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## Review Article

### Identifying Best Practices in Biodiversity Governance: A Comparative Analysis of South Africa, France, India, And Peru on Their Implementation of The Nagoya Protocol

**AUTHOR(S):** Benryane M. A.<sup>1</sup>, Belqadi L.<sup>2</sup>, Bounou S.<sup>3</sup>, Birouk A.<sup>1\*</sup>

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#### ABSTRACT

This research provides a comprehensive international benchmarking analysis of biodiversity governance, focusing on the implementation of the Nagoya Protocol. As a landmark agreement under the Convention on Biological Diversity, the Nagoya Protocol is crucial for global efforts to preserve and sustainably use biological diversity. The study employs a case study approach to evaluate the effectiveness, challenges, and innovative practices in biodiversity governance across South Africa, France, India, and Peru. By examining these diverse legal, socio-economic, and environmental contexts, the research offers insights into the successes and limitations of current practices, contributing valuable knowledge to the ongoing discourse on biodiversity conservation and sustainable use. The research underscores the complex interplay between international norms and domestic policy-making in environmental governance. It critically analyzes how international agreements like the Nagoya Protocol influence national strategies, local actions, and community engagements in biodiversity conservation. The findings highlight the importance of international cooperation and the need for adaptive and inclusive governance models that resonate with local realities and needs. This study aims to inform policymakers, practitioners, and stakeholders involved in biodiversity governance by providing a thorough analysis of global best practices. It seeks to foster a deeper understanding of effective strategies for implementing international environmental agreements, particularly in enhancing equitable access and benefit-sharing mechanisms central to the ethos of the Nagoya Protocol. By identifying best practices and governance trends, the study proposes concrete areas for improvement in biodiversity governance. It emphasizes the need for robust legislative frameworks, effective multi-stakeholder coordination, centralized biodiversity-related information, and comprehensive territorial coverage of institutions involved in biodiversity preservation.

**KEYWORDS:** Biodiversity Governance, Nagoya Protocol, Access and Benefit-Sharing (ABS), International Benchmarking, Environmental Governance

#### INTRODUCTION

This research aims to provide a comprehensive international benchmarking on the best practices in biodiversity governance, with a special focus on the implementation of the Nagoya Protocol. The Protocol, a landmark agreement under the Convention on Biological Diversity (CBD), represents a critical

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## Authors Details

### Benryane M. A.<sup>1</sup>

Agricultural Biotechnologies, Agro-biodiversity and Local Products Unit (UR6), Hassan II Agronomic and Veterinary Institute, Madinat Al Irfane, B.P. 6202, Rabat, Morocco.

### Belqadi L.<sup>2</sup>

Agricultural Biotechnologies, Agro-biodiversity and Local Products Unit (UR6), Hassan II Agronomic and Veterinary Institute, Madinat Al Irfane, B.P. 6202, Rabat, Morocco.

### Bounou S.<sup>3</sup>

EUROMED University of Fes, Rond point Bensouda, RN6, Fes, Morocco.

### Birouk A.<sup>1</sup>

Agricultural Biotechnologies, Agro-biodiversity and Local Products Unit (UR6), Hassan II Agronomic and Veterinary Institute, Madinat Al Irfane, B.P. 6202, Rabat, Morocco.

## Corresponding Author

### Benryane M. A.\*

Agricultural Biotechnologies, Agro-biodiversity and Local Products Unit (UR6), Hassan II Agronomic and Veterinary Institute, Madinat Al Irfane, B.P. 6202, Rabat, Morocco

mechanism in the global effort to preserve and sustainably use biological diversity. This study delves into various international frameworks, assessing how different nations have adopted and adapted the principles of the Nagoya Protocol within their biodiversity governance structures.

Through a meticulous case study approach, the research evaluates the effectiveness, challenges, and innovative practices that have emerged in the application of the Protocol. It seeks to understand the diverse legal, socio-economic, and environmental contexts that shape biodiversity governance across the globe. By analyzing these dimensions, the study offers a nuanced understanding of the successes and limitations of current practices, thereby contributing valuable insights to the ongoing discourse on biodiversity conservation and sustainable use.

Moreover, this research addresses the complex interplay between international norms and domestic policy-making in the realm of environmental governance. It critically examines how international agreements like the Nagoya Protocol influence national strategies, local actions, and community engagements in biodiversity conservation. This analysis not only underscores the importance of international cooperation in addressing global environmental challenges but also highlights the need for adaptive and inclusive governance models that resonate with local realities and needs.

Ultimately, the study aims to inform policymakers, practitioners, and stakeholders involved in biodiversity governance by providing a thorough analysis of global best practices. It intends to foster a deeper understanding of effective strategies for implementing international environmental agreements, particularly in enhancing equitable access and benefit-sharing mechanisms, which are central to the ethos of the Nagoya Protocol.

## Section I: Benchmarking methodology and country selection

### Benchmarking methodology

The methodology employed for this research aims to establish a rigorous and in-depth benchmarking of biodiversity governance, within the framework of the Nagoya Protocol. Initially, the methodological approach requires a judicious selection of a sample of countries for comparative analysis. This selection is characterized by geographical diversity and the representation of heterogeneous socio-economic and political contexts.

In terms of data acquisition, the research was based on a combination of approaches, mobilizing both primary and secondary sources. This included interviews with key stakeholders, notably the National Focal Points (NFPs) of the selected countries, in-depth studies of official government documents and data mining from the relevant scientific literature. To quantify the effectiveness of biodiversity governance practices, a sophisticated set of criteria and indicators was designed. These, by their measurable and objective nature, capture a multitude of factors influencing effective biodiversity governance. The data acquired was then analyzed using a qualitative approach. This phase consists of a meticulous study of legal frameworks, management systems, compliance mechanisms and the equitable sharing of benefits arising from the exploitation

of genetic resources. On this basis, it was possible to identify best practices in biodiversity governance, and to assess their relevance and effectiveness within different national contexts. The insights derived from this research provide a solid foundation for formulating crucial recommendations for the implementation of the Nagoya Protocol, considering the determining elements for successful biodiversity governance.

### Selecting countries for benchmarking

The Nagoya Protocol aims to achieve several objectives, which can be divided into five dimensions: economic, social, technological, environmental, and national. Each of these dimensions has its own set of objectives that countries seek to achieve (Table 1).

On the economic front, the objectives are to derive monetary benefits and share these revenues by developing new commercial products from genetic resources, as well as to stimulate growth in specific sectors, such as biotechnology or agrotech. In social terms, the first objective is to strengthen national capacities in the field of genetic resources. Another objective of this dimension is to protect the rights of indigenous populations and local communities, who are often the holders of traditional knowledge associated with GR. In technological terms, the first objective is to inventory and create a database on genetic resources, and to promote research and development, as well as innovation. Regarding the environmental dimension, the objectives are ecosystem protection, biodiversity conservation and the sustainable exploitation and use of genetic resources. Finally, the national position dimension has two objectives. The first is to acquire and/or consolidate sovereignty over genetic resources. The second is to protect the country's reputation and international collaboration by meeting its obligations to the multilateral agreement in the international context, vis-à-vis the other Parties to the Protocol.

**Table 1:** Categories of national objectives for implementing the Nagoya Protocol

Dimension	National targets
Economical	Developing additional commercial products from RG
	Contribute to the development of specific sectors (biotech, agri, etc.)
Social	Strengthening national capacities for GR research
	Protecting the rights of indigenous peoples and local communities
Technological	Census and knowledge of national RG
	Research and development (R&D) and innovation
Environmental	Protecting ecosystems and biodiversity
	Sustainable use of GR and ecosystem services
Policy	Ensuring sovereignty over national GR
	Comply with CBD multilateral treaty and Protocol obligations

Based on these identified dimensions, to measure the effectiveness of the Nagoya Protocol's implementation in different countries, we will rely on the dimensions and targets established by the CBD Secretariat used for the analysis of national biodiversity and Protocol implementation reports, and which will be examined according to the specific dimensions cited above. According to the CBD Secretariat's assessment of the implementation of the Nagoya Protocol by country Parties to the CBD, these national targets are extracted from national biodiversity strategies and generally cover all dimensions, but the focus is usually on one or two. Developing countries tend to give

more weight to the social dimension (mainly to protect local populations), while more developed nations tend to place greater emphasis on the conservation and commercial use of biodiversity. For an effective benchmarking analysis of their capacity to implement the Nagoya Protocol, countries will be selected according to the following capacities, reflecting the overarching national dimensions and objectives as outlined by the Protocol, namely:

- A rich biodiversity with a high level of endemism, making biodiversity a key "national resource". For this, the international biodiversity index ranking will be used.
- Level of R&D on biodiversity in the country. Given its importance for the use and valorization of GR, to evaluate this aspect, the level of R&D expenditure per capita will be used, in particular applied to natural resources.
- National interest and political motivation in preserving biodiversity. To this end, the Environmental Performance Index will be used to rank countries, focusing on the "biodiversity and habitat" category, which assesses the measures taken by countries to conserve natural ecosystems and protect the full range of biodiversity within their borders.
- Finally, the level of compliance with the Nagoya Protocol by countries, which is generally assessed based on a country's progress in implementing the Protocol's requirements for access to genetic resources and the fair and equitable sharing of the benefits arising from their use. This includes:

- Adoption and implementation of national ABS legislation and regulations;
- Setting up national focal points for ABS issues
- The development of access and benefit-sharing (ABS) procedures and agreements with stakeholders;
- Capacity-building efforts for government agencies, researchers, and other relevant stakeholders;
- Participation in international ABS processes and negotiations; and
- The number of internationally recognized certificates of compliance (IRCC) relating to ABS published with the CBD Secretariat.

To assess compliance levels, we used a combination of methods, such as analyzing countries' national reports on implementation progress, conducting interviews with stakeholders, and carrying out desk research on countries' legal and regulatory frameworks. The CBD ABS Clearing House (ABS-CH), in addition to consolidating information published by countries on Protocol implementation (number of regulatory measures, national implementation progress reports, IRCC, etc.) also provides official information on the level of compliance and identifies areas for improvement.

Based on these criteria, a list of the best-performing countries ranks as follows:

**Table 2:** Selection of Countries for Benchmarking

#	Biodiversity index	PN compliance level <sup>1</sup>	R&D expenditure per capita <sup>2</sup>	Perf. Environmental <sup>3</sup> biodiversity	Number of IRCC
1	Brazil	France	United States	Botswana	India
2	Indonesia	South Africa	China	Zambia	France
3	Colombia	Belarus	Japan	Poland	Spain
4	China	Benin	India	Germany	Kenya
5	Mexico	Bhutan	Germany	France	Argentina
6	Australia	Cameroon	South Korea	United Kingdom	Peru
7	Peru	Dominican Republic	France	Belize	South Africa
8	India	Kenya	United Kingdom	Spain	South Korea
9	Ecuador	Peru	Taiwan	Lithuania	Panama
10	United States	Uruguay	Brazil	Belgium	Vietnam

Based on a weighted calculation where the ranking of countries in each category represents 1/5<sup>th</sup> of the score, the following countries were selected for benchmarking: **South Africa, France, India and Peru** (note that South Africa is also ranked 16<sup>th</sup> in the world in the biodiversity index<sup>4</sup>). All the countries selected have ratified the Nagoya Protocol and provide an interesting and diverse comparative base, representing different continents and regions, as well as distinct levels of development (Table 2).

### Information gathering and intelligence

This study focuses on an in-depth analysis of the implementation of the Nagoya Protocol in a selection of countries identified for benchmarking. This work is based on an exhaustive exploration of the data available on the official ABS Clearing-House website. This platform centralizes the exchange of information on access to genetic resources and the sharing of benefits arising from their use. In addition, data shared within the ABS working group and

<sup>1</sup> Convention on Biological Diversity for the Biodiversity Index - Access and Benefit-Sharing Clearing-House : [ABSCH | Access and Benefit-Sharing Clearing-House \(cbd.int\)](https://absch.cbd.int/)

<sup>2</sup> OECD, 2022 : [Research and development \(R&D\) - Gross domestic spending on R&D - OECD Data](https://data.oecd.org/research-and-development/)

<sup>3</sup> Yale University, 2022 : [Environmental Performance Index | Environmental Performance Index \(yale.edu\)](https://epl.yale.edu/environmental-performance-index/)

<sup>4</sup> Source : South African Department of the Environment website - Score of 0.714 (Biodiversity index is a measure of the distribution of particular/endemic species in a specific area).

by the national focal points of certain countries have been integrated into this analysis. To be as exhaustive as possible, this research also benefited from the use of specific country fact sheets on ABS implementation, legislation and bioresources, drawn up respectively by the CBD Secretariat (country profiles), the UEBT (ABS country fact sheets) and the IUCN (biodiversity country profiles). However, it should be noted that the quality of the information may vary. This variation is mainly attributable to the degree of detail of the information available and provided by the authorities of the countries in question to the above-mentioned institutions, as well as to the level of precision of the data supplied by their various representatives contacted during this study. In addition, this analysis has been enriched by the integration of feedback from users of genetic resources, gathered in the context of case reviews of ABS contracts, where these are accessible and not covered by overly restrictive confidentiality clauses. This additional information has enabled us to refine our understanding of the ABS procedures implemented in the countries studied, offering a more complete and nuanced perspective of the dynamics at play in the implementation of the Nagoya Protocol.

## Section II: Implementation of the Nagoya Protocol in South Africa

### General context of biodiversity in the country

Due to its unique topography, temperature, geology and population, South Africa possesses many natural and cultural riches. It is considered one of the most ecologically diverse countries in the world, due to its high species diversity, endemism, and ecosystem diversity. There are nine biomes for terrestrial biodiversity and 31 fluvial ecoregions for rivers. Coastal estuaries and marine environments are divided into subtropical, warm-temperate, and cold-temperate biogeographical zones. Numerous structural forms of vegetation, rivers, wetlands, estuaries, and marine habitats support biodiversity in these ecosystems. South Africa is home to 10% of the world's plant species and 7% of reptile, bird, and mammal species, despite covering only 2% of the planet. Around 15% of the world's marine species live here. Amphibians, plants, and invertebrates are endemic to 56%, 65% and up to 70 (Secretariat of the Convention on Biological Diversity, 2023). However, South Africa's biodiversity is under threat. Reviews of national Red Lists show that much of South Africa's biodiversity is under threat. For example, 10% of bird and amphibian species, 20% of mammal species and 13% of plant species are threatened. The 2004 National Spatial Biodiversity Assessment (NSBA) provides an analysis of natural environments. The data show that 82% of critical river ecosystems are threatened. Of these, 44% are critically endangered, 27% endangered and 11% vulnerable. Of the country's 440 plant species, 5% are critically endangered, 12% endangered and 16% vulnerable. Three of the 13 estuarine groups are critically endangered, five endangered and two vulnerable. In addition, 65% of the 34 marine biozones are threatened, of which 12% are Critically Endangered, 15% Endangered and 38% Vulnerable. As far as freshwater ecosystems are concerned, only 29% of the country's primary rivers are intact or largely intact. It is estimated that over 50% of South Africa's wetlands are degraded. The Cape

Floral Kingdom, renowned for its floral wealth, is a case in point. The smallest and most vulnerable of the six floral kingdoms, it contains 38% of South Africa's plant species. Over 20% of its 1,850 plant species are threatened with extinction (Secretariat of the Convention on Biological Diversity, 2023). The loss and degradation of South Africa's biodiversity affects society and the economy. Natural ecosystems provide clean water and air, mitigate soil erosion, promote crop pollination, supply medicinal plants, cycle nutrients, provide food and habitat, and meet spiritual, cultural, aesthetic, and recreational needs. Many economic sectors depend on biodiversity, including fisheries, game and livestock farming, native species horticulture and agriculture, commercial and subsistence use of medicinal plants, and ecotourism. The total economic value of ecosystem services in South Africa, including provisioning, regulating and cultural functions, has been estimated at 73 billion rand per year. This estimate does not include the economic value of the marine environment and the use of water resources. Moreover, this value represents 7% of the country's GDP. Furthermore, intact ecosystems in their original or near-natural state are likely to offer cost-effective resilience to climate change. This includes reducing the impact of extreme climatic events on human settlements and activities. A large proportion of South Africans depend on natural resources for food, shelter, and healthcare, and it is estimated that around 70% of South Africans use traditional medicinal plants for their health. (Secretariat of the Convention on Biological Diversity, 2023).

### Biodiversity governance in South Africa

South Africa has a strong biodiversity policy. The White Paper on the Conservation and Sustainable Use of South Africa's Biodiversity (1997) guides legislative measures to implement this policy. The National Environmental Management Act (1998) provides the framework for environmental legislation. Several pieces of legislation have been adopted to clarify and support the achievement of its objectives in the fields of protected areas, coastal management, air pollution and waste management. The National Environmental Management Act: The Biodiversity Act (2004) is relevant to South Africa's obligations under the CBD. This Act addresses the fragmentation of biodiversity legislation at national and provincial levels. To achieve this, it merged several pieces of legislation and introduced collaborative governance. Several national, provincial, and local government agencies manage biodiversity. The Department of Environmental Affairs and Tourism (DEAT) leads environmental governance in the region. Biodiversity programs include the Succulent Karoo Ecosystem Program (SKEP), the Eastern Cape Co-ordination Unit for Bioregional Programs, the Grasslands Program, the Marine Program, and the Freshwater Program. (Department of Forestry, Fisheries and the Environment of South Africa, 2019). Government and donors are the main sources of funding for biodiversity management in South Africa. It should be noted that donor funding is declining. Despite limited resources, South Africa has made progress in mainstreaming biodiversity in many areas. It uses the ecosystem approach in the design and implementation of activities. A comprehensive structure for

integrating biodiversity into decision-making and land-use planning has been put in place. A register of threatened ecosystems, in line with the Biodiversity Act, is one of the tools created to support this integration. Provincial spatial biodiversity plans and bioregional biodiversity plans use systematic biodiversity planning to identify important biodiversity areas. South Africa's National Climate Change Response Strategy and National Action Program against Land Degradation address biodiversity challenges. The recently published National Sustainable Development Framework and discussion paper Towards an Anti-Poverty Strategy for South Africa recognize the importance of well-functioning ecosystems for sustainable development. (Department of Forestry, Fisheries and the Environment of South Africa, 2019). The biodiversity sector has effectively implemented business and biodiversity programs with many production sectors to promote sustainable production. In 2004, the Biodiversity and Wine Initiative (BWI) developed biodiversity principles for the wine industry, recognizing South Africa's status as the world's seventh largest wine producer, and introducing tax reforms and economic incentives encourage biodiversity-friendly practices (Department of Forestry, Fisheries and the Environment of South Africa, 2019).

#### **Legislative measures relating to the Nagoya Protocol**

An analysis of the implementation of the Nagoya Protocol in South Africa reveals a rich and detailed legislative framework for Access and Benefit Sharing (ABS). National ABS legislative measures include an amendment to the Biodiversity Act in 2015, regulation and bio-prospecting, access and benefit sharing from April 1, 2008, patent amendments no. 25 in 2005, and national environmental management via the Biodiversity Act (NEMBA) of 2004, notably Chapter 6 on bioprospecting, access and benefit sharing (BABS) (Department of Environment, Forestry and Fisheries, 2018). The scope of these measures covers any living or dead organism of a native species, any genetic material, or derivatives of such organisms, as well as any chemical compounds and products obtained using biotechnology that have been modified by genetic material or chemical compounds found in native species. Certain exclusions should be noted, however, such as genetic material of human origin or indigenous biological resources listed in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) (Department of Environment, Forestry and Fisheries, 2018). In terms of institutional structure, South Africa has designated the Biodiversity Monitoring Office within the Department of Environmental Affairs (DEA) as its national focal point. The latter is also recognized as the competent national authority, ensuring that all prospecting and export of indigenous biological resources is subject to a permit. In addition, prior informed consent is required from those granting access to indigenous biological resources, and from the indigenous communities concerned. (Department of Forestry, Fisheries and the Environment of South Africa, 2019).

#### **Section III: Implementation of the Nagoya Protocol in France** **General context of biodiversity in the country**

Thanks to its strategic position in Europe and beyond, France boasts a rich natural and cultural heritage. France's overseas territories include the Mascarene Islands, the Guyana Plateau, the Caribbean, the South Pacific, the Austral and Antarctic Islands and the North American boreal ecosystem. France occupies a strategic position on the European continent, where many influences converge. It comprises four of the eleven biogeographical zones: Atlantic, Alpine, Continental, and Mediterranean. France is in five of the 37 WWF and IUCN (International Union for Conservation of Nature) biodiversity hotspots in the world. (International Union for Conservation of Nature (IUCN), 2023). Four of these hotspots are in the French overseas territories. France has the second largest EEZ in the world, covering some 11 million square kilometers. These issues contribute to France's biodiversity commitments (Secretariat of the Convention on Biological Diversity, 2023). Ecosystems and landscapes reflect the diversity of territories and bio geoclimatic conditions. It is impossible to list all the ecological types in France. Mangroves, coral reefs, aquatic plant habitats, wetlands, agro-pastoral landscapes, and caves are emblematic, rare, or threatened. These ecosystems require special attention and protection. France's overseas territories have 10% of the world's coral reefs, making them the fourth largest. These territories therefore contribute to national and global biodiversity. Surface characteristics alone are not sufficient to assess the ecological health of an ecosystem. Their distribution, functioning and historical and projected dynamics must be considered. Forest habitats of Community importance in mainland France were assessed for conservation in 2007. Around 65% of these habitats were insufficiently protected. Rocky habitats, such as cliffs and caves, and sclerophyllous ecosystems, such as dry coastal moors and Mediterranean forests, were better conserved. (Secretariat of the Convention on Biological Diversity, 2023). France boasts a rich and diverse flora and fauna in a variety of habitats, both at home and abroad. The national register lists 11,934 plant species, 43,727 animal species and 14,183 fungal species in mainland France. Knowledge of foreign regions is incomplete, and information is often limited. Official registers show a much greater diversity of species than in mainland France. For example, native plant species are 50 times more numerous than others. Because of their insularity, overseas territories have unique endemic species and small populations of species, making biodiversity more vulnerable. The current red list of flowering plants and ferns in Réunion shows that of 905 species, 49 are extinct and 275 are endangered (Secretariat of the Convention on Biological Diversity, 2023).

#### **Biodiversity governance in France**

France follows international conventions, EU legislation (such as the Birds Directive, the Habitats Directive, and the Marine Strategy Framework Directive) and regional agreements to protect species. The national biodiversity strategy is based on the sustainable development strategy. The Grenelle laws also reinforce the national biodiversity strategy by implementing

numerous effective biodiversity conservation measures. Several sectoral strategies promote the integration of biodiversity (Office Français de la Biodiversité, 2022). The rural development program, which comes under the second pillar of the Common Agricultural Policy, introduced several measures to promote biodiversity in agriculture between 2007 and 2013. To remedy habitat fragmentation and protect biodiversity, territorial policies can use creative methods such as blue and green corridors. The action plan for sustainable and responsible fishing in the marine sector includes measures to improve the management of fishery resources. These activities focus mainly on improving the choice of fishing gear and scientific understanding of resource conservation. (Office Français de la Biodiversité, 2022). FLEGT, an EU forestry law adopted in 2003, is implemented through separate agreements with many countries. GMO authorization and management are well regulated at national and European level (Secretariat of the Convention on Biological Diversity, 2023). Biodiversity governance in France is ensured at central level by the Ministry of Ecology and the French Office for Biodiversity (OFB). At present, the 2030 National Biodiversity Strategy (SNB) reflects France's commitment under the Convention on Biological Diversity. It covers the years 2022 to 2030, and follows on from the first two strategies, which covered the periods 2004-2010 and 2011-2020 respectively. Its aim is to reduce pressures on biodiversity, protect and restore ecosystems, and bring about far-reaching changes to reverse the trajectory of biodiversity decline. (Office Français de la Biodiversité, 2022). National and European biodiversity strategies are continuously monitored, as EU member states submit national reports every six years to evaluate the Birds and Habitats Directives. Since 2007, these reports have included an assessment of the conservation of species and ecosystems of importance to the EU, in particular natural and semi-natural species. (Secretariat of the Convention on Biological Diversity, 2023).

#### Legislative measures relating to the Nagoya Protocol

France has developed a robust legislative and regulatory framework to implement the Nagoya Protocol, integrating the principles of equity, biodiversity conservation and respect for the rights of local and indigenous communities. Considering the specific characteristics of overseas territories also highlights the need for contextualized approaches that respect biocultural diversity. (Secretariat of the Convention on Biological Diversity, 2023). Although France regulates access to GR and associated TK under its sovereignty, it should be remembered that monitoring the fair and equitable use and sharing of benefits is subject to European regulations. The EU requires users to exercise due diligence: on the one hand, to collect certain information when accessing GR and TK to ensure traceability (e.g. place and date of access); on the other hand, to use GR and TK in accordance with what has been agreed with the supplier countries. These rules apply to all players carrying out their research and development projects in the EU, whatever their nationality or the origin of the resources. In France, implementation of the Nagoya Protocol has taken the form of a series of laws, decrees and orders governing access to genetic resources and the sharing of benefits arising

from their use. Law no. 2006-436 of April 14, 2006 on national parks, for example, lays the foundations for the protection and management of biological resources in national, marine, and regional parks. This approach is reinforced by other specific legislation in overseas territories, notably New Caledonia and French Polynesia, where local laws regulate access to biological resources and benefit sharing (French Ministry of Ecological Transition, 2018). The general regime in metropolitan France and the French overseas territories covers all genetic resources and associated traditional knowledge, with a few exceptions. Human genetic resources, those collected outside national territory, or those covered by other specialized international instruments are excluded. This measure aims to ensure balanced and equitable management of genetic resources, while respecting the rights and knowledge of local and indigenous communities (Ministry of Ecological Transition, 2018).

There are two main procedures for genetic resources in France: declaration and authorization, depending on the purpose of the research. Particular attention is paid to associated traditional knowledge, with specific procedures involving communities of inhabitants, thus guaranteeing their involvement and consent in the use of genetic resources (Ministry of Ecological Transition, 2018).

Benefit sharing in France is envisaged in both monetary and non-monetary forms, with priority given to examining non-monetary sharing arrangements. Local communities play a central role in this process, reinforcing the ethical and equitable dimension of sharing the benefits arising from the use of genetic resources. (Office Français de la Biodiversité, 2022).

In the French overseas territories, separate ABS rules may apply. New Caledonia and French Polynesia, for example, have already enacted their own ABS legislation, underlining the importance of approaches tailored to local and regional contexts.

#### Section IV: Implementation of the Nagoya Protocol in India General context of biodiversity in the country

India is known for its biodiversity, with 7-8% of all recorded species. India is home to four of the 34 biodiversity hotspots: the Himalayas, Indo-Burma, the Western Ghats, Sri Lanka and Sundaland. India is renowned for its traditional knowledge of biological resources. Over 91,200 animal species and 45,500 plant species have been recorded in the country's ten biogeographical zones. Ongoing studies and research are helping to update flora and fauna inventories and make new discoveries. In addition to its wealth of species, India has a high level of endemism. India has 69 bird species, making it the world's eighth-largest group of endemic vertebrates. India ranks fifth for reptiles, with 156 species. India has 110 species of amphibians, ranking eighth. The endemism of Indian fauna is most pronounced among amphibians (61.2%) and reptiles (47%). India is one of the eight Vavilovian places of origin and diversity of agricultural plants. It has around 300 wild relatives and closely related cultivated plant species that have evolved naturally. (Secretariat of the Convention on Biological Diversity, 2023).

India has many wetlands, including cold, high-altitude desert wetlands and warm, humid coastal wetlands, which are home to

numerous plant and animal species. Mangroves cover 4,445 square kilometers of the country. India's inland waters are home to many species of fish. Over a length of 28,000 km, Indian rivers, and their tributaries cross different geoclimatic zones with varied biotic and abiotic characteristics. India has 783 species of freshwater fish belonging to 89 genera and 17 families. Of these, 223 species are endemic to India. Indian fish represent 11.72% of species, 23.96% of genera, 57% of families and 80% of the world's fish population. With 2,411 fish species, the country has the third highest number of fish species in the world (International Union for Conservation of Nature (IUCN), 2022)..

According to the 2010 IUCN Red List, India has 4 mammals, 94 birds, 66 amphibians, 30 reptiles, 122 fish, 113 invertebrates and 255 plants classified as Critically Endangered, Endangered or Vulnerable. The International Union for Conservation of Nature (IUCN) lists 758 Indian animal and plant species as globally threatened. This represents 0.55% of the species recorded in the country. (International Union for Conservation of Nature (IUCN), 2022). Protecting India's biodiversity is essential, as it provides goods and services essential to human survival. It also improves the socio-economic conditions and livelihoods of many local populations. It thus promotes sustainable development and reduces poverty. The Indian Forest industry is increasingly recognized as a major contributor to poverty reduction through biodiversity. Indian forests offset 11% of the country's greenhouse gas emissions. Some 200 million Indians depend on trees for their livelihood. According to official estimates, the forestry and logging sector contributed 1.5% to the country's GDP in 2001-2002. This estimate does not consider the informal trade and use of forest products, nor their intangible benefits such as CO<sub>2</sub> sequestration. (Secretariat of the Convention on Biological Diversity, 2023).

### **Biodiversity governance in India**

Indian culture and the Constitution (Article 48A and Article 51(g)) respect the conservation and ethical use of biodiversity, rooted in indigenous knowledge systems and practices. Several notable laws, efforts and policies protect biodiversity. These include the Biodiversity Act 2002, the National Wildlife Action Plan 2002-2016, the National Environment Policy 2006, the National Biodiversity Action Plan 2008, and the National Climate Change Action Plan 2008. India has also improved policy, legislative and administrative implementation of biodiversity conservation and management. In this context, a few positive actions stand out. These include the Biodiversity Act and Rules, the Scheduled Tribes, and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, the Wildlife Crime Control Bureau, the Green India Mission, the Mahatma Gandhi Rural Employment Guarantee Act, and the National Fisheries Development Bureau. (Secretariat of the Convention on Biological Diversity, 2023).

India has made significant progress in capacity building in several areas, including the creation and improvement of forest enterprises, the facilitation of self-help groups to promote collaboration between joint forest management and other government initiatives, and the implementation of comprehensive

economic partnership agreements. Partnerships with NGOs, community groups, government agencies, contractors and industry strengthen stakeholder participation. Existing and emerging bilateral and multilateral environmental agreements support regional and international cooperation in biodiversity conservation and management. (Secretariat of the Convention on Biological Diversity, 2023). After ratifying the Convention on Biological Diversity (CBD) and following extensive consultations, India passed the Biodiversity Act in 2002 and formally promulgated the rules in 2004. These legislative measures were taken to effectively implement the provisions of the CBD, particularly those relating to its third objective, access and benefit sharing (ABS). India was one of the first countries to implement such legislation. The law is to be implemented through a hierarchical institutional framework comprising the National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs) and Biodiversity Management Committees (BMCs) at local level. This structure complies with the Constitution's provisions on decentralized governance. The Biodiversity Act is an important and forward-looking piece of legislation, which could have a positive impact on biodiversity conservation in the country. (Ministry of Environment, Forest and Climate Change, 2018).

The eleventh Conference of the Parties (COP-11) was held in Hyderabad, India, from October 1 to 19, 2002. As President of COP-11, India pledged \$50 million as the first beneficiary of the Hyderabad Call for Biodiversity Champions. This funding has helped to strengthen institutional frameworks, technical skills, and human capacity for biodiversity conservation in India. It has also made it possible to support similar capacity building in other developing country partners of India, in its sub-region (Secretariat of the Convention on Biological Diversity, 2023). Finally, several ecological and species monitoring programs are in place. Illegal killing of elephants (MIKE), participatory monitoring of natural resources in selected villages of the Uttara Kannada district, climate change and forests, genetic variation through DNA fingerprinting under LaCONES, pollution monitoring and control, and the success of World Natural Heritage sites under the UNESCO-IUCN project "Enhancing Our Heritage: the management effectiveness" are examples. The National Wildlife Action Plan (NWAP) Monitoring Committee has performed an important task in regularly assessing the progress of India's protected areas. India has launched a new forest mapping initiative, the Forest Survey of India, which assesses forest and tree cover every two years. (International Union for Conservation of Nature (IUCN), 2022).

### **Legislative measures relating to the Nagoya Protocol**

India's implementation of the Nagoya Protocol reflects an integrated and nuanced approach to the management of genetic resources and associated traditional knowledge, articulated around several key pieces of legislation. India's National ABS Measures are centered on the National Policy on Biodiversity of 1999, the Biological Diversity Act of 2002, and the Biodiversity Rules of 2004, which together structure the country's governance of genetic resources on three distinct levels (Ministry of Environment, Forest and Climate Change, 2018).

Under this regime, certain exclusions are explicitly noted. Genetic resources used in community trade, uses by cultivators and breeders such as farmers, beekeepers and traditional healers, and human genetic material are exempt from certain restrictions. In addition, plant variety genetic resources are protected by the Plant Varieties and Farmers' Rights Act 2001, and collaborative research between India and foreign institutions is also governed by specific guidelines issued by the Ministry of Environment and Forests (Ministry of Environment, Forest and Climate Change, 2018). Regarding benefit sharing, India has adopted a specific financial strategy, stipulating that benefit sharing is between 2% and 5% of the gross factory gate price of the product derived from the genetic resource and/or associated traditional knowledge. This provision ensures fair compensation for local and indigenous stakeholders, thus contributing to biodiversity conservation and sustainable development. (Union for Ethical BioTrade (UEBT), 2019). In the field of traditional knowledge related to GR, the development of an easily accessible database containing codified traditional knowledge relating to the Indian systems of medicine, namely Ayurveda, Sidha, and Unani, is an innovative initiative undertaken by India. This initiative, known as the Traditional Knowledge Digital Library (TKDL), aims to protect India's traditional knowledge from misappropriation by international patent offices. Non-disclosure agreements have been concluded with the patent offices of the United States, the European Union, and certain European Union countries regarding the Traditional Knowledge Digital Library (TKDL). Subsequently, the inclusion of references to the TKDL as prior art has led to the invalidation of patent grant decisions, the withdrawal of intention to grant patents or the voluntary withdrawal of patent applications in over 50 cases at European patent offices in recent times. (Ministry of Environment, Forest and Climate Change, 2018). Finally, the competent authority at the federal level in India for the implementation of these measures is the National Biodiversity Authority (NBA), a body that plays a central role in the coordination, administration and enforcement of biodiversity-related laws, thus ensuring that genetic resources and associated traditional knowledge are managed in an equitable and sustainable manner, in line with the principles of the Nagoya Protocol (Ministry of Environment, Forest and Climate Change, 2018).

## Section V: Implementation of the Nagoya Protocol in Peru

### General context of biodiversity in the country

The increase in natural flora and fauna in Peru shows that biodiversity is growing. The current number of wild plant species is 20,585, while the number of wild animals is 5,585. However, the IUCN Red List predicts an increase in threatened species. The country's most important environments are mountains, coastal foothills, rainforests, dry forests, swamps, and marshes. Tropical forests and lowland ecosystems cover around 94% of the country's forested area. The diversity of forest flora and fauna provides economic resources such as timber. However, their survival is threatened by agricultural expansion, selective logging, and hunting, as well as by ecological degradation. Road construction

is the main cause of deforestation (International Union for Conservation of Nature (IUCN), 2022).

Natural forests cover 73 million hectares, most of which are in good condition. Deforestation has also declined rapidly. Mahogany and cedar are important forest species, fetching high prices on national and world markets. Unsustainable logging is causing 50% of their populations to disappear, which is a cause for concern. Carob forests dominate coastal forests. Despite a gradual recovery over the last 30 years, carob forests still face challenges, mainly due to climate change. These problems are also due to energy-related agricultural development and logging. Protected areas are known to conserve a wide range of genetic variation for many species, including those listed (Secretariat of the Convention on Biological Diversity, 2023).

Fishing is vital to the Peruvian economy. In terms of landed catch, the country is one of the world's leading fishing nations. However, overexploitation of certain species, such as Peruvian hake, has led to regulatory efforts to manage its fisheries. The decline in marine biodiversity has been attributed to resource depletion, pollution, and urban and agricultural growth in coastal areas. Coastal aquaculture has caused catastrophic damage to mangrove ecosystems (Secretariat of the Convention on Biological Diversity, 2023).

Inland biological communities, on the other hand, are little studied, although there is growing interest in understanding them. Illegal mining activities pollute Lake Titicaca with poor-quality effluent. Three lake basins have introduced and invaded poeciliids, cichlids, trout, and algae. In the Peruvian Amazon, "stingrays", a fish of the *Potamotrygonidae* family found only in freshwater habitats, are widely exploited and commercialized. (International Union for Conservation of Nature (IUCN), 2022). In recent years, however, the national economy has increasingly benefited from environmentally-friendly businesses. Exports of organic products have risen by 20%, and the area devoted to organic or ecological production has increased by 25%. Exports of indigenous plants and animals have also increased, generating \$250 million a year. But these figures contrast with the meagre resources devoted to raising awareness and protecting biodiversity (Secretariat of the Convention on Biological Diversity, 2023).

### Biodiversity governance in Peru

Article 68 of the Peruvian Constitution promotes biodiversity and its protection. In 1997, Peru passed the Law on the Conservation and Sustainable Use of Biodiversity, and in 1999, Peru adopted a national biosafety law to reduce the risks associated with biotechnology. In 2011, the Law on the Prohibition of Living Modified Organisms (LMOs) prohibited their approval and release into the environment for five years. To strengthen implementation of the law, Peru established the National Biosafety Framework in 2012. Significant progress has been made under the Biotechnology and Competitive Development Program, the Knowledge, and Conservation of Indigenous Genetic Resources (Biosafety) Program and the Special Project to Strengthen Scientific and Technological Capacity in Modern Biotechnology, but Peru has no industry-specific biosafety



legislation (Secretariat of the Convention on Biological Diversity, 2023).

Regional governments have made progress in biodiversity management and the development of management tools. Regional policies, management plans, land use plans, the creation and reinforcement of nature reserves and agro-ecological zoning are examples of these tools. The activities of the regional environmental agency are limited to three regions. Updated and implemented regional biodiversity strategies have led to modest increases in biodiversity. (Secretariat of the Convention on Biological Diversity, 2023).

The National Council for Science and Technology and Technological Innovation includes biodiversity in its policies, programs, and initiatives as part of its environmental research program. Investment in science and technology, particularly in natural resources, has increased over the past five years. The budget for these sectors amounted to 61.28 million soles in 2020 (around 16 million USD). (Secretariat of the Convention on Biological Diversity, 2023).

National biodiversity strategies and action plans have been included in the "Peru 2021" bicentennial plan, the national environmental action plan, the environmental agenda, and the Ministry of the Environment's multi-year sectoral strategic plan, which are currently being updated. CEPA and resource mobilization strategies are also being developed. In this way, Peru hopes to offer well-designed and integrated incentives in all sectors and at all levels of government. These incentives will encourage the business sector to protect biodiversity. Finally, the Permanent Commission for the South Pacific, in collaboration with the Peruvian Institute of the Sea, is implementing the South-East Pacific Action Plan for the Protection of the Marine Environment and Coastal Zones. This research focuses on pollution and its impact on marine biodiversity and human health. (Secretariat of the Convention on Biological Diversity, 2023).

#### **Legislative measures relating to the Nagoya Protocol**

An analysis of the implementation of the Nagoya Protocol in Peru reveals considerable commitment to establishing a sound legal and regulatory framework for the management of genetic resources and associated traditional knowledge. Peru's national ABS measures include several supreme decrees and laws. By way of example, Supreme Decree 006-2016-MC created a Multisectoral Commission for the Safeguard and Revaluation of the Traditional and Ancestral Knowledge, Knowledge, and Practices of Indigenous Peoples, marking a formal recognition of the rights and contributions of these communities (Ministerio del Ambiente, 2018).

The scope of Peruvian regulations is extensive, encompassing genetic material and biochemical substances from plants, animals, or other organisms in the wild or cultivated state. It also includes genetic information deposited in databases and traditional knowledge associated with genetic resources. However, certain exclusions are also noted, including human genetic resources and their derivatives, and the exchange of genetic resources between indigenous peoples and local communities based on traditional practices and uses. (Ministerio del Ambiente, 2018).

Peru's institutional infrastructure for ABS reveals a clear division of roles and responsibilities for the management of genetic resources. Several National Competent Authorities (NCAs) have been identified, depending on the type of resources involved. The National Forest and Wildlife Service (SERFOR) is the national competent authority for forest and wildlife genetic resources and their derivatives, including associated micro-organisms and wild relatives of cultivated species. The National Institute for Agrarian Innovation (INIA) is the competent national authority for genetic resources and derivatives of cultivated or domesticated species, including associated micro-organisms. The Ministry of Production (PRODUCE) is the competent national authority for genetic resources and products derived from species present in marine and continental waters, including associated micro-organisms. Finally, the National Service for State Protected Natural Areas (SERNANP) is the competent national authority for genetic resources of forests and wildlife and their derivatives, as well as associated micro-organisms, found in national protected areas. (Ministerio del Ambiente, 2018).

This complex and comprehensive institutional structure underlines Peru's commitment to the effective implementation of the Nagoya Protocol, ensuring that access to genetic resources and the sharing of benefits arising from them are managed in an equitable and transparent manner, while respecting the rights of indigenous and local communities and promoting biodiversity conservation.

#### **Section VI: Identification of best practices for successful implementation of the Nagoya Protocol**

We were able to highlight interesting practices for the successful implementation of the Nagoya Protocol during our benchmarking with the countries concerned, and to identify important governance trends from which Parties could draw inspiration to overcome their own shortcomings in this area. After summarizing the strengths and weaknesses of the mechanisms in each of the countries analyzed, we identify the main governance trends and propose concrete areas for improvement in national biodiversity governance.

#### **South Africa**

South Africa has shown a remarkable commitment to biodiversity governance and the implementation of the Nagoya Protocol, as evidenced by its elaborate and detailed legislative framework. This legislation, including various amendments and specific laws, reinforces Access and Benefit Sharing (ABS), a central element of the Nagoya Protocol. The Biodiversity Act of 2004 is particularly notable for its ability to unify diverse existing legislation and introduce a form of collaborative governance. The latter involves a multitude of government agencies, at national, provincial, and local levels, creating an environment conducive to effective and integrated multi-stakeholder coordination. The competent national authority responsible for overseeing environmental issues is the National Department of Environment, Forestry and Fisheries. The person designated as focal point holds the position of biodiversity officer for the development and implementation of the BABS (Bioprospecting, Access and

Benefit Sharing) policy. This country is the only one in the study to have a specific ABS classification within one of its government agencies. The Ministry is responsible for administering legal measures to promote the sustainable use of indigenous genetic and biological resources. It also strives to promote the fair and equitable sharing of benefits, considering the rights of the owners of indigenous biological resources and associated traditional knowledge, as well as those who access these resources for commercial or industrial purposes. The existence of a directorate specializing in biodiversity economics and sustainable use, which houses BABS, was noted.

However, despite this solid legislative framework and clearly defined institutional structure, South Africa faces notable challenges. Declining funding for biodiversity management, mainly from donors, could potentially hinder the achievement of biodiversity and ABS objectives. This uncertain financial context may jeopardize progress made in biodiversity conservation and sustainable management.

On the other hand, South Africa's commitment to local and indigenous communities in the ABS process is commendable. Their involvement ensures better coordination and more inclusive decision-making, although the industries' dependence on raw materials collected from these communities may give rise to additional tensions and challenges in terms of sustainable biodiversity management. In addition, certain exclusions in ABS measures, notably concerning genetic material of human origin or certain indigenous biological resources, limit the effective scope of these measures, leaving potential gaps in biodiversity protection and management.

### France

An analysis of the strengths and weaknesses of biodiversity governance in France, particularly as regards implementation of the Nagoya Protocol at national level, reveals several crucial aspects. France demonstrates a strong commitment to biodiversity conservation and respect for the rights of local and indigenous communities, as evidenced by its robust legislative and regulatory framework for the implementation of the Nagoya Protocol.

A notable strength lies in multi-stakeholder coordination, illustrated by the interaction between various levels of government and the integration of different sectors. National legislation, combined with European directives and regional agreements, creates a solid network of measures to protect biodiversity, manage genetic resources and share benefits equitably. France is also committed to significant investment in biodiversity and landscape protection, and actively supports biodiversity conservation in developing countries. In 2016, France created the National Agency for Biodiversity. The collaboration involves the integration of ONEMA (Office national de l'eau et des milieux aquatiques), the public establishment for national parks, the Agency for Marine Protected Areas, and the public interest association ATEN.

However, despite these substantial efforts, several challenges remain, which may constitute weaknesses in the biodiversity governance system. Although France regulates access to genetic resources and associated traditional knowledge under its

sovereignty, the monitoring of their use and the fair and equitable sharing of benefits remains subject to European regulations. This could potentially limit France's ability to ensure full and effective implementation of the Nagoya Protocol at national level. In addition, it is reported that it is difficult, at this stage, to assess the contribution of the Nagoya Protocol in France, highlighting a possible lack of effective evaluation and monitoring mechanisms. Exceptions in the coverage of genetic resources, such as human genetic resources, those taken outside national territory, or those covered by other specialized international instruments, represent another potential weakness. This could leave gaps in the management and protection of genetic resources and limit the effectiveness of the ABS system in France.

Despite these challenges, France has demonstrated active implementation of the ABS mechanism, as evidenced by the numerous certificates of compliance issued. This proactivity reinforces the country's position as a leader in the implementation of the Nagoya Protocol, although further efforts are needed to overcome existing challenges and ensure comprehensive and effective biodiversity governance at national level.

### India

Analysis of biodiversity governance in India, particularly through the effective implementation of the Nagoya Protocol at national level, reveals a notable duality between strengths and weaknesses, offering a balanced and realistic perspective on India's efforts in this area. At the legislative level, India demonstrates a remarkable commitment to biodiversity conservation. Comprehensive laws and policies, such as the Biological Diversity Act 2002, have been put in place to ensure responsible and equitable management of genetic resources and associated traditional knowledge. These robust legislative frameworks demonstrate the national commitment to inclusive and sustainable biodiversity governance, marked by significant efforts to strengthen institutional, technical, and human capacities. Finally, India has created a National Biodiversity Authority (NBA), which also acts as the national competent authority for ABS, while the national focal point remains with India's Ministry of Environment, Forests and Climate Change.

However, despite this solid legislative base and the establishment of dedicated organizational structures, the effective implementation of these laws and policies faces significant obstacles. India, as a country with immense biological and cultural wealth, faces considerable challenges in terms of coordination between different actors and levels of governance. The often-complex interplay between national authorities, state agencies and local biodiversity management committees can hamper the effective achievement of the goals of biodiversity conservation and the fair and equitable sharing of benefits arising from the use of genetic resources.

In addition, the focus on protecting traditional knowledge, while laudable, faces challenges relating to the development and management of comprehensive databases, as well as protection against misappropriation. Although India has developed a digital library of traditional knowledge to address this issue, the question of access and protection continues to pose significant challenges.

The considerable number of biodiversity management committees testifies to India's commitment to effective biodiversity management at local and regional level, but it also raises questions about the ability of these committees to function effectively and in a coordinated manner.

Overall, although India has demonstrated a strong commitment to effective biodiversity governance and implementation of the Nagoya Protocol, substantial challenges remain. More effective coordination between different levels of governance, smoother implementation of laws and policies, and more effective management of traditional knowledge and genetic resources are crucial to further strengthening biodiversity governance in India.

### Peru

Analysis of biodiversity governance in Peru highlights distinct strengths and weaknesses in the effectiveness of Nagoya Protocol implementation at national level, particularly about multi-stakeholder coordination and political decision-making processes on biodiversity. Peru has demonstrated a strong commitment to biodiversity protection, as evidenced by the various laws and legislative measures adopted since 1997. The creation of a Multisectoral Commission by Supreme Decree 006-2016-MC, as well as the establishment of several national competent authorities, illustrates the country's commitment to the effective implementation of the Nagoya Protocol. This institutional structure, coupled with extensive regulations encompassing diverse genetic resources and traditional knowledge, underscores Peru's concerted effort to manage access to genetic resources and the sharing of benefits arising from them equitably and transparently.

However, despite these significant advances, several challenges and limitations persist. The country lacks industry-specific biosafety legislation, which can potentially hinder the effective management of biodiversity and genetic resources. In addition, the activities of the regional environment agency are limited to three regions, indicating uneven implementation of biodiversity initiatives across the country. This situation is exacerbated by the lack of clarity and uniformity in procedures for accessing genetic resources, as evidenced by the variety of timeframes and documentation requirements for obtaining contractual agreements, certificates of indigenous cultural intellectual property, and the like.

In addition, although Peru's institutional structure for implementing the Nagoya Protocol is comprehensive, the lack of coordination and clarity in the division of roles and responsibilities can potentially hamper the effectiveness of genetic resource management. The multiplicity of national competent authorities, while beneficial in theory, can in practice lead to overlapping jurisdictions and confusion in access and benefit-sharing procedures. This institutional complexity, coupled with uneven implementation of biodiversity initiatives and policies, highlights the need for greater coordination and clarification to enhance the effectiveness of biodiversity governance in Peru.

## CONCLUSION

### Best practices identified in biodiversity governance

The benchmarking analysis showed that for all the countries observed, an elaborate legislative framework is needed to frame the responsible institutions and ensure complete legal coverage where responsibilities are clearly assigned, as well as decision-making processes, especially those relating to monitoring and issuing permits for access to genetic resources. To this end, all countries have developed regulatory measures that clearly define the jurisdiction of the entities concerned, ensuring not only coverage of all the country's biodiversity ecosystems, but also of the bodies responsible for monitoring and research, financial and economic stakes (which is important in the case of the Nagoya Protocol, especially about monetary benefits) and reporting to international governance bodies, notably the CBD Secretariat. The case of the Protocol's implementation is very interesting, as we were able to note significant institutional changes in the countries observed following the realization of the challenges engendered by the complexity of its implementation.

Another good practice identified is the existence of a body with the technical and material capacity to ensure both inclusion and understanding of the scientific, environmental, social, and economic issues surrounding biodiversity. These entities or "agencies" help to centralize and coordinate efforts to protect and restore biodiversity, offering a more holistic and integrated approach. They bring together experts in biodiversity, ecology, and conservation, facilitating research, monitoring and effective ecosystem management, transcending the boundaries of different ministries and ensuring a more balanced and comprehensive approach to biodiversity management. Finally, these entities have a dedicated budget, ensuring stable, ongoing funding for conservation and restoration projects and integrated biodiversity management. It should also be noted that, on the political side, all the countries surveyed maintain responsibility for administrative oversight and stakeholder coordination at national level, as well as for the country's commitment at international level, at the level of a government body, principally the Ministry in charge of the country's environmental policy. As a result, these entities dedicated to biodiversity are more concerned with technical implementation, monitoring and advice than with control and management.

Based on the benchmarking results, effective multi-stakeholder coordination and integrated biodiversity management also stems from the centralization of biodiversity-related information. The existence of centralized databases seems an essential cornerstone for ensuring control based on real, regularly-updated data, avoiding inequalities in monitoring between the departments responsible for administering different systems, and enabling in-depth research into biodiversity, which in turn enables accurate assessment and increased valuation of biological resources, ecosystem services and natural capital.

A final best practice identified is the complete territorial coverage of the various institutions involved, given the fact that ecosystems must be managed in situ, and the predominant role played by local populations and administrations. In fact, in each of the countries analyzed, sub-structures of administrative control bodies and

technical entities dedicated to biodiversity preservation have been created, and their role continues to grow as the use of biological resources for both research and economic exploitation increases.

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