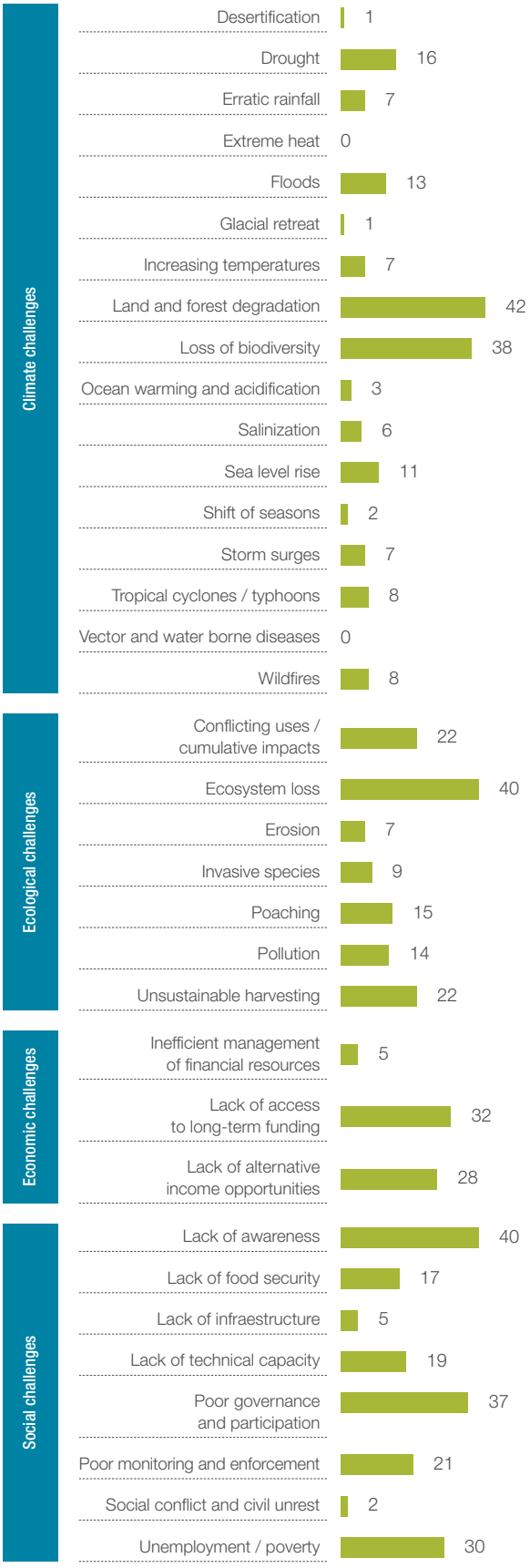

Figure 31. Number of mentions across the solutions for each challenge category. Compiled by the report editors.

commonly addressed issues, followed by unsustainable harvesting, including overfishing, and conflicting uses or cumulative impacts (*see* **Figure 31**). On the other hand, glacial retreat, vector/water-borne diseases, desertification and extreme heat are the least frequently targeted challenges.

Mangrove and wetlands (swamp, marsh, peatland) are the most common ecosystems among the solutions: these ecosystem categories are covered in 34 and 36 solutions, respectively. Coral reef, river/stream, seagrass and tropical evergreen forest are the next key ecosystems covered by the case studies: around a quarter of all solutions relate to one of these ecosystems. Orchard, coastal deserts, cold deserts, area-wide urban development and urban wetland each appear in just one solution. Finally, none of the solutions relate to three ecosystems that are categorised under urban ecosystems and built environments, namely buildings and facilities; connective infrastructures, networks and corridors; and green roofs/walls (*see* **Figure 32**).

Process

The *alliance and partnership development* building block category features most frequently (115 times), closely followed by *education, training and other capacity development activities* (98). *Communication, outreach and awareness building and collection of baseline and monitoring data and knowledge* are also important domains for building blocks, according to the solution providers, with 92 and 84 occurrences respectively. At the other end of the spectrum, *enforcement and prosecution* (19) and *legal and policy frameworks, policy advocacy* (36) are the building block categories that are the least cited (**Figure 33**).

The vast majority of the solutions are implemented at either local scale (45, around 43%) or at multiple scales (37, or 36%). All of the latter solutions include the local scale, with the exception of one case that is implemented at the national and multi-national scales. This means

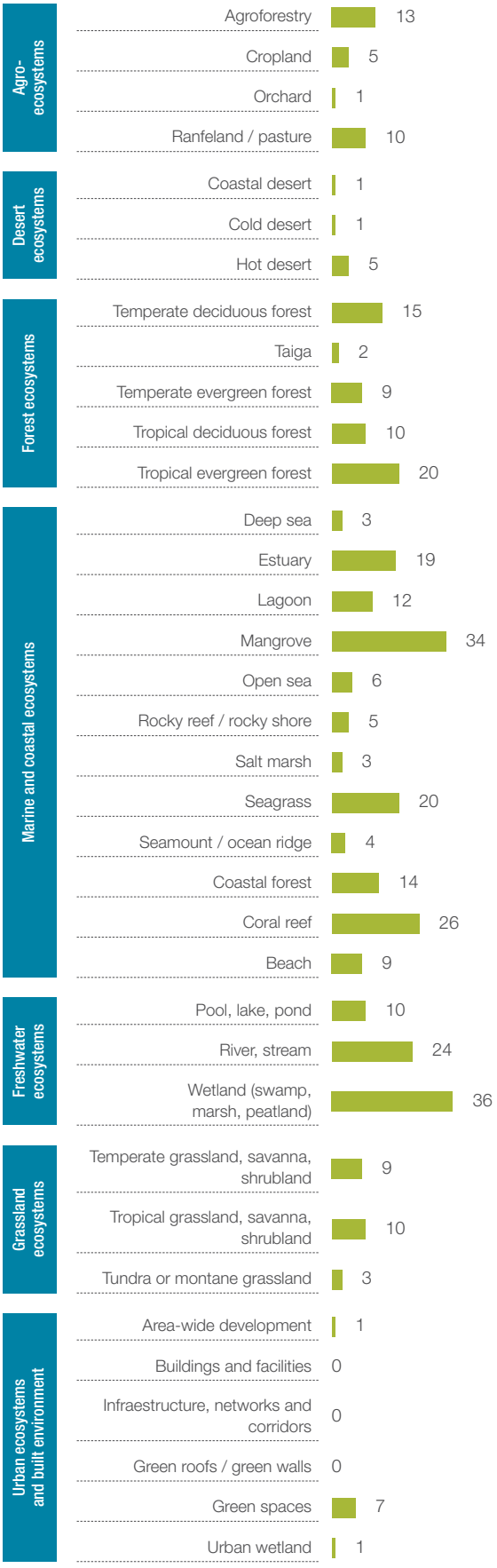

Figure 32. Number of solutions per ecosystem category. Compiled by the report editors.

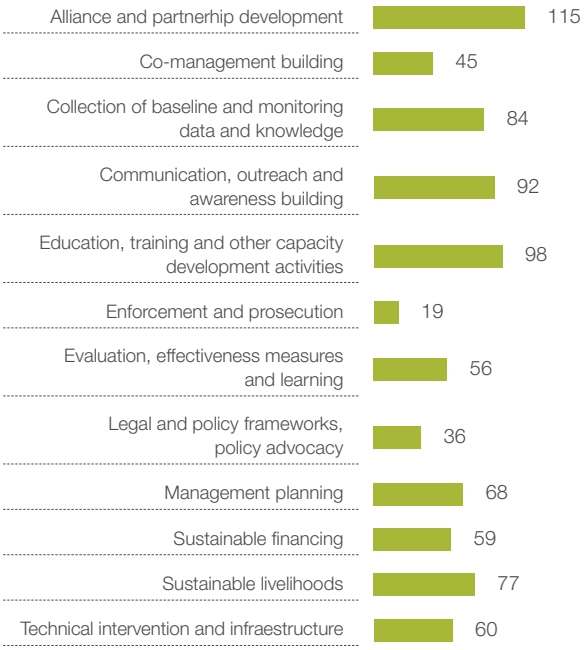

Figure 33. Number of building blocks per building block category across all solutions. Compiled by the report editors.

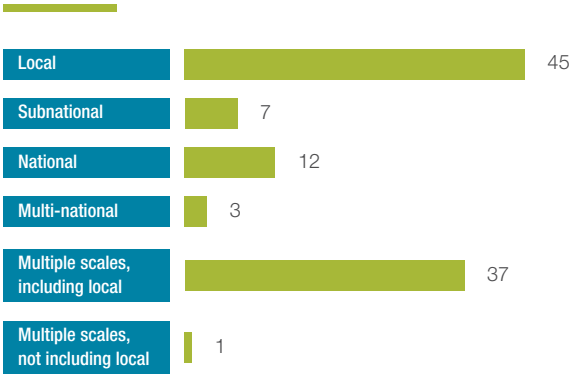

Figure 34. Number of solutions per 'scale of implementation' category. Compiled by the report editors.

that 78% of the solutions include the local scale. Case studies implemented either at the national scale, at the sub-national scale or at the multi-national scale together account for around one-fifth of all solutions (*see* **Figure 34**).

IMPACTS

The terms most frequently used when describing the solutions' impacts are *community/communities* (150x), *area/areas* (121x),

Figure 35. Word cloud of most frequently mentioned terms in the impacts descriptions for all solutions. Compiled by the report editors.

Figure 36. Word cloud of most frequently mentioned terms in the beneficiaries descriptions for all solutions. Compiled by the report editors.

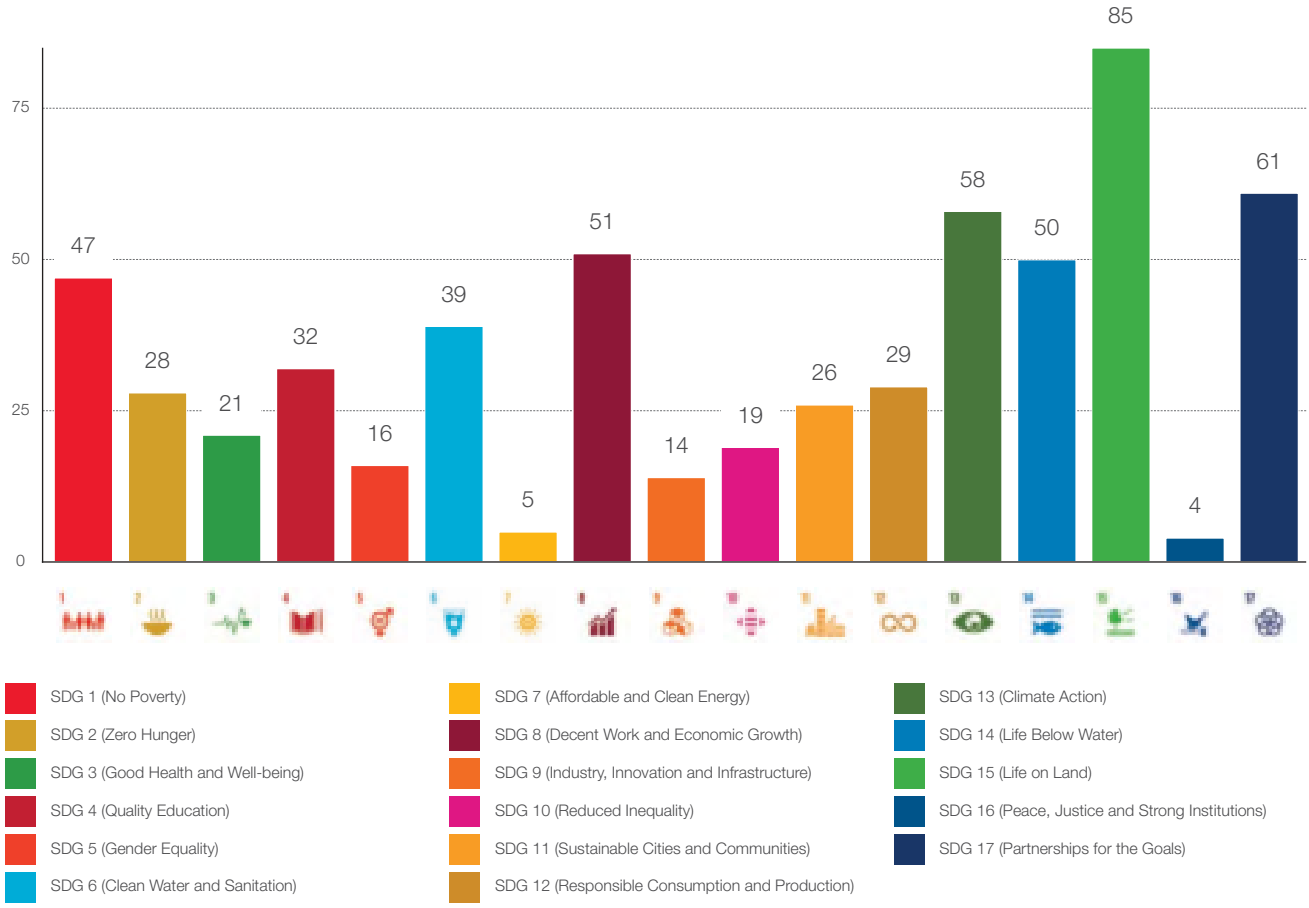

Figure 37. Number of solutions contributing to each of the SDGs (NB: a solution generally contributes to multiple SDGs). Compiled by the report editors.

local (120x), *management* (91x), *conservation* (88x), *through* (77x), *water* (72x), *other* (48x), *increased* (48x) and *protected* (47x). Other frequently mentioned references to ecosystems and their components include *forest* (46x), *species* (45x), *mangrove* (35x) and *wildlife* (34x). *Climate* (47x) and *biodiversity* (35x) are also frequently used terms. Keywords that refer to human aspects, and not yet mentioned above, mostly include *people* (41x), *tourism* (40x), *activities* (40x), and *benefits* (38x) (**Figure 35**).

Community/communities (99x) and *local* (69x) are the words used most frequently to describe the beneficiaries of the solutions. As specific groups, the term *farmers* (16x) comes first, followed by *indigenous* (13x), *fishermen* (12x) and *women* (10x). *Tourism* (13x) is the most frequently mentioned sector of activities cited as benefiting most from the good practices implemented (**Figure 36**).

The portfolio of solutions covers the whole spectrum of the 17 SDGs (*see* **Figure 37**). Naturally, all of the solutions contribute to SDG 14 (Life Below Water) and/or SDG 15 (Life on Land), since these two SDGs are specifically focused on the protection and sustainable use of terrestrial, coastal and marine ecosystems, and conservation of biodiversity is always the primary management purpose of protected areas. Therefore, any protected area solution will be relevant to one or both of these goals.

SDG 15 (Life on Land), SDG 17 (Partnerships for the Goals), and/or SDG 13 (Climate Action) are

those to which the largest number of solutions contribute. Furthermore, many of the solutions are cited as contributing to SDG 8 (Decent Work and Economic Growth) and SDG 1 (No Poverty).

The least frequently mentioned SDGs among the solutions are SDG 7 (Affordable and Clean Energy) and SDG 16 (Peace, Justice and Strong Institutions), together appearing in a total of nine case studies that make a significant contribution.

Recalling the hierarchy of the global goals, as illustrated by the "wedding cake" graphic (*see* **Chapter 1**), we note that the SDGs that constitute the foundational "biosphere" dimension that underpins all other goals, i.e. SDGs 6, 13, 14 and 15, are mentioned 232 times across all solutions (noting that one solution can contribute to multiple SDGs). Within this dimension, SDG 15 (Life on Land) is most frequently mentioned, followed by SG 13 (Climate Action) and SDG 14 (Life Below Water).

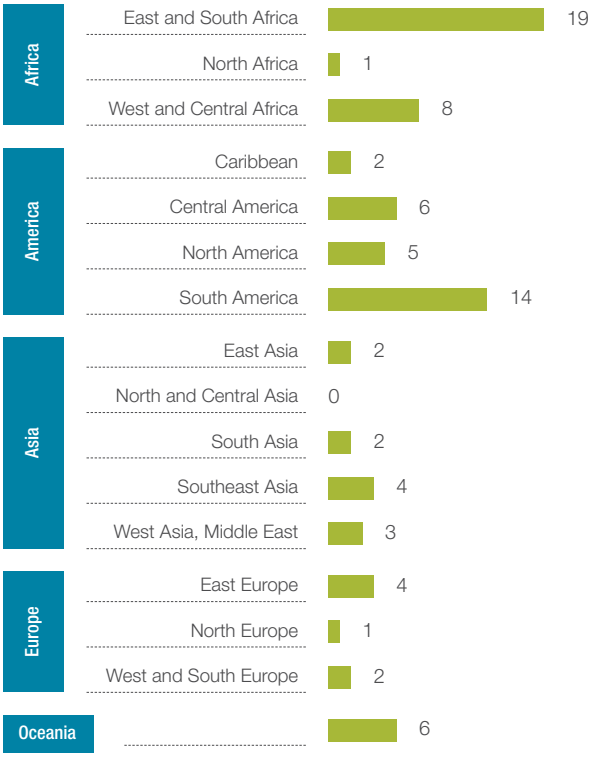

Figure 38. Distribution of terrestrial solutions across regions. Compiled by the report editors.

Figure 39. Distribution of terrestrial solutions across regions. Map compiled by the graphic designer, using data from the report.

Among the SDGs within the "society" dimension (i.e. goals 1, 2, 3, 4, 5, 7, 11 and 16), SDG 1 (No Poverty) comes first, followed by SDG 4 (Quality Education).

SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production) are the most frequently targeted SDGs from the "economy" dimension (which includes goals 8, 9, 10 and 12).

Finally, SDG 17 (Partnerships for the Goals), the enabling and transcendental goal, is targeted by 61 solutions, which places it second in the overall ranking of the most targeted goals.

COMPARING FINDINGS FOR TERRESTRIAL VERSUS MARINE AND COASTAL PROTECTED AREAS

Solutions relating to terrestrial protected areas

Context

The most strongly represented regions in the terrestrial solutions dataset are East and South Africa, as well as South America, which mirrors the overall dataset (**Figures 38 and 39**).

The challenges that are most commonly addressed by the terrestrial protected area solutions are land and forest degradation, loss of biodiversity, unemployment/poverty, lack of public and decision-maker's awareness, ecosystem loss, lack of access to long-term funding, and poor governance and participation. This follows the general trend for the entire dataset (**Figure 40**).

The terrestrial solutions mostly cover freshwater (60) and forest ecosystems (56). More specifically, wetlands (27) are the most frequent habitats, followed by rivers or streams (24) and tropical evergreen forests (20) (**Figure 41**).

Process

Most of the terrestrial solutions cover multiple scales. Among those relating only to one particular scale of implementation, the local level is by far most common. Those terrestrial solutions operating at multiple scales always

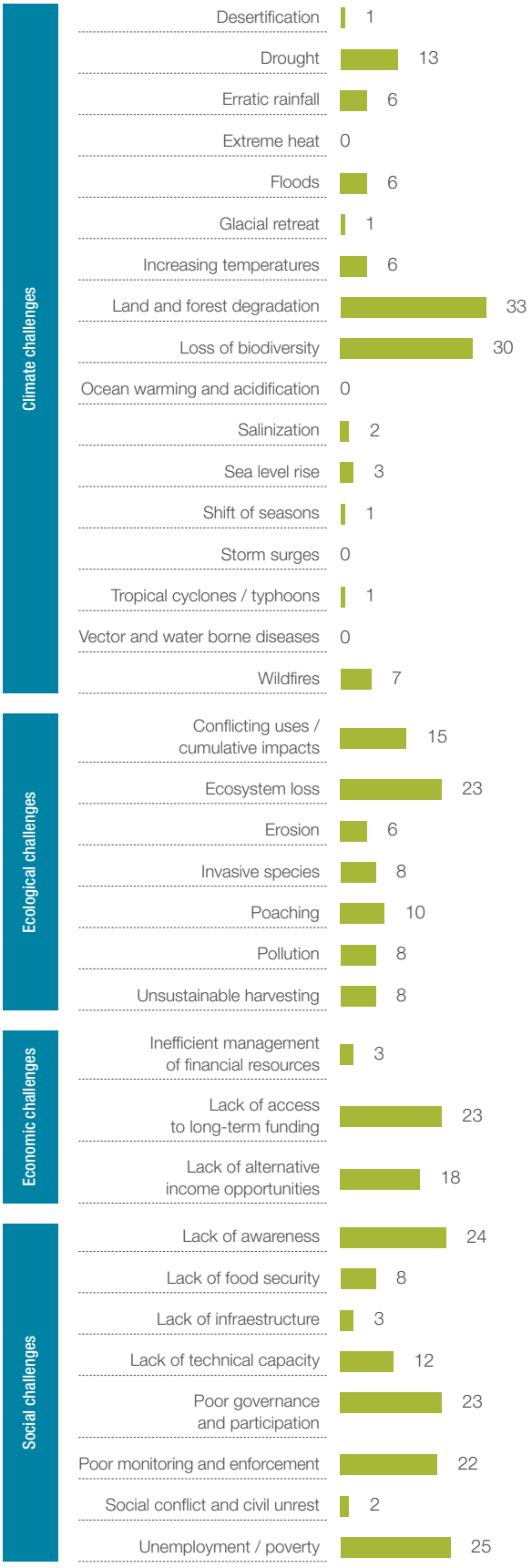

Figure 40. Challenges addressed by the terrestrial solutions. Compiled by the report editors.

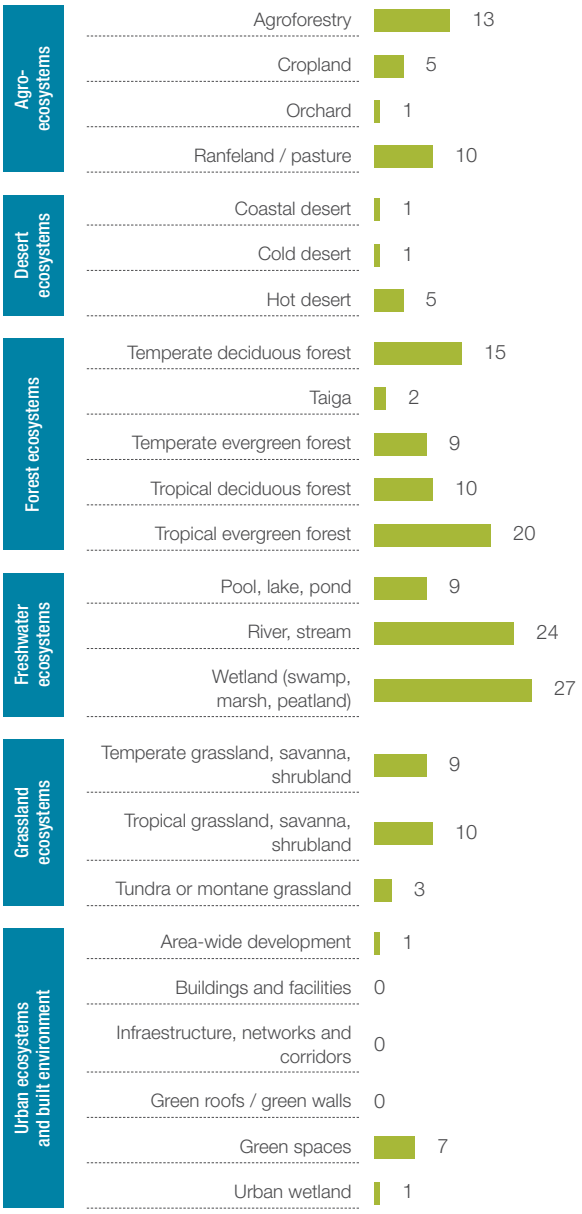

Figure 41. Ecosystems covered by the terrestrial solutions. Compiled by the report editors.

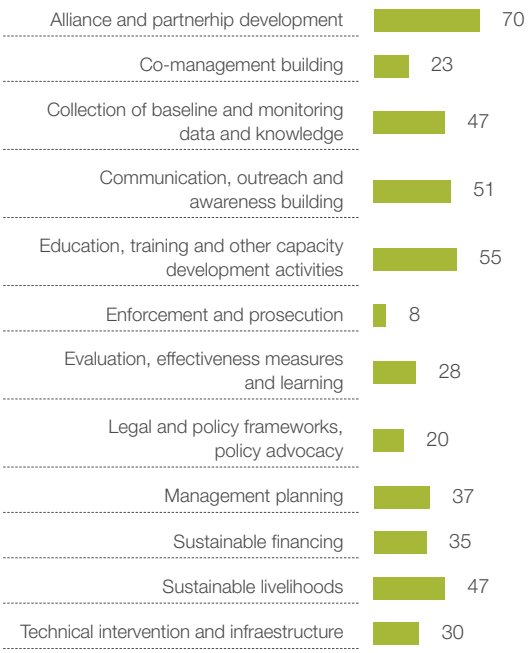

Figure 42. Building block categories within the terrestrial solutions. Compiled by the report editors.

include the local one as well, meaning that over 80% of the solutions relate wholly or partially to the local level, an even higher proportion than for the overall dataset that includes marine and coastal cases.

By far the most commonly named building block category amongst the terrestrial solutions is *alliance and partnership development*, followed by *education, training and other capacity development activities* and *communication, outreach and awareness building*. Again, this is aligned with the general trend for the entire dataset (**Figure 42**).

Impacts

Naturally, the SDG that is by far most frequently addressed by the terrestrial solutions is SDG 15 (Life on Land); this is followed by SDG 17 (Partnerships for the Goals), SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth), SDG 13 (Climate Action) and SDG 6 (Clean Water and Sanitation) (*see* **Figure 43**).

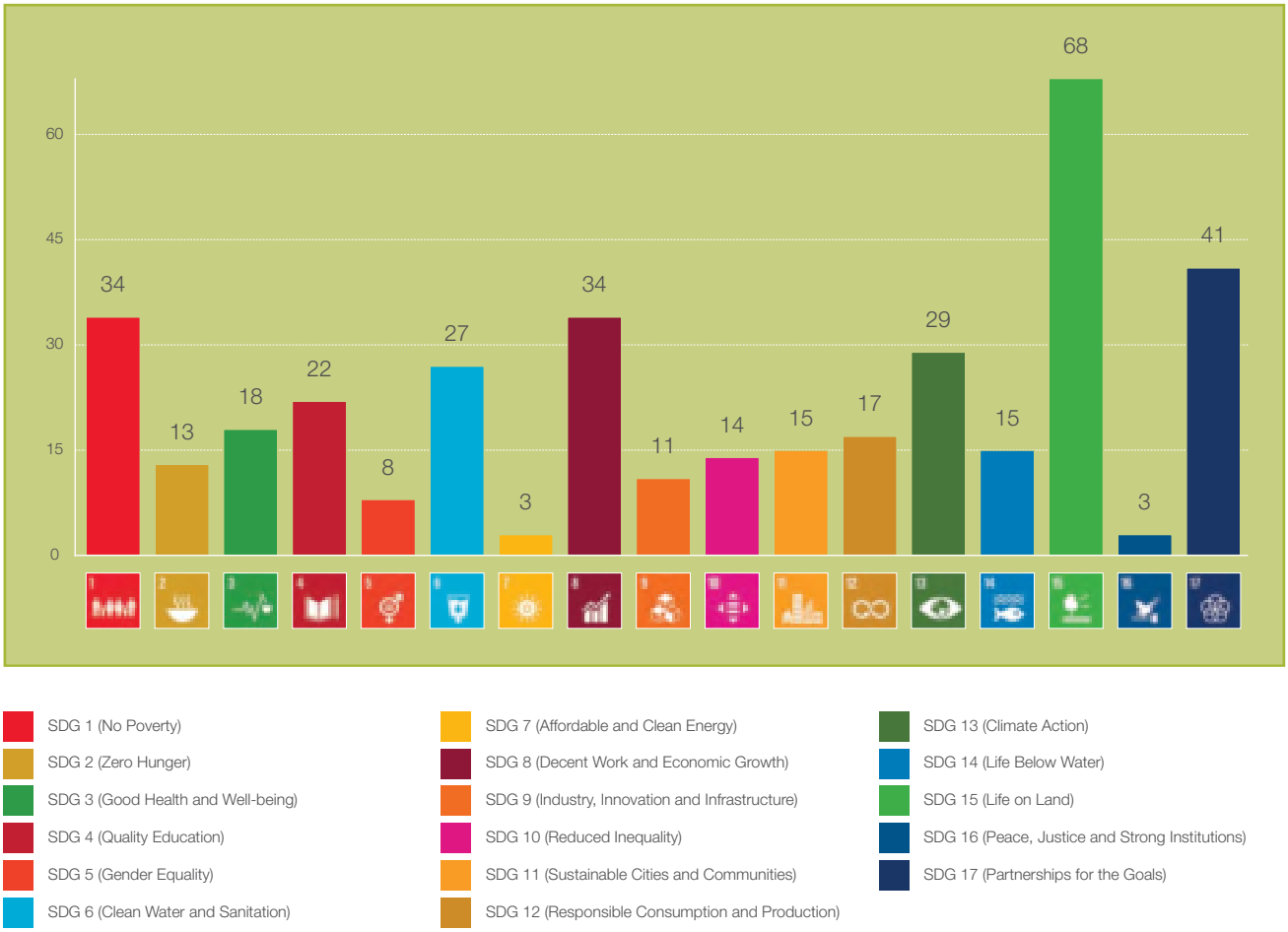

Figure 43. SDGs addressed by the terrestrial solutions. Compiled by the report editors.

Solutions relating to marine protected areas

Context

Most of the solutions relating to marine protected areas come from Southeast Asia, East and South Africa or North America. Southeast Asia is thus represented much more strongly in this subset of solutions compared to the overall dataset (**Figures 44 and 45**).

Process

The most common building block categories among the marine solutions are the same as for the overall data set, i.e. *alliance and partnership development, education, training and other capacity development activities* and *communication, outreach and awareness building* (**Figure 46**).

As for the overall dataset and for terrestrial solutions, the local scale, or multiple scales of implementation, including local, are most common.

Impacts

Not surprisingly, the marine solutions contribute most commonly to SDG 14 (Life Below Water), followed by SDG 13 (Climate Action) and SDG 17 (Partnerships for the Goals), but also SDG 15 (Life on Land) and SDG 8 (Decent Work and Economic Growth) (**Figure 47**).

Figure 44. Regions covered by the marine and coastal solutions. Map compiled by the graphic designer, using data from the report.

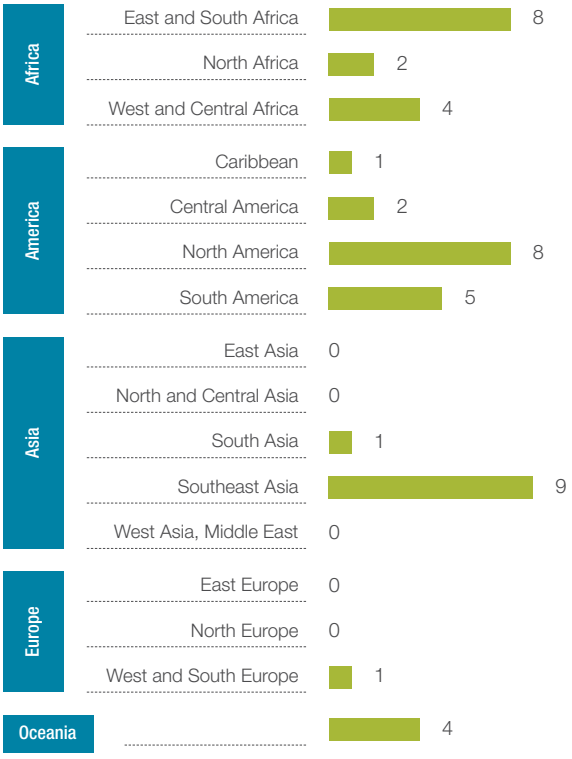

Figure 45. Regions covered by the marine and coastal solutions. Compiled by the report editors.

Figure 46. Building block categories within the marine and coastal solutions. Compiled by the report editors.

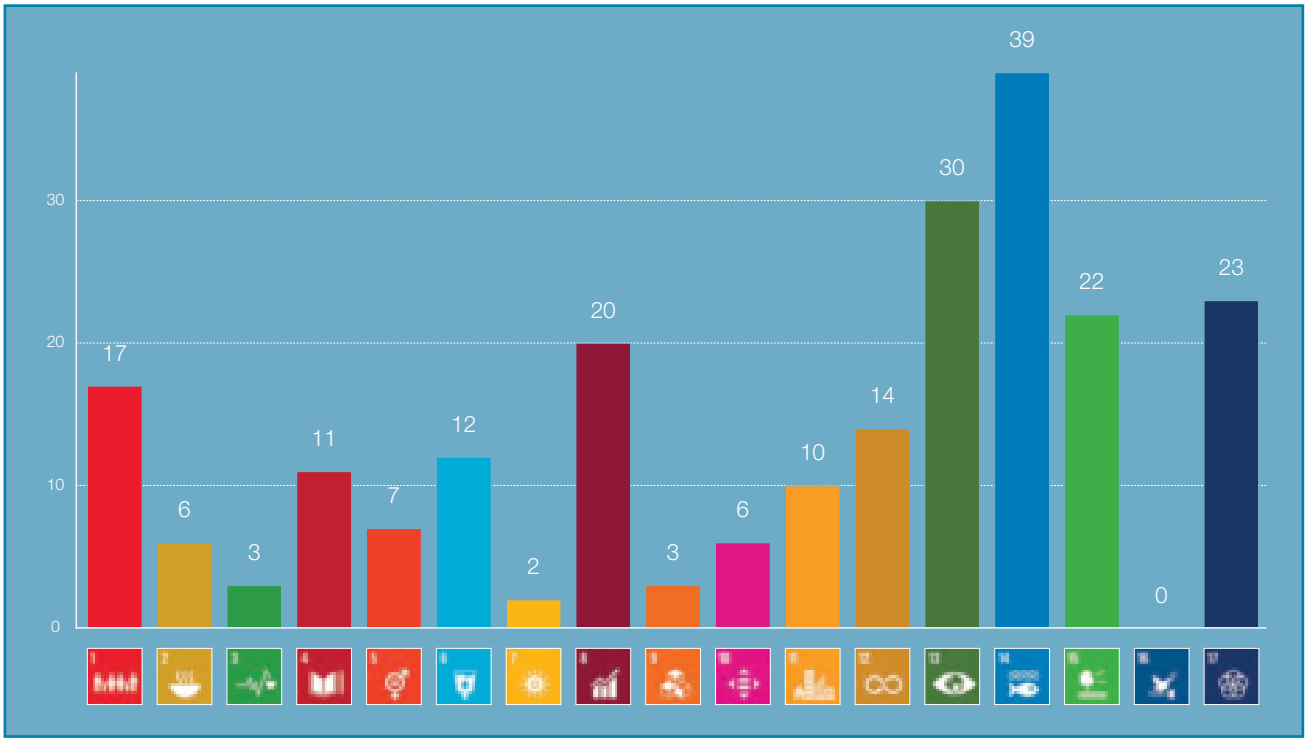

Figure 47. Contributions of the marine and coastal solutions to the SDGs. Compiled by the report editors.

5: Discussion of results, conclusions and recommendations

INTRODUCTION

When the United Nations General Assembly agreed to the Sustainable Development Goals (SDGs) in 2015, care was taken not to present them as a hierarchy, or to imply that some were more important than others. Nonetheless, many commentators have noted that the SDGs are not all created equal, in that meeting many of the SDGs will only be possible if some other SDGs are *also* achieved or are achieved first. And the SDGs most centrally involved with environmental stability – SDG 13 (Climate Action), SDG 14 (Life Below Water), SDG 15 (Life on Land), and SDG 6 (Clean Water and Sanitation), with its emphasis on healthy freshwaters – are recognised as being fundamental to the achievement of most if not all the others. The Stockholm Resilience Centre has developed a diagram of the relationship between the SDGs, with those relating to the biosphere at the base, those concerning society in the middle and finally, at the top and dependent on the others, those more closely related to work and the economy (Ervin, 2019).

The relationships between the various SDGs are not particularly straightforward. There may be tensions between social and environmental goals (Scherer et al., 2018), necessitating a careful reading of individual situations and negotiating trade-offs between two or more legitimate but competing demands. Pressure for economic growth has often undermined attempts to provide decent work, gender equality and responsible consumption, and has been the cause of many environmental problems. Addressing one SDG may exacerbate the problems targeted by another, and it is important that monitoring of individual SDGs also looks at their impact on other goals. Furthermore, approaches that "tick all the environmental and social boxes" may not provide solutions at the scale required (Seddon et al., 2020).

On the other hand, coordinated responses offer the chance to address several SDGs at once. If one considers systems of protected areas, these can provide multiple benefits either at the global and landscape or seascape scale or locally, for stakeholders and rights holders living in and around them. Conservation of biodiversity can support food and water security, and at the same time can help to reduce disaster risk. For instance, mangrove restoration is a conservation priority (related to both SDG 14, Life Below Water and SDG 15, Life on Land) that simultaneously helps build fish stocks (SDG 2, Zero Hunger), stores carbon, and provides coastal protection against storm surges (SDG 13, Climate Action). Savannah protected areas support local communities through ecotourism and employment (SDG 8, Decent Work and Economic Growth), while maintaining unique wildlife (SDG 15, Life on Land), and prevent health-damaging dust storms from dryland (SDG 3, Good Health and Well-Being).

Furthermore, there is an emerging consensus that if we fail to maintain the integrity of natural ecosystems, we will undermine the foundation for achieving social and economic goals as well.

In 2015, the Rockefeller-Lancet Commission on Planetary Health issued a stark warning:

> *"We conclude that the continuing degradation of natural systems threatens to reverse the health gains seen over the last century. In short, we have mortgaged the health of future generations to realise economic and development gains in the present."* (Whitmee, 2015)

In a commentary on the commission's findings, a link between forests, poverty and child health was explored by combining several global datasets, which showed strong links between the poorest children, forest loss, and three childhood diseases: diarrhoea, anaemia and stunting. The authors reported that "as the amount of upstream forest cover increases, the benefits for the poor increase, particularly for those poor households without access to improved water sources." (Fisher et al., 2019) In 2020, the World Economic Forum for the first time identified all five of the "top risks" in its annual *Global Risks Report* as being linked to ecosystem breakdown. The five were extreme weather, climate action failure, natural disasters, biodiversity loss, and human-made environmental disasters (WEF, 2020).

The current COVID-19 pandemic has highlighted the links between ecosystem degradation and the spread of zoonotic diseases (Plowright et al., 2017), the risks of pathogen spillover during land conversion (Faust et al., 2018), and the likely sites of emergence of new disease spillover (Allen et al., 2017). These are just three examples of the multiple links, as noted above, between environmental breakdown and disease (Cook et al., 2004), which can be addressed through effective maintenance of the integrity of natural ecosystems without human disturbance (MacKinnon et al., 2019).

Unfortunately, recognition of the key role of the "biosphere SDGs" has not translated into widespread investment in the maintenance of natural ecosystems. Quite the reverse. In an independent analysis of progress towards the SDGs published in 2019 (Sachs et al., 2019), the report's authors noted that "countries obtain their worst scores on SDG 13 (Climate Action), SDG 14 (Life Below Water) and SDG 15 (Life on Land). No country obtains a 'green rating' (synonym of SDG achieved) on SDG 14 (Life Below Water)." Achievement of all the SDGs is therefore threatened by widespread failure to address ecosystem collapse and climate change. Reversing this trend requires a fundamental shift in governmental and wider societal priorities.

In this context, the meta-review of PANORAMA solutions is important. PANORAMA includes currently the world's largest case study portfolio on the role of protected areas in delivering practical benefits from ecosystem services, allowing important lessons to be learnt about how protected areas are contributing to the SDGs, and to which SDGs, and also pointing the way forward to where they might contribute more in the future.

DISCUSSION OF RESULTS

Context

Regions and general remarks on representativeness of results

Although there is doubtless some reporting bias, the PANORAMA solutions show some of the history of protected areas in the regions included. For example, it is well known that countries in South and Central America have led the way in developing payment for ecosystem services schemes, involving water services from forests and other ecosystems (Hamilton, 2008) and that Australia launched the global *Healthy Parks, Healthy People* programme (Parks Victoria, 2015). This also suggests that PANORAMA is picking up some of the most important examples from around the world and that review and synthesis across them can provide important insights, highlighting trends and providing a basis for recommendations to inform future developments, as well as priorities for protected area management and funding.

However, as noted, the PANORAMA case study portfolio is not a random selection of sites; it relies on information supplied voluntarily and is further influenced by donor priorities, meaning that it is likely

PANORAMA includes currently the world's largest case study portfolio on the role of protected areas in delivering practical benefits from ecosystem services, allowing important lessons to be learnt about how protected areas are contributing to the SDGs.

to be distorted towards certain countries and regions. The information is, therefore, of limited use in drawing overall conclusions about global trends but is more valuable in discerning what makes an intervention successful in its own context. Geographically, data are skewed towards the global South and to the tropics, particularly towards eastern and southern Africa, South America, and Mexico, which together currently supply around 90% of the solutions on PANORAMA. Similarly, there is bias in the geographical focus on particular SDGs, with examples from Africa focusing mainly on SDG 1 (No Poverty), Mexico, Central and South America on SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action), and Asia focusing on SDG 17 (Partnerships for the Goals). Examples from Oceania, particularly Australia, are biased towards health issues, and marine-related solutions are most commonly from Southeast Asia.

Challenges addressed

Protected areas are almost always established for particular conservation objectives or to address particular challenges, and contributions to SDGs need to be seen against this backdrop. Many of the challenges facing these sites are similar and well known. Those most commonly mentioned across the solutions in this publication include land degradation, and particularly forest loss and degradation; loss of biodiversity; and general destruction of ecosystems. Other immediate challenges facing protected area managers include lack of awareness among both decision-makers and the wider public, poor governance at national or local levels, and lack of participation by affected rights holders and stakeholders; and, virtually always in these regions, lack of access to secure, long-term funding. Many of the most commonly-mentioned challenges are social and economic in origin. Unemployment, poverty and lack of any other way of making a living are closely linked to pressures to exploit ecosystems directly for resources or for trade, which continue to increase in many areas. So, SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth, as it relates particularly to employment), SDG 10 (Reduced Inequalities), and SDG 17 (Partnerships for the Goals, often virtually ignored in discussions about the SDGs) are all particularly closely linked to success or failure in these areas. This highlights a theme that emerges throughout this summary of case studies in PANORAMA: getting conservation right means first getting the contextual governance, social and economic issues right.

Ecosystems

The geographical bias of the PANORAMA portfolio inevitably means that there is also some bias in the range of ecosystems represented. Mangroves and wetlands, including swamps, marshes and peatland, are the ecosystems most frequently found among the solutions, not surprisingly as they are threatened in many parts of the world (Duke et al., 2017) and also supply multiple ecosystem services (Hutchison et al., 2014). Next most frequently mentioned are a range of tropical marine and terrestrial systems including coral reefs, seagrass beds and tropical evergreen forests; together these make up about a quarter of the database. In contrast to a general bias towards terrestrial conservation, the portfolio has strong representation from marine projects and initiatives, some 36% of all solutions included in this report. This is in part because, during the initial phase of building the PANORAMA solutions portfolio, there was a strong emphasis on collecting marine and coastal examples through the *Blue Solutions* project (GIZ, 2013).

Mangroves and wetlands, including swamps, marshes and peatland, are the ecosystems most frequently found among the solutions, not surprisingly as they are threatened in many parts of the world (Duke et al., 2017) and also supply multiple ecosystem services (Hutchison et al., 2014).

There are relatively fewer solutions from temperate regions and their ecosystems, almost certainly due to the reporting bias mentioned above, and very few solutions from urban protected areas, with the limited number that do exist relating mainly to SDG 3 (Good Health and Well-Being). This is unsurprising but also slightly concerning. Development agencies and other donors have traditionally focused investments on high biodiversity ecosystems, particularly those facing the highest levels of threat and being critically important to humans, such as forests and coastal ecosystems. Additionally, there is an aspect of 'fashion' in terms of how conservation priorities are decided upon. Some other valuable ecosystems, including grasslands, savannahs and drylands, have tended to be sidelined as a result. Ecosystems of the high seas have been neglected as well, although this is due to a different set of reasons, related to the complex legal status of these areas. A call for more examples of successful conservation initiatives in some of these ecosystems would be a valuable next step for PANORAMA.

There is also some concentration with respect to the SDGs targeted in relation to different ecosystems. Marine ecosystem examples relate particularly to SDG 2 (Zero Hunger) and SDG 13 (Climate Action). In the latter case, this includes a lot of examples relating to mangroves and particularly mangrove restoration. Similarly, many of the examples from freshwater ecosystems relate to SDG 6 (Clean Water and Sanitation) and the use of natural ecosystems to supply plentiful supplies of pure water. The relationship between forests, water and ecosystem services is now well recognised (Hamilton, 2008) and is obviously attracting a lot of donor attention, but other ecosystem services – such as the role of dryland vegetation in slowing soil erosion, desertification and dust storms – get less

Hunan Badagongshan National Nature Reserve, China. © Hunan Badagongshan National Nature Reserve, China.

attention. The latter also have major human health impacts with, for instance, wealthy countries like Kuwait experiencing high levels of childhood asthma due to the poor air quality as a result of dust (Al-Dousari, 2009).

PROCESS

Building blocks

The review found that, out of the 809 building blocks that make up the solutions included in this publication, the highest number of building blocks fall in the *alliance and partnership development* category, closely followed by those related to *education, training and other capacity development activities*. In the former category, the term *governance* features repeatedly, with the design and implementation of participatory approaches with stakeholders also being a regular feature. Another important enabler was *communication, outreach and awareness building*, the next highest building block category. These results suggest that the key to success is more about reaching a broad consensus among local people to whom a programme or protected area brings real benefits than it is about a strong-arm approach to enforcement or an emphasis on technical innovation. In doing so, the results provide important guidance for those setting up new protected areas or managing existing sites, suggesting the need for detailed and probably lengthy negotiations before deciding on a way forward. This is not necessarily easy in situations where pressures are acute, and there is the need for urgent action but imposing a solution without getting local people on side is likely to lead to long-term problems in its implementation. It is important also for donor agencies to bear this in mind, i.e. allowing for sufficient consultation at project planning and inception phase, as well as adaptive management during implementation, rather than imposing rigid frameworks.

However, achieving this is very difficult unless there is clear information about what has succeeded or failed, and a good monitoring system is needed for this. From the experience with the PANORAMA portfolio of projects, it seems as if more people and organisations are starting to recognise this important factor for success.

A deeper look into individual examples found that building blocks related to educational and capacity-building aspects often involved supporting the development of very basic skills, including building the literacy and capacity of local actors such as fishers, small-scale farmers, and local people's organisations, targeting both individuals and institutions. Action learning and training were also important, focusing both on skills particularly linked to protected area management, such as patrolling and enforcement, and on techniques like mangrove restoration or the use of tree nurseries. All these issues will have implications for both conservation and sustainable development. Patrolling against poaching protects wild plants and animals of course (SMART Partnership, n.d.) but, in many cases, communities also need these skills to protect their fishing, hunting or gathering grounds, or to stop poachers moving into communities, threatening families and disrupting society (IUCN SULi, IIED, CEED, Austrian Ministry of Environment and TRAFFIC, 2015). Restoration activities have clear conservation value but can also help to protect communities against natural disasters, such as the role of forests on mountain slopes or coastal vegetation in ameliorating floods or storm surges (Dudley et al., 2015). They can also provide a sustainable source of raw materials and foods, for instance, the role of mangroves in providing safe and nursery areas for fish (Hutchison et al., 2014). Furthermore, in remote rural or coastal communities, the capacity needs are often still quite simple: basic literacy and the ability to use a mobile phone can help a fishing community to learn the price for fish in

centres of population and thus avoid being swindled by middlemen and traders.

Interestingly, *collection of baseline and monitoring data and knowledge* was also one of the commonest building block categories, highlighted in many solutions affecting multiple SDGs. Monitoring is one of the first aspects of management to be cut when, as so often happens, protected areas face a budget shortfall, but this is really a false economy. Experience shows (McShane and Wells, 2004) that a good monitoring system is one of the most important elements in any substantial conservation or development project. Nothing works perfectly the first time around, and good projects use adaptive management to address problems, correct for changing conditions, and integrate lesson learning into ongoing programmes. However, achieving this is very difficult unless there is clear information about what has succeeded or failed, and a good monitoring system is needed for this. From the experience with the PANORAMA portfolio of projects, it seems as if more people and organisations are starting to recognise this important factor for success.

The solutions recognise the need for sustainable funding to support protected areas, so it is no surprise that there is a heavy emphasis on this in the building blocks, with close links to SDG 17 on partnerships. Building blocks relating to strengthening *sustainable livelihoods* also occur frequently, which is the other side of this issue, linking to both poverty (SDG 1) and employment (SDG 8), and suggesting, as mentioned above, that projects need to consider immediate human needs alongside biodiversity or ecosystem needs.

Conversely, those building blocks least frequently cited are those falling into the categories of *enforcement and prosecution*, and *legal and policy frameworks, policy advocacy*. This result is particularly interesting because it runs counter to the way in which many protected areas agencies (regarding enforcement), NGOs (regarding policy advocacy) and donors prioritise their efforts. While it must be stressed that most of the solutions in this report relate to individual protected areas rather than national protected area policy, it nonetheless suggests that putting greater effort into negotiating agreements and succeeding in the social elements of conservation is often more useful than simply trying to instigate conservation by force. (These general conclusions are not intended to denigrate the tough and often dangerous work carried out by rangers in those protected areas that are a focus of the illegal wildlife trade and where enforcement is, indeed, often a critical priority.)

An overarching observation on process is that many of the 106 solutions illustrate that success was achieved through careful engagement of a broad group of people over longer periods of time, allowing for flexibility throughout all stages of implementation.

Scale of implementation

Not surprisingly, most of the solutions reported on PANORAMA are working at a local scale (71% of solutions include the local scale), although a significant number operate at multiple scales. This may be a function of the framing of the PANORAMA initiative itself, which deliberately seeks to promote locally led approaches. It also relates to the fact that most solutions published on the PANORAMA platform relate to projects or longer-term initiatives of conservation NGOs and international organisations, which often are implemented at local level. But it also illustrates a reality well known to most people involved in the management of protected areas: that national or global approaches can tell us a certain amount about how to react in any given situation but inevitably have their limitations. Most issues need to be addressed at the scale of an individual site or community and will be tailored to an individual situation. It is nonetheless interesting to see broader solutions being presented, such as national plans for particular species, software development, and capacity-building programmes. It will be interesting to see whether the balance between local and wider scale solutions changes in the future as the overall solutions portfolio grows. Indeed, it would be good to see the inclusion of more broad-scale programmes, such as national policy frameworks, regional initiatives (such as moratoria on clearing certain endangered habitats) and transnational initiatives.

Jasper National Park, Canada. © Tim Gouw. Unsplash.

IMPACTS

Impacts section of the solution template

Summary of some keywords helps to draw up a picture of what the various solutions published on the web platform are trying to influence.

The most frequently cited key words to characterise the solutions' impacts are *community/communities* (155 occurrences), *local* (117), *area/areas* (114), *management* (86) and conservation (84). The fact that *community/communities* is by far the most commonly appearing term in the impacts section also reinforces the earlier conclusion that the priority is often to work closely with local communities in finding mutually satisfactory options for management of protected areas, if there is to be a reasonable chance of success. The second commonest word is *local*, which refines this general point further by showing that, however important the views of more distant stakeholders, ultimate influence usually lies mainly in the hands of those closest to the site and it is reassuring to see that many of the positive impacts are also being seen here.

A number of ecosystem-related words tell us something about priorities of management. It is perhaps significant that *water* is the most common of these, with 65 occurrences. Water security is an issue that everyone can relate to, particularly as pressures from climate change, rapid urbanisation, soil salinisation and growing per capita demands for water place many national water strategies under stress. The role of protected areas in addressing water supply has long been recognised; it is the ecosystem service most successfully integrated into payment for ecosystem services schemes. This may change in the future as carbon capture systems such as REDD+ are increasingly implemented, but the latter has been a slow starter despite a great deal of publicity (Millbank et al., 2018), and it is

perhaps significant that it does not feature more here. Other ecosystems that emerge repeatedly are *forests* (49) and *mangroves* (32), while, not surprisingly, *species* (45), *wildlife* (38), and *biodiversity* (34) are also frequently used terms. *Climate* (44) is also commonly referred to for a range of different reasons, both as a target of management and because protected areas can supply solutions to some of the challenges posed by a rapidly changing climate.

Keywords that refer to human aspects are mostly characterised by *people* (43), *activities* (41), *benefits* (40) and *tourism* (33). The importance of people is to be expected from everything that has been said before, along with an increasing emphasis on the benefits that protected areas can and do supply. A major failing of many protected areas has been the insufficient emphasis given to management and understanding of these benefits; indeed, many managers have only a fairly vague idea of what local people most value from the sites that they manage, which inevitably hampers their efforts at reflecting these in management plans.

A resulting key recommendation is to involve experts with a social science background in protected area management, ideally by hiring them as staff. Successful engagement of different stakeholder groups, to ensure their active participation and support to a site, requires a different skill set than that of biologists, foresters or other natural scientists, who traditionally constitute protected area staff.

Tourism remains a critical element, but the COVID-19 pandemic has crystallised existing fears that this is a complicated type of benefit, providing valuable funds but also encouraging some of the very things that are undermining the environment, including frequent long haul travel. Tourism is also subject to anything that affects the security of travel, including conflict, and the impacts of epidemic disease transmission, with consequent impacts on the revenues and related employment. Domestic tourism appears to be much more secure, but for some developing countries, most inhabitants currently have neither the money nor the interest in ecotourism to be major supporters of protected areas. For these countries, building domestic interest in wildlife, protected areas, and the natural and cultural heritage of countries is one of the most urgent tasks. That said, based on various analyses of COVID-19 impacts on tourism, "it is fair to assume that nature will be explored more in the post-COVID-19 era, and protected areas might expect a significant rise in the number of visitors, particularly by domestic tourists. This will have advantages but also side effects and will require more responsible management of negative impacts to find new solutions, to build a more sustainable tourism in Natural Areas, and to improve resilience to future shocks and instabilities." (OECD, 2020).

The emphasis on local communities is not simply a way of neutralising any complaints they might have about a protected area, but that the emphasis is shifting to making them positive stakeholders and thus supporters.

Beneficiaries

In line with the main findings above, it is perhaps no surprise that *communities* and *local* are the two words most commonly used to describe the beneficiaries of interventions assessed here. Not surprising, but worth noting nonetheless, it shows that the emphasis on local communities is not simply a way of neutralising any complaints they might have about a protected area, but that the emphasis is shifting to making them positive stakeholders and thus supporters. However, the words are also rather vague and open to a wide degree of interpretation; and a wide variety of different groups may be included. Among terms used to describe specific groups of beneficiaries, *fishermen* (17) is the commonest, followed by *farmers* (13), *indigenous* (12) and *women* (9). This suggests a bias in projects; recognition of both the

The overall conclusion most pertinent to the subject of this report, that protected areas are already contributing to all of the UN Sustainable Development Goals, is important. It provides governments with something additional to report on in their feedback on the SDGs, strengthens the position of protected areas in consequence, and provides additional arguments for further expansion of protected land and sea in national and global conservation strategies.

plight of many coastal communities and the positive role that marine protected areas can play in rebuilding fish stocks (Côté et al., 2001) has led to a plethora of different initiatives. It also again reflects the strong focus in the PANORAMA portfolio on marine and coastal solutions, linked to "solution collating" efforts under the *Blue Solutions* project. Farming sits less comfortably with the way in which most tropical protected areas are run, although mixing livestock and wildlife in African conservancies is becoming increasingly commonplace and can be successful (Ogutu et al., 2017). It is surprising that relatively few of the projects mention indigenous peoples explicitly, given the huge amount of territory that they manage (Garnett et al., 2018) and their presence in so many protected areas. Specific gender-focused interventions have become more common, perhaps particularly since gender was highlighted in SDG 5 (Gender Equality), although they remain a small proportion of the total and it is still too early to tell whether these are primarily 'add-on' projects or whether gender rights are becoming integrated more centrally into national protected area policies.

Looking beyond people to sectors, tourism, with 13 mentions, is the sector of activities that benefits most from the good practices implemented, which is in line with earlier parts of this effort.

Contributions to the SDGs

The final section of the case study review and synthesis is, in the context of this report, also the most important. How do the multitude of examples reviewed relate to individual Sustainable Development Goals, and what does this mean? IUCN has argued for some time that protected areas have the potential to contribute to all the SDGs (Dudley et al., 2017), and the portfolio of solutions bears this out.

It is no surprise that SDG 15 (Life on Land) and SDG 13 (Climate Action) are among the goals that benefit most from the solutions considered. Much more surprising is that SDG 17 (Partnerships for the Goals) is among the front runners, with 63 mentions. SDG 17 sometimes gives the impression of being a goal tacked on at the end, with a ragbag of aims relating to finance, trade, technology, capacity building and a range of systemic issues, which include a heavy emphasis on partnerships of many kinds, including multi-stakeholder partnerships. The emphasis here is on the partnership side and it is an interesting demonstration of how far protected area processes have advanced in the last 15 or 20 years that this should feature so prominently in terms of management attention. As outlined in chapter 1 and throughout chapter 3, reconciling competing demands to achieve a range of societal benefits alongside nature conservation in protected areas is complex and requires partnerships across sectors. The importance of SDG17 across the case studies also speaks to the issue of mainstreaming protected areas across sectors to effectively deliver on a range of demands.

Recalling the hierarchy of global goals shown in the "wedding cake" graphic from the Stockholm Resilience Centre in Chapter 1, it is unsurprising and reassuring that SDG 6 (Clean Water and Sanitation), SDG 13 (Climate Action), SDG 14 (Life Below Water) and SDG 15 (Life on Land) are together mentioned 241 times across all solutions (noting that one solution can contribute to multiple SDGs). The additional and welcome emphasis on socio-economic benefits from protected areas should not be at the expense of fundamental

conservation values. As noted above, unless we get the biosphere targets right, the others are almost bound to fail, and as protected areas are the cornerstone of most national conservation strategies, this emphasis is absolutely correct. SDG 15 (Life on Land) was the most mentioned, followed by SDG 13 (Climate Action) and then SDG 14 (Life Below Water); it is worth mentioning that despite the heavy emphasis on fishers, ocean conservation still lags behind terrestrial conservation, even though threats to marine life are arguably even more severe. Furthermore, many marine solutions also cross over to terrestrial habitats (SDG 14 and SDG 15), in large part because of the emphasis on mangroves. Mangrove ecosystems urgently need conservation and restoration, but it is slightly worrying that wider issues, and particularly high seas conservation, still receive so little attention.

Among the SDGs within the society dimension (i.e., SDGs 1, 2, 3, 4, 5, 7, 11 and 16; almost half the SDGs), SDG 1 (No Poverty) comes first, followed by SDG 4 (Quality Education). Many protected areas in the tropics are now expected to report on their contributions to poverty alleviation, and this can be challenging, particularly in places where poor governance quality and weak rule of law makes it likely that any profitable enterprises that do develop will be dominated by a powerful minority (Dudley et al., 2010a). It is interesting, and heartening, to see a concerted series of projects trying to break this cycle and ensure that local people can use the ecosystem services and tourism potential of protected areas in their neighbourhood as a way of building sustainable livelihoods.

Notwithstanding what has just been said about poverty alleviation, protected areas are unlikely to feature to a major extent at the top of the wedding

Seal in Norway. © Gregoire Dubois.

cake, in the economy dimension. Of the solutions that do contribute to that dimension, the focus on SDG 8 (Decent Work and Economic Growth) is to be expected, but the number of projects relating to SDG 12 (Responsible Consumption and Production) is slightly more surprising.

Cross linkages are important between the SDGs, both to maximise efficiency and to avoid the kinds of tensions and trade-offs mentioned at the start of this chapter. For example, the solutions gathered in the SDG 1 cluster addressing poverty often contribute to SDG 8, on economic growth and decent work. Health (SDG 3) and education (SDG 4) are also closely linked, reflected in the *Healthy Parks, Healthy People* programme having contributed several health examples focused on educating people about building their mental and physical health through interaction with nature in protected areas. The identified link between SDG 6 (Clean Water and Sanitation) and SDG 2 (Zero Hunger) is probably mainly because of the large emphasis on projects working with fishing communities and marine protected areas, although there are also close links with irrigation in some areas.

In parallel with this report, IUCN has also been working with multiple partners on a **report on area-based conservation and the SDGs**, which includes an in-depth look at around a dozen of the SDGs and some detailed case studies. None of the case studies identified in the latter address a single SDG and many contribute to half a dozen or more. While the aforementioned report will be useful in identifying the main ecosystem services receiving attention at the moment, and also where the gaps are, the true picture will inevitably be richer than a short publication can hope to encompass.

Future case study review, building on a key finding of this publication being about local participation as a critical success factor to reconcile conservation impacts with development objectives, could focus on closer examination of such participation models.

SOME CONCLUDING THOUGHTS

Many people see the Vth IUCN World Parks Congress in Durban, South Africa, in 2003, as the moment when social and governance issues emerged into the forefront of conservation thinking related to protected areas. It is heartening to see this emphasis being reflected in so many of the examples reported by PANORAMA. However, it is also worth noting that this is probably to some extent a self-selecting group; protected areas managers who put most of their effort into apprehending poachers and throwing local people out of their site may be less likely to write up their results for a global knowledge-sharing initiative. Also, it will be important to track projects and make sure that the gains described are maintained over time.

The emphasis on relatively few ecosystems is also concerning, in that many critical conservation issues may not be receiving the attention they deserve. But the overall conclusion most pertinent to the subject of this report, that protected areas are already contributing to all of the UN Sustainable Development Goals, is important. It provides governments with something additional to report on in their feedback on the SDGs, strengthens the position of protected areas in consequence, and provides additional arguments for further expansion of protected land and sea in national and global conservation strategies. However, perhaps more important than arguments for increased quantity, i.e. coverage, of protected areas, this report provides compelling evidence of the importance of protected area quality: only if good governance is achieved, can these sites provide a range of human development benefits alongside conservation benefits. The IUCN Green List of Protected and Conserved Areas standard recognises this by making criteria relating to quality, diversity and vitality of governance an integral component of assessing a site's performance.

Future case study review, building on a key finding of this publication being about local participation as a

Coral gardening. © CCCPIR-SPC, GIZ.

critical success factor to reconcile conservation impacts with development objectives, could focus on closer examination of such participation models. For example, it would be worth exploring specific types of shared and community-led protected area governance arrangements in terms of 'solutions', i.e. what has proven to work well.

Further research that looks at the various context and process factors in the solutions, and how they correlate with contributions to individual SDGs, is needed to establish more specifically how a combination of factors results in impacts towards certain SDGs. To achieve this, starting out with more specific hypotheses, or theories of change, would improve robustness of any future review and synthesis of the PANORAMA solutions portfolio, be it on the topic of this publication, or other topics.

What are the lessons for PANORAMA? Certainly, there is a need to encourage solution submissions from a broader range of ecosystems, particularly grasslands and savannahs, island ecosystems, urban ecosystems, and the high seas. It is probably also worth seeking a broader range of approaches – the lack of information about enforcement is indicative because many projects, in fact, do focus on enforcement issues – and looking at innovative, community-based initiatives, where it would be useful to include lessons from these for the wider community.

Many of the solutions are ongoing, and it is still too early to judge their long-term success (or failure). One important innovation, therefore, would be a periodic review of solutions – say once every five years – seeking from the contributor an update on what has happened, assuming they still work in the site. This would both increase the overall value of the individual descriptions, by feeding in information collected over a longer time period and clean the system of any

interventions that have not, for one reason or the other, stood the test of time.

PANORAMA currently has a small and powerful group of partners and collaborators, but this might usefully be widened. It might be worth including some of the more science-based NGOs, or academics working on conservation evidence approaches, to strengthen the collection and verification of data to make it easier in the future to use the platform for more quantitative review. This would focus particularly on issues relating to peer review, updating and baselines, for example. Along the same lines, linking PANORAMA more deliberately to other libraries of conservation success stories will be important. Such new collaborators, particularly academic institutions, could also contribute to carrying out future reviews of the solutions portfolio, further improving the methodology for such review in terms of scientific robustness and relevance. The review and synthesis underlying this report could be repeated with such academic partners in some years' time. New policy and conservation partners and collaborators could help ensure strong uptake of solution review results in conservation planning and implementation.

Another approach would be to gain the support of the major development agencies and partners to make the synthesis of case studies for learning and exchange a routine activity that accompanies all projects and grant investments, including facilitating submission of solutions by practitioners who may not be comfortable with English, French or Spanish. The design of projects could also incorporate some of the lessons learned across the portfolio and be more deliberately framed to test the validity of a particular intervention. The size and ambition of PANORAMA is such that it would be worth investing extra attention to make the information it contains still more powerful.

Golden snub nosed monkey - Shennongjia National Park, China. © OU Peng.

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INTERNATIONAL UNION
FOR CONSERVATION OF NATURE
WORLD HEADQUARTERS
Rue Mauverney 28
1196 Gland, Switzerland
mail@iucn.org
Tel +41 22 999 0000
Fax +41 22 999 0002
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