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Introductory Chapter: Today's National Parks (NPs) and Protected Areas (PAs) for a Sustainable Future

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1. Introduction

The decline in the world's biodiversity is recognised as a key facet of the environmental crisis in which the twentieth century has seen the most far-reaching ecological change that provides the greatest threat to the planet and to human survival. There is continuing understanding, starting from the famous Earth Summit in 1992 through to the 2012 Rio Conference, that urgent actions are needed to secure core natural assets such as woodlands and biodiversity matters. At the turn of the century, world leaders adopted the United Nations Millennium Declaration and outlined eight chapters and key objectives or targets and 2015 as the deadline [1]. These targets are globally known as millennium development goals—ranging from peace; development; environment; human rights; and the vulnerable, hungry, and poor. In 2015, countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals. Implementation and success will rely on countries' own sustainable development policies, plans, and programmes and will be led by countries. The Sustainable Development Goals (SDGs) will be a compass for aligning countries' plans with their global commitments [2].

“As we hurdle towards 2030, Sustainable Development Goals 14 and 15 cannot be overlooked, because that's where biodiversity and nature reside—life below water, 14, and life on land, 15. And to get to 2030 we need to get biodiversity right,” said IUCN Director General Inger Andersen [3]. The Protected Planet Report 2018 reviews the achievement of Aichi Biodiversity Target 11, which stresses for the effective and equitable management of 17% of terrestrial and 10% of coastal and marine areas by 2020. The report confirmed that the world is well in line to meet the coverage aspect of Target 11 and highlighted the need to meet related aspects by 2020 [4].

This chapter focuses on the management of PAs and NPs—arguably the world's most depleted resources and the initiatives taken by countries when delivering their obligations mainly under the auspices of IUCN both within and beyond national jurisdiction. The chapter falls into five sections. The brief review of the world's biodiversity, the role of IUCN, and the impending threats to world's biodiversity is outlined in Section 1. Next, Section 2 outlines the “IUCN Categories” as well as the growing importance of PAs and NPs. Section 3 presents the major threats to conservation and the implications they brought to PAs and NPs. Section 4 presents a review of some major global initiatives, which exist alongside the statutory designations of the PA system in some countries as case references. All these initiatives have been led by “third sector”

organisations, and all attempts have been made to complement the global approach to ecological management with partnership working and public participation. The chapter concludes, in Section 5, that within the present economic and political structures of the PAs and NPs, these new initiatives represent individually imaginative and in aggregate vital adjuncts to areas protected by formal (statutory) designation.

2. Protected areas and national parks: a global commitment

The International Union for Conservation of Nature (IUCN) is an international organisation working in the field of nature conservation and sustainable use of natural resources. It offers public, private, and non-governmental organisations with the “nature-based solutions” to reversing environmental declines and securing a healthy, liveable planet. Since its establishment in 1948, IUCN has evolved into the world’s largest and most diverse environmental network. It harnesses the experience, resources, and reach of its offices in more than 160 countries (plus 1300 member organisations) and runs projects all around the world benefited from a network of 13,000+ voluntary scientists and experts spanning the globe [5]. This validates the IUCN as the global authority on the status of the natural world and the measures needed to safeguard it with the world’s largest and most diverse environmental network. It continues to champion nature-based solutions as key to the implementation of international agreements such as the Paris Climate Change Agreement and the 2030 Sustainable Development Goals. IUCN experts are organised into six commissions dedicated to species survival, environmental law, protected areas, social and economic policy, ecosystem management, and education and communication [5]. IUCN works across a wide range of themes related to conservation, environmental, and ecological issues, covering business and biodiversity; climate change; ecosystem management; environmental law; forests; gender; global policy; governance and rights; marine and polar; protected areas; science and economics; species; water; and world heritage [6].

2.1 Natural resources at risks

At present, however, biodiversity is facing devastating effects that are directly or indirectly resulting from the rapid growth in human population. According to the Population Division of the Department of Economic and Social Affairs of the United Nations [7], the world’s population is predicted to increase to 9.1 billion by 2050. Gross observation shows that most of this growth will occur in developing countries that record human activities and their associated impact to most of the world’s biodiversity. It will aggravate to many hazards and risks on the world’s ecosystems and species because the majority of human populations derive their livelihoods from the increased susceptibilities of these biological resources. In addition to the increasing overall vulnerabilities of population growth, biodiversity is also threatened by pollution, climate change, habitat loss, and invasive species [8]. The author’s purpose is merely to present the current practice of various global initiatives pertaining to protected area and national park in comparative fashion. Since IUCN has been deeply involved with protected areas and national parks from its very beginnings, the roles performed by this key international organisation will also be highlighted. By showing what has been done with such implementation, each initiative illustrates the interaction of international and national agencies as well as NGOs in support of such activities. As we compare and contrast across regions, one should note that countries have their power to ensure that species and ecosystems are maintained as part of the human habitat. This one factor presents unique challenges to sustainability planning implementation, which will be outlined.

Informed estimates are that as many as a million species may be gone forever by the turn of the century [9]. As a matter of fact, of all the species that have ever existed on Earth, 99% have become extinct [10].

Apart from the physical damage plastic causes, it contains harmful chemicals, damaging to both humans and wildlife. Plastic additives such as phthalates and chlorinated, brominated, and fluorinated compounds pose significant risks to human health. In the absence of decisive action, 1.2 million tonnes of additives per year could enter our oceans by 2050, and together with the plastic in soil and freshwater, they will continue to contaminate our food chain and water supplies. The oceans provide protein-rich food for billions of people, so the chemical contamination they introduce into the food chain poses a serious threat to food security and health. Worldwide, marine plastic pollution is costing us between US\$ 13 and 40 billion per year as tourism, fisheries, and shipping revenues are lost [3].

2.2 What is a protected area?

The World Conservation Union (IUCN) widely refers protected areas as “... a clearly defined geographical space recognized, dedicated and managed, through legal or other effective means to achieve the long-term conservation of nature with associated ecosystem services and cultural values” [11]. Since Yellowstone Park in USA was first officially protected, in the year 1872, the number and popularity of protected areas are rapidly growing around the world [1].

Protected areas—national parks, wilderness areas, community conserved areas, nature reserves, and so on—are a mainstay of biodiversity conservation, while also contributing to people’s livelihoods, particularly at the local level. Protected areas provide us food, clean water supply, medicines, and protection from the impacts of natural disasters and are at the core of efforts involving actors, institutions, strategies, and policies towards conserving nature. It has been estimated that the global network of protected areas stores at least 15% of terrestrial carbon; thereby, their role in helping mitigate and adapt to climate change is also increasingly acknowledged [1].

2.3 IUCN protected area categories system

2.3.1 Protected area categories

Protected areas are classified according to their management objectives set out in the IUCN protected area management categories. The categories set forth a multitude of management strategies aimed at protecting areas, are recognised by international bodies such as the United Nations and by many national governments as the global standard, and as such are increasingly being incorporated into government legislation [11] (**Table 1**).

2.4 National park

A national park is uniquely acknowledged for its conservation purposes. Especially, it is a reserve of natural, semi-natural, or developed land that a sovereign state declares or owns. Despite many efforts for individual nations to designate their own national parks differently, there is a common idea: the conservation of ‘wild nature’ for posterity and as a symbol of national pride [12]. An international organisation, the International Union for Conservation of Nature (IUCN) and its World Commission on Protected Areas (WCPA), has defined “National Park” as its Category II type of protected areas (see above) [11].

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

Source: <https://www.iucn.org/theme/protected-areas/about/protected-areas-categories/category-ia-strict-nature-reserve>.

Table 1.
IUCN protected area categories system.

To establish priorities for the protection of national parks, the IUCN established the primary objectives such as “to protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation”. The interrelated objectives outlined are “to manage the area in order to perpetuate, in as natural a state as possible, representative examples of physiographic regions, biotic communities, genetic resources and unimpaired natural processes; to maintain viable and ecologically functional populations and assemblages of native species at densities sufficient to conserve ecosystem integrity and resilience in the long term; to contribute in particular to conservation of wide-ranging species, regional ecological processes and migration routes; to manage visitor use for inspirational, educational, cultural and recreational purposes at a level which will not cause significant biological or ecological degradation to the natural resources; to take into account the needs of indigenous people and local communities, including subsistence resource use, in so far as these will not adversely affect the primary management objective; and, to contribute to local economies through tourism” [11].

The IUCN World Parks Congress (WPC) is the world's premier global forum for setting the agenda for protected areas and takes place approximately once every 10 years. Since its first staging in 1962 in Seattle, USA, IUCN World Parks Congresses, previous IUCN Congresses have had a significant impact in assisting national governments to create new protected areas and directing more resources towards biodiversity conservation [13] (**Table 2**).

1	1962—Seattle, USA	The First World Conference on National Parks (Seattle, USA, 30 June–7 July 1962) aimed to establish a more efficient international understanding of national parks and to encourage further development of the national park movement worldwide. It set definitions and standards for representative systems of protected areas leading to the elaboration of the UN List of National Parks and Equivalent Reserves, later renamed UN List of Protected Areas.
2	1972—Yellowstone/Grand Teton National Park, USA	The Second World Conference on National Parks (Yellowstone, USA, 18–27 September 1972) focused on the effects of tourism on PAs; park planning and management; and social, scientific and environmental problems within national parks in wet tropical, arid and mountain regions. It also contributed to the genesis of the UNESCO World Heritage Convention and the Ramsar Convention on Wetlands of International Importance.
3	1982—Bali, Indonesia	The World National Parks Congress (Bali, Indonesia, 11–22 October 1982) focused on the role of PAs in sustaining society, and recognized 10 major areas of concern, including the inadequacy of the existing global network of terrestrial PAs and the need for: more marine, coastal and freshwater PAs; improved ecological and managerial quality of existing PAs; a system of consistent PA categories to balance conservation and development needs; and links with sustainable development.
4	1992—Caracas, Venezuela	The IVth World Congress on National Parks and Protected Areas: “Parks for Life” (Caracas, Venezuela, 10–21 February 1992) emphasized the relationship between people and PAs, and the need for, inter alia, the identification of sites of importance for biodiversity conservation, and a regional approach to land management. The Caracas Action Plan synthesised the strategic actions for PAs over the decade 1992–2002 and provided a global framework for collective action. The Plan aimed to extend the PA network to cover at least 10% of each major biome by 2000.
5	2003—Durban, South Africa	The Vth World Parks Congress (Durban, South Africa, 8–17 September 2003) held under the patronage of Nelson Mandela and Her Majesty Queen Noor of Jordan, the IUCN World Parks Congress 2003 helped develop a new paradigm for protected areas, defining and advancing the roles of governance, sustainable finance, capacity development, social equity and benefit sharing, leading to the Durban Action Plan and Durban Accord, both of which informed the Convention on Biological Diversity’s successful Programme of Work on Protected Areas. Other outcomes included: the UN List and State of the World’s Protected Areas, a global report on the world’s PAs; a Protected Areas Learning Network (PALNet), a web-based knowledge management tool for PA managers and stakeholders; deliverables on Africa’s PAs, including a recommendation on regional PAs and the Durban Consensus on African Protected Areas for the New Millennium; and a Handbook on Managing Protected Areas in the 21st Century, collating case studies, models and lessons learned during the Congress to constitute the “User Manual” for the Durban Accord.
6	2014—Sydney, Australia	The IUCN World Parks Congress 2014 (Sydney, Australia, 12–19 November 2014) focused on “Parks, people, planet: inspiring solutions.” During the 8 days of plenary and workshop sessions, side events and field trips, participants addressed ways to: reach conservation goals; respond to climate change; improve health and well-being; support human life; reconcile different development challenges; enhance diversity and quality of governance; respect indigenous and traditional knowledge culture; and inspire a new generation to prioritize conservation.

Source: <https://www.worldparkscongress.org/wpc/about/history>

Table 2.
The IUCN World Parks Congress (WPC) has been convened six times at 10-year intervals since 1962.

Furthermore, various parties, that is policymakers, practitioners, CEOs, activists, and indigenous leaders, considered strategic issues related to PAs, conservation, and sustainable development in a series of seven moderated public debates, termed “World Leaders’ Dialogues”. The principal outcome document of the WPC, the Promise of Sydney, captured the main essence of the Congress as well as an ongoing online dialogue regarding potential solutions.

The ‘ongoing’ IUCN Red List of Threatened Species is acknowledged as the most high-profile contribution to conservation. The Red List is described by the IUCN as being “based on an objective system for assessing the risk of extinction of a species based on past, present, and projected threats” [13]. The stated goal of the Red List is to “provide information and analyses on the status, trends and threats to species in order to inform and catalyse action for biodiversity conservation” [14].

Launched in 2014, the IUCN Green List of Protected and Conserved Areas is the first global standard of best practice for area-based conservation. It is a designed certification for protected and conserved areas—national parks, natural World Heritage sites, community conserved areas, nature reserves, and so on—that are effectively managed and fairly governed [15]. Green-listed sites are certified as being effectively managed and fairly governed, with a positive impact on people and nature. The IUCN Green List also helps measure and accelerate progress towards Aichi Target 11, a UN biodiversity target that aims for 17% of terrestrial and 10% of marine areas to be protected, effectively conserved, and fairly managed by 2020. While the world is on track to meet the coverage aspect of Target 11, the ‘effectiveness’ aspect is still far from being reached. Since its launch, the number of countries committing to the IUCN Green List has grown fourfold—from 8 to 33 [15, 16]. Some 250 candidate sites have now volunteered to achieve its standard. The process of certification is voluntary and can take between 6 months and 5 years, during which time the sites work towards clear objectives and targets. For example, Van Long Nature Reserve, Vietnam, became a candidate in 2015. The certification process has helped secure commitment to expand the protected area into two neighbouring provinces.

Countries including Australia, Cote D’Ivoire, Kenya, Malaysia, Madagascar, as well as the US State of California have committed to nominating more sites to the IUCN Green List in the near future. California is prioritising its 124 marine protected areas, while Europe is studying how the standard could be implemented across its network of protected areas, Natura 2000. China, which counts six protected areas on the IUCN Green List, plans to nominate more sites (IUCN [4, 16]). IUCN just listed 15 new areas to the IUCN Green List of Protected and Conserved Areas, which now counts 40 sites in total [6].

By giving recognition to well-managed and well-governed protected and conserved areas, the IUCN Green List aims to increase the number of natural areas delivering long-lasting conservation results for people. Clearly, nature-protected and conserved areas are the foundation of biodiversity conservation. They safeguard nature and cultural resources, improve livelihoods, and drive sustainable development. The IUCN’s ultimate scope of protected areas and conserved areas covers three key areas [6]:

- Achieving quality for successful and valuable protected areas
- Enhancing justice for fair, just, and inclusive protected areas
- Contributing protected area solutions to development challenges

The IUCN Programme 2017–2020 was of particular interest because it was approved by Member organisations at IUCN’s World Conservation Congress in

September 2016 in Hawaii, USA. It was developed as a result of a nine-month consultation process across IUCN Members and Commissions. Accordingly, IUCN's work is guided by the Programme 2017–2020, which has three priority areas [6]: *first*, valuing and conserving nature enhances IUCN's heartland work on biodiversity conservation, emphasising both tangible and intangible values of nature; *second*, promoting and supporting effective and equitable governance of natural resources consolidate IUCN's work on people-nature relations, rights and responsibilities, and the political economy of nature; and *third*, deploying nature-based solutions to societal challenges expands IUCN's work on nature's contribution to tackling problems of sustainable development, particularly in climate change, food security, and social and economic development.

3. The threats to NPs and PAs

In particular, there are cases around the world where protected areas face serious environmental problems. The management of protected areas is a complicated process that often reflects the conflict in the relationship between society and protection, usually through the prohibition of particular activities as established in the existing protection status [17].

The loss of biodiversity can be attributed to extinction that refers to the cessation of the existence of a species or a group of species. It is a natural process that is when species are diminished because of environmental forces (habitat fragmentation, global change, natural disaster, and overexploitation of species for human use) or because of evolutionary changes in their members (genetic inbreeding, poor reproduction, and decline in population numbers). The moment of extinction is generally when the death of the last individual of a particular species occurs. In many cases, however, the capacity to breed and recover may have been lost before this point [8].

Deforestation has been seen around the world in decades, though tropical rainforests are particularly targeted. If current deforestation levels proceed, the world's rainforests may be globally extinct in as little as 100 years, according to National Geographic. According to GRID-Arendal—a United Nations Environment Program collaborating center, a frequent deforestation trend occurred in countries particularly Indonesia, Thailand, Brazil, the Democratic Republic of Congo, and other parts of Africa, as well as some parts of Eastern Europe. As a consequence, several sites within the protected area network have been frequently degraded. According to a study by the University of Maryland and the World Resource Institute [18], Indonesia is recorded the most deforested nation. Since the last century, the country has lost at least 39 million acres (15.79 million hectares) of forest land. Similarly, African national parks also faced with deforestation problems and continuous reduction of forest lands mainly due to political actions as well as the application of measures applied by those responsible for the management of these parks [19]. The terrible damage in protected areas, despite the strict protection status [20], is linked with social factors such as the increased logging activity, which means more revenue for rural counties, where logging mills are often located, and more jobs in these areas. Many rural communities have experienced economic decline since environmental concerns decreased logging on federally protected lands [21]. In Costa Rica, particularly around the Osa Peninsula, the greater forest cover loss in areas with a high density of threatened, endemic, and new-to-science species poses a significant question regarding the success of future conservation initiatives outside protected areas [22]. The UK, similar to many of the countries such as the USA, Caribbean,

Latin America, Australia, and the Mediterranean, suffers from coastal flooding and erosion, as a consequence of intensive industrial and agricultural activities, as well as by urbanisation and tourism [23, 24]. As [25] state, intensive logging constitutes a factor that provides further evidence for anthropogenic disruption of the structure and functioning of rainforest ecosystems.

In the case of the National Park System, fires last year burned through parts of Glacier, Yosemite, Crater Lake, Grand Canyon, and Yellowstone National Parks, as well as Whiskeytown and Santa Monica Mountains National Recreation Areas [26]. In Laguna del Tigre National Park in Guatemala, about two thirds of the total land of the park was destroyed by forest fires, as a consequence of phenomena associated with considerable immigration of population to the area as well as with deficiencies affiliated with organisation issues of the administration bodies [27]. On the other hand, according to [28], in Arikok National Park, Aruba, the herbivory causes vegetation cover to decrease, which can lead bare soils to become vulnerable for wind and water erosion problems, which can be attributed to trampling and grazing of livestock.

In Cardamom National Park protected area, Wildlife Alliance Rangers raided two illegal settlements and confiscated two homemade guns, one chainsaw, electric fishing gear, and wild animals' parts. After examining the impact of hunting on the distribution of biodiversity in the protected area, [29] concluded that mainly the settlements and their occupants had been conducting forest crimes such as large-scale logging and poaching since 2016. This means that the Wildlife Alliance's Forest Protection Program will need to counter these threats by stopping poachers and loggers on daily basis [30]. Also, the problem of illegal hunting created debates in relation to effective management and conservation of biodiversity with regard to the protected areas of Africa [31].

According to a new study published recently, the authors have warned that climate change has adversely and uniquely affected many of the 417 national parks spread across the United States and its territories [32]. A study published in *Nature*, a leading scientific journal, provides data that suggest that climate change-related phenomena have killed 150,000 people annually for the past 30 years and that numbers will increase [33].

The long-lasting state of economic and political crisis, economic sanctions combined with consequences of war, and the NATO air strikes in 1999 resulted in an enormous destruction of infrastructure and high foreign debts in some countries in Europe [1]. Due to this reason, protected areas in Serbia, for instance, suffer from inadequate funding. In correspondence with the existing legal regulation, some portions of the national budget must be allocated for protected areas, besides fund for environmental protection, taxes for use of natural resources, income from their own activities, projects, and other donations.

In the case of the protected area in Serbia, [34] have pointed out that the financial allocation of the Ministry of Environment and Spatial Planning (MESP) covers limited part of the operational costs of the protected area and its portion is dwindling. Therefore, most of the protected areas (PA) in Serbia are faced with financial constraint and not sustainable [1]. In addition, the capacity development processes and projects are oriented towards setting up standards of competences enabling professional staff and empowering community actors to meet high demands of modern protected area management. Moreover, according to [35], the preservation of the KwaZulu-Natal PA residents with high illiteracy, poverty, and unemployment like those in Kwadlangezwa are willing to participate in ecotourism businesses, as this could be a way of empowering them economically. Arguably, willingness to participate in ecotourism development and planning could be linked to the higher level of literacy in Empangeni.

Furthermore, the National Chambal Sanctuary (NCS), otherwise known as the National Chambal Gharial Wildlife Sanctuary, is a PA in northern India—which flows in three states of India: Uttar Pradesh (UP), Madhya Pradesh (MP), and Rajasthan and covers in and around the Chambal River—and is facing various issues related to social, economical, environmental, and institutional factors [36].

In addition, comparing their first study results, where tourism development, biodiversity protection, and climate change were mostly regarded separately, a shift towards a more integrated development, including climate change as one of the issues to be solved, was observed [37]. Moreover, an integrated solutions found in participatory scenario approaches can be an “eye-opener” for climate change adaptation and act as a tool to unblock the elements of the motivation chain, and thus end up by generating action.

Although incentives for the protection of the environment are without a doubt important and decisive for the future of the planet, it is acknowledged that within a broader frame of governance, landscape protection and natural and cultural heritage conservation are linked to training opportunities and skills enhancement, physical and intellectual access, community participation, and the engagement of local residents and visitors [38]. Decision-making processes will always include to some extent conflicting interests that must be balanced in order for problems to be solved [17].

It is common to find the fact that no specific planning organisations and routines exist for climate change adaptation, integrated strategic planning combining biodiversity, and PA management. If used partially, for example, in regional planning procedures, these approaches can be carried out at a conceptual level. In consequence, this can lead to conflicts of interests between the different forms of human activity, thereby leading to less impactful outcomes. In Greece, with the absence of executive authority, the management bodies of protected areas are ineffective in performing their administrative and management duties. Such executive authority is given to other related bodies and control mechanisms [39], a fact that in most cases creates confusion regarding the responsibilities of each body especially during the implementation of protection measures. In consequence, this has led to increasing conflict among the multiple authorities and breaches of the legal requirements for environmental protection that apply in the area or people's own ability to take action is very limited.

4. Some global initiatives on the management of protected areas

The management of protected areas is a complicated process that often reflects the conflict in the relationship between society and protection, usually through the prohibition of particular activities as established in the existing protection status [17]. The countries have become more directly involved in the conservation of biodiversity such as the prohibition of trade in endangered species, the establishment of protected areas, and the crafting and enforcement of laws to regulate land use. But, to conserve biodiversity, there has also been increased reliance on economic instruments [8]. The following are some of the relevant global initiatives:

4.1 The United Nations Convention on Biological Diversity (CBD)

During the Earth Summit in Rio de Janeiro in 1992, the United Nations Convention on Biological Diversity (CBD) was committed to stem the rapid world-wide loss of biodiversity and to provide a legal framework for its conservation. The three indicators for success include to promote the conservation of biological diversity, the sustainable use of its components, and the fair equitable sharing of the benefits arising from the use of genetic resources [15].

4.2 Natural World Heritage

Natural World Heritage sites are recognised as the planet's most important protected areas, providing preparedness and resilience to millions of people worldwide [3]. And yet, they are under the specificities of different risks from mining, poaching, climate change, infrastructure development, and other threats. Natural World Heritage sites include iconic places such as the Great Barrier Reef, Yellowstone, the Galápagos Islands, and Kilimanjaro and are recognised as the world's most significant protected areas. IUCN's evaluations of nominations are part of a rigorous process where a wide range of information is reviewed. IUCN's World Heritage Panel is an essential part of this process, ensuring the highest quality of independent advice.

4.3 World commission on protected areas

The Commission is recognised as the premier network of 2500 experts from 140 countries that mobilises action in science, conservation, policy, and engagement to support well-managed and connected parks and other protected areas. The Commission develops knowledge-based policy, advice, and guidance on the full suite of issues surrounding protected areas through the establishment of specialist groups and task forces, as well as global protected area standards and best practice guidelines (see more details at [16]).

4.4 Related solutions for protected areas

In facing the most pressing governance challenges of natural hazard, protected areas offer vital solutions to some issues including species extinction, climate change, and poverty. Acknowledging this, IUCN proposed 'Solutions' as one of the international scale joint frameworks and cooperation strategies for its global work on protected areas. For more details, see reference [3, 16].

4.4.1 World Conservation Congress

With the goal of conserving the environment and harnessing the solutions nature offers to global challenges, the IUCN World Conservation Congress becomes the forum for several thousand leaders and decision-makers from government, civil society, indigenous peoples, business, and academia [5].

The Congress contributes to a subset of managing natural environment for human, social, and economic development, but this cannot be achieved by conservationists alone. The IUCN Congress should not be viewed as an isolated means to address differences and work together to create good environmental governance, but rather to engage in all parts of society to share both the complex and multifaceted part of conservation. The IUCN World Conservation Congress convenes every 4 years to set priorities and agree on the Union's work programme. IUCN congresses have produced several key international environmental agreements including the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species (CITES), the World Heritage Convention, and the Ramsar Convention on Wetlands [5].

4.4.2 Oceania

Oceania is geographically one of IUCN's largest regional programmes, covering over 100 million square kilometres of the Pacific Ocean.

4.4.3 Biodiversity and Protected Areas Management (BIOPAMA) Programme

The Biodiversity and Protected Areas Management (BIOPAMA) Programme is a €60 million initiative of the European Union (EU) and the African, Caribbean and Pacific (ACP) Group of States to improve the long-term conservation and sustainable use of natural resources through better use and monitoring of information and capacity development on management and governance. It is implemented through IUCN (International Union for Conservation of Nature) and the Joint Research Centre of the European Commission (EC-JRC). The programme focuses on the 79 ACP countries, which cover a huge diversity of ecological, social, and cultural systems. These regions contain a significant proportion of our planet's biodiversity.

4.4.4 PANORAMA—solutions for a healthy planet

PANORAMA is a partnership promoting examples of inspiring, replicable solutions across a range of conservation and development topics, to enable cross-sectoral learning and upscaling of successes.

PANORAMA, through its “protected areas solutions” thematic community, profiles specific case studies of such solutions, their success factors, and lessons learnt. It also places protected areas in a larger thematic context, through other, inter-linked PANORAMA thematic communities, profiling solutions across multiple themes.

IUCN has acknowledged the role that protected areas can play, for example, in climate change adaptation and mitigation, disaster risk reduction, ensuring sustainable local livelihoods, and addressing desertification. This results in well-planned and justly governed areas, when the costs and benefits of protected area systems are shared equitably, as well as mainstreamed into all economic sectors. Consequently, protected areas contribute to national and local economies. In particular, these approaches are the foundation for sustainable and resilient livelihoods for many communities.

4.4.5 MOOCs and protected areas capacity building

Massive open online courses (MOOCs) are now an undeniable part of the education landscape and a revolutionary opportunity for everyone across the world with an Internet connection to access free courses and to receive a certificate or academic credits. The IUCN Papaco MOOCs on ‘protected areas management’ and ‘ecological monitoring’ have cumulated a number of 12,700 registrations so far from more than 120 countries. Two more MOOCs have just started, on ‘law enforcement in protected areas’ and ‘species conservation’ in African protected areas.

4.4.6 CapeNature

The Protected Area Solutions project relies on the IUCN Green List of Protected and Conserved Areas (GLPCA) to deliver on the “quality” elements of Aichi Target 11. The project also develops a portfolio of case studies to communicate successful PA biodiversity and climate change outcomes through the PANORAMA platform.

Closely related to the mission of PANORAMA, the WCPA Natural Solutions specialist group promotes and develops the potential for protected areas to deliver a range of ecosystem services, with a particular focus on food and water security and disaster risk reduction.

4.4.7 Additional solutions for protected areas

Some of the additional solutions for protected areas include the following:

- *Clean Water*: One third of the 105 world's largest cities derive drinking water from forested protected areas. Another 10% obtain water from sources that originate in 'protected' watersheds. Some natural forests (especially tropical montane cloud forests) and wetland areas increase total water flow.
- *Food Security*: Protected areas conserve populations of wild species, pollinators, and crop wild relatives safeguarding species and populations vital for food security and agriculture.
- *Health*: Climate change and lack of clean water are expected to lead to increased health risks and epidemics. Protected areas contribute to health by protecting intact ecosystems and supplies of medicinal plants and genetic material for pharmaceuticals. Many people (80% in Africa) rely on traditional medicines; 28% of plants are used medicinally; and 60% of medicinal plants are collected from the wild, including in protected areas.
- *Ecosystem stability*: Economic losses from natural disasters have increased 10-fold over the last 50 years. Protected areas can play a role in helping reduce the occurrence and impacts of natural disasters, such as floods, landslides, tsunamis, typhoons and storms, fire and drought, and desertification. For example, in Argentina, flood protection programmes have integrated conservation of natural habitats to reduce vulnerability and disaster risks, to complement infrastructure and early-warning investments.
- *Distinguishing features*: Category II areas are typically large and conserve a functioning "ecosystem", although to be able to achieve this, the protected area may need to be complemented by sympathetic management in surrounding areas.
 - The area should contain representative examples of major natural regions, and biological and environmental features or scenery, where native plant and animal species, habitats, and geodiversity sites are of special spiritual, scientific, educational, recreational, or tourist significance.
 - The composition, structure, and function of biodiversity should be to a great degree in a "natural" state or have the potential to be restored to such a state, with relatively low risk of successful invasions by non-native species.
- *Role in the landscape/seascape*: Category II provides large-scale conservation opportunities where natural ecological processes can continue in perpetuity, allowing space for continuing evolution. They are often key stepping-stones for designing and developing large-scale biological corridors or other connectivity conservation initiatives required for those species (wide-ranging and/or migratory) that cannot be conserved entirely within a single protected area.

5. Summary and conclusion

Biodiversity needs to be conserved, protected, and used sustainably. The benefits that biodiversity provides to society require that effective measures should be managed appropriately and, when indicated, coordinated with ongoing scientific

projects. This is to ensure that nature is protected and used sustainably. Today, however, biodiversity is facing a variety of environmental impacts that are directly or indirectly attributable to a variety of environmental impacts due to the concentration of a wide range of human activities and rapid growth in human population. In many parts of the world, however, the loss of biodiversity has been identified as a serious environmental problem that can significantly undermine the prospects for sustainable development and the evolution of ecosystem and reduces their resilience. Our analysis shows that the most significant elements of sustainability in protected area governance that should receive highest priority are integrated approach to natural, cultural, and economic aspects; flexibility in responding to constant changes and pro-activity in finding innovative solutions; involving local community in planning, decision-making, and providing economic benefits with no harm to nature; respecting traditional knowledge as the basis for building up new learning approaches and programmes; and connectivity to other protected areas, common issues, and international developments [1]. It is worth noting, therefore, that the national parks and other types of protected areas continue to form the basis of the full range of species and natural ecosystems that must be better designed, protected, and managed despite impending weaknesses regarding guarding procedures, supervision, and implementation of protection measures in all these areas.

In addition to IUCN's close collaboration with UNESCO and WWF, this fact shows that there is a need for a better organisation and co-operation among the administrative and management bodies of a country that will require the cooperation of international agencies, non-governmental organisations, researchers, as well as local communities in the areas of conservation or any other protected area authorities. This approach, nonetheless, may be modified to specific contexts and goals, and applied with this purpose to other similar social environments, especially in countries in transition within the region. With this kind of intra- and inter-kind of relationships between various stakeholders, all parties will strengthen their positive attitude towards preserving and also lend greater support in the wider scope of PAs and NPs, since they think that essentially it has positive influence on the life of the inhabitants and on the natural environment.

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