Policy in practice: How to "do" the Nagoya Protocol: common misconceptions, challenges and best practices for access and benefit-sharing compliance

Davide Faggionato*[1], Melania Muñoz-García*[1], Tanja Kostic[2], Mariana L. Ferrari[3, 4], Pascale Vonaesch[5], Mathilde Poyet[6,7], Perrine Portier[8, 4], Matthew J. Ryan[9], Djamila Djeddour[9], Cornelia Stumptner[10], Giovanna Cristina Varese[11, 4], Aurora Zuzuarregui[12, 4], Mathieu Groussin[13,7], Michael Schloter[14], Robert D. Finn[15], Aylin S. Haas[1], Ian Probert[16], Gerard Verkley[17], Jörg Overmann[1], Amber H. Scholz[+1]

*These authors contributed equally to this work.

+Corresponding author; correspondence should be addressed to amber.h.scholz@dsmz.de.

1. Leibniz Institute DSMZ-German Collection of Microorganisms and Cell Cultures, Inhoffenstraße 7B, 381124 Braunschweig, Germany
2. Center for Health & Bioresources, Bioresources Unit, AIT Austrian Institute of Technology, Konrad Lorenz Strasse 24, 3430 Tulln, Austria
3. Institut Pasteur, Université Paris Cité, Biological Resource Center of Institut Pasteur, F-75015, Paris, France
4. Microbial Resource Research Infrastructure (MIRRI-ERIC)
5. Department of Fundamental Microbiology, University of Lausanne, UNIL-Sorge, 1015, Lausanne, Switzerland
6. Institute of Experimental Medicine, Kiel University, Kiel, Germany
7. Global Microbiome Conservancy
8. University of Angers, Institut Agro, INRAE, IRHS, SFR QUASAV, CIRM-CFBP, MIRRI-ERIC, F-49000, Angers, France
9. CABI, Silwood Park, Buckhurst Road, Ascot, Berkshire, SL5 7PY, United Kingdom
10. Diagnostic & Research Centre for Molecular Biomedicine, Diagnostic & Research Institute of Pathology, Medical University of Graz, Neue Stiftingtalstrasse 6, 8010 Graz, Austria
11. Department of Life Sciences and System Biology, Mycotheca Universitatis Taurinensis, University of Torino, 10125, Turin, Italy
12. Spanish Type Culture Collection (CECT-UV), Universitat de València, Edificio 3 CUE, Parc Científic Universitat de València, Catedrático Agustín Escardino 9, 46980 Paterna (Valencia), Spain
13. Institute of Clinical Molecular Biology, Kiel University, Kiel, Germany
14. Helmholtz Center Munich-German Research Center for Environmental Health, Neuherberg, Germany
15. European Molecular Biology Laboratory, European Bioinformatics Institute (EMBL-EBI), Wellcome Genome Campus, Hinxton, Cambridge, UK
16. Sorbonne Université, CNRS, FR2424, Roscoff Culture Collection, Station Biologique de Roscoff, Roscoff 29680, France
17. Westerdijk Fungal Biodiversity Institute Uppsalalaan 8, 3584 CT Utrecht, Netherlands

Abstract

The Nagoya Protocol establishes an international framework for access-and-benefit-sharing (ABS) including for microbial research. Yet many microbiologists have only a vague understanding of what the NP requires and are unsure how to navigate its complexities, despite the fact that non-compliance can have significant legal consequences and far-reaching reputational and legal impacts. This paper discusses common misconceptions and practical challenges that microbiologists may encounter when complying with the Nagoya Protocol and a step-by-step guide on how to "do" the Nagoya Protocol. We present three case studies to showcase real-life experiences and provide best practice principles for access-and-benefit-sharing while fostering biodiversity conservation, equitable collaboration, and sustainable innovation.

Keywords

Nagoya Protocol, Convention on Biological Diversity, Access and Benefit-Sharing, Genetic Resource, Compliance, Associated Traditional Knowledge

Sustainability Statement

Compliance with the Nagoya Protocol and applicable national legislation on access and benefit sharing is essential for the responsible use of genetic resources. The elements of the Nagoya Protocol on prior informed consent, mutually agreed terms, and fair and equitable benefit sharing were revolutionary and led to the United Nations Sustainable Development Goal 15's Target 15.6: Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed. By legally accessing biodiversity and respecting the sovereign rights of provider countries and indigenous peoples and local communities over their genetic resources, the microbiology community will contribute significantly to the advancement of SDG 15.

Introduction

The days of colonial exploration and a "take what you want" approach to nature and research conduct are long over. Scientific progress cannot be achieved without consideration for the environment, equity, and scientific cooperation at eye-level (Simm 2007; Sirakaya 2022). One key policy instrument to ensure this is the Nagoya Protocol (NP), but many researchers are still unaware of this key legal tool and do not understand what it is nor how it works (Davis *et al.* 2015; Schneider *et al.* 2022). Members of this consortium have heard well-regarded scientists confuse the NP with climate change regulation (Kyoto Protocol) or rules governing endangered species. From our experiences at numerous meetings and workshops, we routinely encounter a lack of awareness that biodiversity is governed by this United Nations instrument and every country in the world can have laws in place that govern access to microbial (and other biological) samples.

The consequences of ignoring these legal obligations are concrete and significant. For example, scientific journals and funding agencies increasingly demand proof that genetic resources (GR) (i.e. biological samples) have been accessed and used in compliance with the Nagoya Protocol (European Commission 2021a; German Research Foundation 2021; Marden *et al.* 2021; Webpage - UiT The Arctic University of Norway). Furthermore, failure to demonstrate compliance can lead to manuscript rejection, grant withdrawal, and damaged professional credibility (Law 2019, 2021; Editor and Publisher of Journal of Natural History 2020; Kim *et al.* 2020). Beyond the immediate loss of funding or publications, researchers risk long-term reputational harm, loss of collaboration opportunities with countries and communities, and exclusion from future projects. In some cases, violations can carry formal sanctions, fines, and put entire research programs and institutions at risk.

This "policy in practice" paper serves as a blueprint on how to act respectfully and legally in the complex legal environment of Access and Benefit-Sharing (ABS) under the Convention on Biological Diversity (CBD) and its Nagoya Protocol (Conference of the Parties to the Convention on Biological Diversity 2011; Webpage - Convention on Biological Diversity). The CBD and NP are part of a larger, complex web of international regulation of microbial resources described in a related policy briefing by Faggionato et al. in this same issue. The principles enshrined in these instruments underlie SDG target 15.6, establishing mechanisms for the fair and equitable sharing of benefits while supporting access to genetic resources towards the full implementation of the 2030 Agenda for Sustainable Development (Biermann, Kanie and Kim 2017; Weiland *et al.* 2021). The lens of the authors' consortia is microbiology but the practices are widely applicable to all life scientists. To aid readers in navigating the abbreviations and acronyms used, see Table 1.

History and principles of the Nagoya Protocol

The 1992 CBD's objectives are conservation, sustainable use, and the fair and equitable sharing of benefits arising from the use of biodiversity (Webpage - Convention on Biological Diversity). The CBD confirms each country's sovereign rights over the biodiversity within their borders, allowing (although not requiring) them to regulate access to genetic resources. However, the details of ABS were not internationally formalized and certainly not standardized. The CBD's Nagoya Protocol, which entered into force on October 12, 2014 was intended to solve this problem by providing a binding international legal framework on access to and utilization of GRs, defined as any non-human biological material containing functional units of heredity. The NP also governs *derivatives,* naturally occurring biochemical compounds resulting from the gene expression or metabolism of biological resources, including proteins, lipids and metabolic compounds obtained from GR (Conference of the Parties to the Convention on Biological Diversity 2011).

The NP, while well-intentioned, has garnered a challenging reputation in the research community. This stems from its bilateral nature, meaning agreements are negotiated between a provider (usually a country) and a user of GR (researchers conducting commercial or non-commercial activities). While simple in principle, there is wide variation in how countries have implemented the NP at the national level (Robinson and Von Braun 2019; Chege Kamau 2022). This policy-in-practice pieces aims to raise awareness, clarify misconceptions, describe regulatory challenges, and offer practical guidelines for microbiologists.

The main principle of the NP is that users must ask for permission to access GR and/or associated traditional knowledge (aTK) and share benefits with the country from which they were collected and/or with aTK holders (henceforth "providers").

At its core, the NP rests on three pillars:

- **Access:** adherence to national ABS regulations on access to their GR (either *in situ* in country or *ex situ* from a collection) and/or aTK. It may be necessary to obtain Prior Informed Consent (PIC). Countries can decide whether they regulate access to GR or not.
- **Benefit-sharing:** a commitment to share benefits back. It may imply the negotiation of Mutually Agreed Terms (MAT) with the provider(s). Benefits can be monetary (e.g., royalties) or non-monetary (e.g. scientific collaboration) (Conference of the Parties to the Convention on Biological Diversity 2011) which should contribute to the SDG (Normand *et al.* 2021; Crowther *et al.* 2024).
- **Compliance**: all Parties to the NP must establish measures to ensure that users within their jurisdiction comply with the ABS rules from providers. One example is the EU Regulation No. 511/2014 (European Parliament and Council 2014; European Commission 2021b), which establishes obligations for users of GR within the EU and requires national authorities in Member States to implement compliance checks. Despite the requirement, many NP Parties do not have compliance measures but users should still follow national laws.

Nagoya Protocol and microbial biobanking

Legal ABS obligations fall on the user who conducts research and development on the GR. However, storage of GR or environmental samples without conducting research is outside the scope of the NP. Nevertheless, biobanks should fulfill international obligations and support the SDGs when distributing such materials. It is good practice to store NP-relevant information, such as the country and date of collection and any associated ABS permits, and to transfer it to the user alongside the biological material. Such practices facilitate future legal utilization because it would be difficult for the final user to obtain relevant NP information from the original depositor without the collection or biobank facilitating it.

Correcting frequent misconceptions about the Nagoya Protocol, the "DOs"

While the principles of ABS and the importance of the NP are straightforward, the requirements are often written in complex legal terms and often only in the local language, making them difficult to understand and follow. Consequently, several misconceptions have emerged within the scientific community over the past decade. In this section, we address common misconceptions and provide clarity on the language of the NP.

1. Non-commercial academic research is subject to ABS obligations

It is often incorrectly assumed that non-commercial or academic research is exempt from the NP. However, the NP defines the term "utilization" as conducting research and development on the genetic and/or biochemical and molecular components of GR (*derivatives*), regardless of the purpose of the research. Although Article 8 of the NP does call for "facilitated access" for conservation, public health,

and food security (Conference of the Parties to the Convention on Biological Diversity 2011), many countries do not (yet) have clear provisions that facilitate this type of “public good” research.

2. Researchers must follow ABS laws of the country where the genetic resource was originally collected – not where it was cultivated or stored

Defining the provider country of a microbial GR is often a source of confusion because of the various ways of accessing microbial GR in practice. The provider country is the one where the material (*in situ* sample) was originally collected. It is *not* the country where the microbial strain was ultimately cultivated or isolated in the laboratory, nor the country of storage (i.e. *ex situ* collection or biobank).

3. ABS laws often apply to national researchers

Whether ABS regulations apply to domestic researchers varies by country, but often they too must obtain an ABS permit to access and utilize GR within their own country, whether on private property or in protected areas. For example, both Brazilians and foreign researchers need to follow Brazilian ABS laws. Some countries offer facilitated procedures for such access and use for national researchers, while others apply the same set of rules that apply to researchers working for foreign research institutions.

4. Researches from countries that are not a Party to the CBD should still "do Nagoya"

Scientists carrying out research in countries that are non-Parties to the NP, such as the United States of America (USA) (Webpage - NP parties, Convention on Biological Diversity), must still comply with the ABS rules established in provider countries and obtain the necessary ABS permits. The key difference is that researchers within the USA will not be checked for compliance by a USA federal authority. But they can damage their reputation and international collaborations if they willfully ignore national laws. Additionally, as the EU is a Party to the NP and its ABS law on compliance applies to all Member States (European Parliament and Council 2014; European Commission 2021b), all researchers based in the EU have compliance obligations, including those based in non-NP-Parties—such as Italy and Poland.

5. Utilizing commodities for research purposes changes their intended use and can trigger ABS obligations

Trade and exchange of commodities, whether for direct consumption or as ingredients, e.g. microbial starters in food and drink products, falls outside the scope of NP. However, if research and development are carried out on commodities, the intended use has changed. The user is expected to identify and contact the provider country to determine if ABS permits are needed. However, microorganisms introduced *unintentionally* in the EU (e.g. pathogens or food contaminants) and the isolation and identification of microorganisms from commodities for quality control purposes are out of the scope of the EU ABS Regulation.

Challenges in applying the Nagoya Protocol in non-commercial research

1. Legal complexity

Obtaining ABS permits often implies understanding multiple legal documents, completing forms (usually in the local language) and, in many cases, long benefit-sharing negotiations with providers. Often, simply being able to confirm whether or not a country regulates access to GR/aTK can be a challenging task, as

many Parties have not shared clear guidelines in the ABS Clearing-House (ABS-CH) (Webpage - ABSCH, Convention on Biological Diversity), an online platform established under the CBD to facilitate the ABS information sharing, and sometimes do not respond timely to enquiries. Once a determination is made, obtaining the necessary ABS permits can take several months or even years, causing significant delays. Box 2 highlights the legal complexity arising from a real case on biological control of non-native invasive species.

2. Diversity of regulatory frameworks and liability fragmentation

The CBD and the NP recognize the sovereign rights of countries over their GR, which enables Parties to define their own ABS rules. Consequently, many aspects differ among ABS legislation, including scope, definitions, requirements, procedures, and even terms used to name ABS permits (such as declaration, notification, registration, Mutually Agreed Terms (MAT), Material Transfer Agreement (MTA)).

Varying administrative procedures, legal interpretations and wording may cause misunderstandings, making it difficult for researchers to engage with provider countries, further disrupting project timelines (Heinrich *et al.* 2020; Ebert *et al.* 2023; Morgera 2024). In some countries, several Competent National Authorities (CNA) (e.g. ministries, agencies, and local entities) are designated to implement ABS procedures under local legislation, creating challenges in identifying a clear point of contact for users seeking ABS compliance. Temporary rules add to the uncertainty, making it difficult for researchers to navigate regulations efficiently (Ferrari *et al.* 2024) (Box 3).

3. Governance and legal complexities affecting Indigenous Peoples and Local Communities involvement in ABS

The scientific community supports the rights of Indigenous People and Local Communities (IPLCs) as custodians of GR and aTK and their role as providers and beneficiaries of ABS systems. However, lack of official recognition of IPLCs groups by the provider country and unclear governance frameworks, can add further complexity to the process of obtaining ABS permits. Although some national ABS frameworks clearly define the role of IPLCs, in many cases they are not formally recognized as beneficiaries, requiring them to appeal to human rights courts to assert their rights to fair and equitable benefit-sharing and prior informed consent (Zheng 2021). This lack of recognition complicates the identification of authorized representatives, particularly in countries without legal frameworks to uphold collective community rights. This creates practical and methodological challenges that make full compliance difficult.

4. Retroactive e*x situ* access and utilization rules

Researchers may also face challenges with ABS regulations that cover new utilization of GR collected before the implementation of the NP. While international law is generally not retroactive, some countries' legislation is retroactive *de facto* because utilization (not access) triggers ABS, causing confusion and administrative challenges (Margo A. Bagley, Arti K. Rai 2014; Rabitz 2015). This particularly affects research on microorganisms from *ex situ* collections and biobanks, where the legal status of these samples varies according to the ABS legislation in the provider country.

5. Incompatibility of some ABS laws and the International Code of Nomenclature of Prokaryotes

According to the International Code of Nomenclature of Prokaryotes (ICNP), for the valid publication of names of new prokaryotic taxa, scientists must deposit voucher specimens of type strains in publicly accessible *ex situ* culture collections in two different countries that must be made available without restrictions (Rahi 2021). However, if the ABS permit imposes restrictions on sharing them with third parties or requires new ABS permits, the conditions for valid publication under the ICNP cannot be met. As a result, researchers may still describe new taxa, but their names cannot be validated according to the ICNP and therefore will not be internationally recognized. Consequently, some culture collections now refuse deposits of strains originally collected in certain provider countries (Webpage - Strain Deposit, Leibniz Institute DSMZ).

6. Insufficient legal and regulatory training in scientific education

Despite over a decade of international NP implementation, training on ABS and other international legal and regulatory frameworks remains largely absent from microbiology education, leaving researchers unprepared (Smith *et al.* 2017). Researchers often learn informally through experience or colleagues. Integrating legal and regulatory topics into life sciences education is essential to equip future researchers for NP compliance. Similarly, there is a lack of structured ABS-related training and capacity building for biobank managers. Biobanks and collections need to be aware of their obligations and of best practices for NP compliance, in order to manage and transfer NP-relevant information.

How to comply with the Nagoya Protocol: a step-by-step guide

Whether you are collecting new samples in the field or working with previously gathered materials, this section highlights five key stages of the ABS procedure and provides an overview of the main steps (Fig. 1).

The *ABS World interactive infographic* (Webpage - ABS world, German Nagoya Protocol HuB) can help determine whether ABS laws apply to your project. Not all Parties to the Protocol regulate access (e.g. Germany), while some non-Parties (e.g. Colombia) do (Webpage - NP parties, Convention on Biological Diversity). In some cases, ABS laws may only relate to compliance, not access. Therefore, it is critical to review each country's profile on the ABS-CH (Webpage - ABSCH, Convention on Biological Diversity) and, when needed, follow up directly with national authorities. Partnering with local collaborators can also help navigate procedures and cultural contexts.

When information is insufficient, contact the ABS National Focal Points or Competent National Authorities listed on the ABS-CH (Webpage - ABSCH, Convention on Biological Diversity). Provide detailed information about your research, including taxonomic focus, sampling locations, and project objectives. You may also request documentation about forms and procedures and seek confirmation of your understanding of the ABS measures.

Before requesting permits or signing agreements, make sure your planned use—such as transfer to third-party or publishing genetic sequences in open access databases—is covered. Use the *ABS Strategy Checklist* (Webpage - ABS Strategy, German Nagoya Protocol HuB) to prepare effectively to deal with ABS in provider countries.

Once permits are issued, ensure your use of the material strictly follows the authorized terms. Do not forget to check compliance obligations in your user country. For researchers in the EU, this may include seeking, keeping, and transferring relevant ABS documentation and submitting a *due diligence declaration* via *DECLARE* (Webpage - ENV DECLARE, EU Commission). Reading the *EU ABS Guidance Document* is highly recommended—it includes clear explanations and practical examples (European Commission 2021b). For more details, tools, and examples see Supplementary Information.

Outlook

The regulatory frameworks established by the CBD and NP can appear complex and daunting for microbiologists and other life sciences researchers. However, adherence to these guidelines not only facilitates equitable research aligned with biodiversity conservation and sustainable use objectives and supports SDG 15, but also opens new opportunities for international collaboration and capacity building. In this context, scientists and institutions working with genetic resources—microbial or otherwise—benefit from collaborating, sharing knowledge, experience and best practices to address ABS regulatory challenges effectively while advancing the global sustainability agenda (Normand *et al.* 2021).

Closer engagement between the scientific community, policymakers, and local authorities can facilitate the development of a more effective ABS framework that fulfills both scientific needs and the equitable benefit-sharing objectives outlined in Target 15.6 (Webpage - Fast Track, Leibniz Institute DSMZ; *Webpage - Sustainable Development 15: Life on Land*). Such partnerships are particularly important for guiding biological research on biodiversity and environmental sustainability.

The implementation of NP compliance in non-commercial research involving GR from provider countries requires dedication, patience, and a readiness to make compromises (Fig. 1, Box 1, 2, and 3). Nevertheless, these efforts contribute to the development of more ethical research practices that align scientific advancement with respect for the rights and interests of provider communities and nations, ultimately advancing the broader goals of sustainable development and equitable resource sharing enshrined in international agreements and the 2030 Agenda for Sustainable Development (Biermann, Kanie and Kim 2017; Weiland *et al.* 2021).

Box 1. Navigating the NP and ABS compliance in human microbiome research – case studies for best practices

The globalization of human microbiome research has drawn new attention to the complexities of the NP and associated ABS regulations. While the NP clearly does not apply to human GR, the status of human-associated microorganisms and/or their genetic material and derivatives remains ambiguous.

Challenge 1: Does human microbiome fall under NP regulations?

National interpretations vary widely: some countries classify human microbiota as within the scope of the NP, others explicitly exclude them, and some offer no official guidance at all. This uncertainty creates an unpredictable landscape for microbiome researchers. Scientists who are not trained in international policy may unknowingly fall into illegality.

In this complex regulatory context, the Global Microbiome Conservancy (GMbC) (Webpage - Global Microbiome Conservancy) provides a practical example of how an international consortium can advance scientific goals while navigating legal complexity. Aiming to promote diversity in available human-microbiome datasets to better understand the impact of lifestyle on microbiomes and health, GMbC consortium members collect and sequence human microbiome samples worldwide (Fig. 2A, B), which are then stored in a biobank for downstream analysis and distribution of isolated microorganisms.

Since 2016, the GMbC has encountered several NP interpretations, including working with countries that consider human-associated microbiomes within scope and require a formal ABS-permit process (e.g., Pakistan, 2021), countries who consider these materials outside the scope of the NP and provided a waiver (e.g., Rwanda, 2018), and non- NP Party countries that also provided a waiver (e.g., Paraguay, 2024). Despite this variability, the GMbC has adopted a policy of full ABS compliance. Standardized documents are used in all participating countries, including Collaboration and Collection Agreements, and, when applicable, ABS permits or waivers. They include commitments to equitable scientific collaboration, such as co-authorship of publications, capacity-building, and long-term partnerships.

Working closely with national focal points, the GMbC consortium constantly strives to ensure ongoing ABS compliance even if the road to this goal can often be winding (Fig. 2C). Its experience highlights the importance of vigilance: regulations can be modified, countries may become NP Parties, their interpretations of whether human microbiomes fall within scope may change, retroactivity may become an issue, and additional ABS permits or waivers may have to be obtained.

Challenge 2: How to handle subsequent sharing of bio-material stored in already existing biobanks

As culturing techniques develop, laboratories are building their own microbial repositories. Initially created to address their own research objectives, collected human-derived microorganisms are sometimes requested by others. However, in most cases, original participant consent forms and ABS permits were obtained before such distribution was anticipated. Consequently, this new utilisation requires new permits and renegotiated benefit-sharing terms (Fig. 2C).

The Afribiota Consortium (Webpage - Afribiota project) has collected human-microbiome samples from children to better understand the physiology of stunted childhood development and its link to gut microbial communities (Fig. 2B). The corresponding ABS approvals or waivers were obtained for these specific research objectives and subsequent sharing of resources was not included in the initial ABS agreement. Therefore, new ABS contracts were needed for that purpose. Retroactive ABS permits or waivers have been crucial to ensure the legally compliant dissemination of biobanked GR. In this case, retroactive permits were granted only because the original consent forms specifically mentioned both long-term biobanking and the possibility of third-party distribution. Had those clauses been absent, the consortium would have had to either re-consent participants or refrain from sharing the material.

The experiences of the GMbC and the Afribiota consortiums highlight that NP-compliant human microbiome research is not only possible but also scalable worldwide. Collaboration with research groups in each provider country should be the norm: it facilitates navigation of local regulations and promotes capacity-building. As microbiome science evolves, the need for clear ABS frameworks for human-microbiomes becomes urgent. International ABS compliance could be strengthened through global guidelines clarifying the scope of the NP with respect to human-associated microbes, and through toolkits to help researchers navigate often complex ABS requirements (Fig. 2C).

Box 2. Legal labyrinths and biological control: the story of floating pennywort, an aquatic invader

The biological control of non-native invasive weeds illustrates the need for functional ABS systems that safeguard biodiversity by fostering strong international collaboration and engaging committed institutional and academic stakeholders.

Invasive aquatic plants such as floating pennywort (*Hydrocotyle ranunculoides*) are a major environmental and economic challenge: by forming dense, monospecific mats on the surface of lakes and rivers, they threaten local ecosystems and their function, increase flood risk, and damage recreational and commercial activities. Introduced to Europe through the ornamental aquatic plant trade, floating pennywort established itself in English waterways during the 1990s and now cost UK stakeholders more than £25 million per year in control and mitigation measures (Webpage - UK Environment Agency and Department for Environment, Food & Rural Affairs). Faced with this growing impact and the obligations under the EU Water Framework Directive, the UK authorities decided to explore classical biological control, an approach that has been proven for over a century to provide effective and sustainable suppression of invasive exotic weeds through the targeted introduction of host specific natural enemies, from the areas of origin of the plants.

After Argentina became a signatory of the NP in 2011, its ABS framework was fragmented and marked by overlapping national, provincial, and federal laws. As a consequence, the export of the weevil *Listronotus elongatus,* a promising biological control agent from floating pennywort's native South American range, to the Centre for Agriculture and Bioscience International (CABI) was stalled in legal limbo for nearly four years.

It was only with the implementation of Argentina's 2019 Resolution 410, that a simplified regime for the utilization of GR for non-commercial research purposes and minimum standards for provincial competent authorities issuing ABS authorizations were established. Access to GR was streamlined and included mutually agreed terms, material transfer agreements by provincial authorities and national parks, and authorization by the National Food Safety and Quality Service (SENASA) and the Ministry of Environment and Sustainable Development (MAyDS) for exporting genetic material to the UK. By late 2019, once access to Argentine genetic resources was clarified, CABI, in collaboration with its in-country partner, the Foundation for the Study of Invasive Species (FuEDEI), was able to restart research on floating pennywort biocontrol funded by the ministerial Department for Environment, Food and Rural Affairs (DEFRA). In early 2020, CABI formally applied to the UK phytosanitary regulators to introduce the weevil *L. elongatus* into England, which would form part of a coordinated national floating pennywort management strategy.

In the UK, CABI complied with national legislation in England and Wales under the Wildlife and Countryside Act 1981, which provides the legal framework for the release of non-native biological control agents. Following a scientific review by independent advisors, consultation with involved governments, and public engagement, ministerial consent was given to CABI in 2021 for the controlled release of *L. elongatus* in England. The weevils were imported into quarantine under a Secretary of State phytosanitary license with CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) certification confirming they are not subject to trade restrictions (Webpage - CITES). Their release in the UK is carefully regulated, requiring a license from the Secretary of State. This process includes ongoing environmental monitoring, placement of specimens in official reference collections, and securing additional permits for any trials conducted within protected areas. A dedicated research permit for *H. ranunculoides* allows breeding facilities to transport and cultivate the weevil's regulated host plant for rearing purposes—ensuring full compliance with phytosanitary regulations.

This case highlights the importance of establishing clear minimum standards for local competent authorities in countries with provincial ABS regulations. Such efforts are key to streamlining permitting processes and enabling timely responses to major drivers of biodiversity loss, including the spread of invasive species (Fig. 3).

Box 3. From complexity to practicality. How can policy evolve, sometimes for the better?

The evolution of France's ABS measures demonstrates how adaptive legal frameworks, precise clarifications, and targeted updates can streamline compliance with the NP underscoring the critical role of open, constructive dialogue between users and regulators in crafting effective ABS legislation.

When the French ABS law came into force in August 2016, it aimed for simplicity: non-commercial users only had to submit a short declaration, while commercial utilization required full authorization. In order to further facilitate access, exceptions were introduced for certain GR that did not require a declaration or authorization. For example, a list of "model species" (Webpage - Légifrance) and five specific schemes, including one for domesticated and cultivated species, were exempt from the national ABS

system. Despite good intentions, navigating the list of “model species” increased regulatory complexity, while the “special scheme for domesticated and cultivated species” remained of little practical use for microbiologists in the absence of clarity if microorganisms were covered. In addition, the documentation associated with ABS obligations was initially only available in French.

Researchers therefore found themselves having to navigate a maze of partly unclear obligations for mainland France, compounded by the fact that French overseas territories, such as New Caledonia and French Polynesia, and for traditional knowledge from French Guiana and Wallis et Futuna, have their own ABS regimes, each requiring separate communication with local focal points.

Dialogue between the scientific community and the relevant ministries never ceased, and legislators welcomed the scientific community's comments and managed to broker solutions that gradually addressed some of the operational problems.

A three-year trial period, from 2019 to 2022, temporarily excluded microorganisms from any ABS obligations, allowing unrestricted access, a change that was warmly welcomed by the microbiological community (Ferrari *et al.* 2024). After 2022, a two-year period of uncertainty followed, as the exemption had expired and it remained unclear whether cultivated microbes were excluded. During this time, scientific communities from several Horizon Europe research projects actively consulted French authorities. By 2024, France clarified in administrative proceedings that microorganisms placed in a culture medium fall into the “domesticated and cultivated species scheme“ under which there is no ABS procedure nor obligations to fulfill (Webpage - Ministère de l’Agriculture, de l’Agro-alimentaire et de la Souveraineté alimentaire) and that the same exception applies to “[t]he genetic resources collected by the laboratories to prevent and control the serious risks for human health ...” (Online document - ABSCH, Courtesy translation French law 2016-1087) (Fig. 4). Meanwhile, all guidance documents, declaration forms, and authorization templates have been translated into English over time, breaking down the language barrier that had hindered many non-French-speaking scientists (Online document - ABSCH, Courtesy translation French law 2016-1087; Online document - Ministère de la Transition écologique, de la Biodiversité et des Négociations internationales sur le climat et la nature; Webpage - Formulaire 15786*02, Service Public Entreprendre).

Looking ahead, France's experience suggests several guiding principles:

- First, ABS regulatory frameworks must remain adaptable to reflect the evolving needs of stakeholders and changes in the reality of benefit-sharing among nation states.
- Second, unambiguous legislative definitions facilitate regulatory navigation and ensure uniform application.
- Third, multilingual guidelines are essential to promote global collaboration and reduce administrative burdens.

Legislators and users of genetic resources must remain vigilant: legal changes can introduce uncertainty, but they also offer opportunities to improve clarity, accessibility, and ethical rigor in the management of ABS obligation for genetic resources.

Author contributions

Davide Faggionato (Conceptualization [lead], Writing – original draft [lead], Writing – review & editing [lead], Visualization [lead]), Melania Muñoz-García (Writing – original draft [lead], Writing – review & editing [lead], Visualization [lead]), Tanja Kostic (Conceptualization [lead], Writing – review & editing [supporting], Visualization [supporting]), Mariana L. Ferrari (Conceptualization [lead], Writing – original draft [supporting], Writing – review & editing [supporting], Visualization [supporting]), Pascale Vonaesch (Writing – original draft [supporting], Writing – review & editing [supporting], Visualization [lead]), Mathilde Poyet (Writing – original draft [supporting], Writing – review & editing [supporting], Visualization [lead]), Perrine Portier (Conceptualization [lead], Writing – original draft [supporting], Writing – review & editing [supporting], Visualization [supporting]), Matthew J. Ryan (Conceptualization [lead], Writing – review & editing [supporting], Visualization [supporting]), Djamila Djeddour (Writing – original draft [supporting], Writing – review & editing [supporting], Visualization [supporting]), Cornelia Stumptner (Conceptualization [lead], Writing – review & editing [supporting], Visualization [supporting]), Giovanna Cristina Varese (Conceptualization [lead], Writing – review & editing [supporting], Visualization [supporting]), Aurora Zuzuarregui (Conceptualization [lead], Writing – review & editing [supporting], Visualization [supporting]), Mathieu Groussin (Writing – original draft [supporting], Writing – review & editing [supporting], Visualization [lead]), Michael Schloter (Writing – review & editing [supporting], Visualization [supporting]), Robert D. Finn (Writing – review & editing [supporting], Visualization [supporting]), Aylin S. Haas (Writing – review & editing [supporting], Visualization [supporting]), Ian Probert (Writing – review & editing [supporting]), Gerard Verkleiy (Writing – review & editing [supporting]), Jörg Overmann (Conceptualization [lead], Writing – review & editing [supporting], Visualization [supporting]), Amber H. Scholz (Conceptualization [lead], Writing – original draft [lead], Writing – review & editing [lead], Visualization [lead]).

Correspondence should be addressed to Amber H. Scholz.

Funding

D.F., T.K., P.P., J.O., A.H.S. and R.D.F. acknowledge support from the Horizon Europe project MICRObiome Biobanking (RI) Enabler (MICROBE) (Grant agreement ID: 101094353).

P.P., M.J.R., D.D., A.Z., and G.C.V. acknowledge support from the Horizon Europe project Microbes-4-Climate (Grant agreement ID: 101131818).

A.S.H. and A.H.S. acknowledge support from the Horizon Europe project European Viral Outbreak Response Alliance (EVORA) (Grant agreement ID: 101131959).

C.S. obtained funding from the Austrian Federal Ministry of Women, Science and Research funded project BBMRI.at (grant number 2023-0.752.780).

G.C.V. acknowledges support from the European Commission – NextGenerationEU, Project SUS-MIRRI.IT "Strengthening the MIRRI Italian Research Infrastructure for Sustainable Bioscience and Bioeconomy", code n. IR0000005. Furthermore, we acknowledge the contribution and support from the RI MIRRI-IT.

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Horizon Europe Program. Neither the European Union nor the granting authority can be held responsible for them.

M.M.G. and A.H.S. acknowledge support from the German Alliance of Scientific Organization's project "Access and Benefit Sharing Information Platform".

M.P. and M.G. acknowledge support from the DFG (German Science Foundation) within the Collaborative Research Center (CRC) 1182 on the Origin and Function of Metaorganisms (Project-ID 261376515 – SFB 1182, project C5.1 to M.G., project C5.2 to M.P.) and within the Cluster of Excellence 2167 "PrecisionMedicine in Chronic Inflammation (PMI)" (EXC 2167). They also acknowledge support for the Global Microbiome Conservancy from the Center for Microbiome Informatics and Therapeutics at the Massachusetts Institute of Technology, USA. M.G. also received funding from the ERC (VESICULOME, 101126254).

P.V. acknowledges support from the Swiss National Science Foundation through the NCCR Microbiome, supported by the Swiss National Science Foundation (Grant number 180575), as well as an Eccellenza Professorial Fellowship (no. PCEFP3_194545) and a SNSF Starting Grant (no. TMSGI3_218455).

Co-funded by the European Union.

Acknowledgements

The outline and policy content of this article were developed within Work Package 5, "Legal and ethical framework for microbiome biobanking", of Horizon Europe project MICRObiome Biobanking (RI) Enabler (MICROBE). The manuscript's policy analysis was subsequently discussed and peer-reviewed at a 2025 meeting of the Horizon Europe Microbes-4-Climate project, with additional input from the Horizon Europe projects MICROBE and European Viral Outbreak Response Alliance (EVORA). Subsequent rounds of review by project-affiliated authors and members of the MICROBE Advisory Group further refined and consolidated the content.

The manuscript's policy content was also presented and discussed at Europe Biobank Week 2025 and at the MikroBioKosmos Society & Central and Eastern Europe Symposium of Microbial Ecology 2025.

We would like to thank Scarlett Sett of the CSIRO Australian Centre for Disease Preparedness for her comments during the preparation of this manuscript.

The world map in Figure 2 and the outlines of Argentina and the United Kingdom in Figure 3 were created using www.mapchart.net. The icons used in the supplementary information were made by Freepik from www.flaticon.com.

Figures were generated using biorender.com:

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Conflict of interest

No conflict of interest declared.

Data availability

All relevant data are contained within this article.

Bibliography

Biermann F, Kanie N, Kim RE. Global governance by goal-setting: the novel approach of the UN Sustainable Development Goals. *Current Opinion in Environmental Sustainability* 2017;**26–27**:26–31.

Chege Kamau E ed. *Global Transformations in the Use of Biodiversity for Research and Development: Post Nagoya Protocol Implementation Amid Unresolved and Arising Issues*. Cham: Springer International Publishing, 2022.

Conference of the Parties to the Convention on Biological Diversity. Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity: Text and Annex. 2011.

Crowther TW, Rappuoli R, Corinaldesi C *et al.* Scientists' call to action: Microbes, planetary health, and the Sustainable Development Goals. *Cell* 2024;**187**:5195–216.

Davis K, Smit MF, Kidd M *et al.* An access and benefit-sharing awareness survey for botanic gardens: Are they prepared for the Nagoya Protocol? *South African Journal of Botany* 2015;**98**:148–56.

Ebert AW, Engels JMM, Schafleitner R *et al.* Critical Review of the Increasing Complexity of Access and Benefit-Sharing Policies of Genetic Resources for Genebank Curators and Plant Breeders–A Public and Private Sector Perspective. *Plants* 2023;**12**:2992.

Editor and Publisher of Journal of Natural History. Statement of Retraction: Additional new species of *Grouvellinus* Champion 1923 (Insecta, Coleoptera, Elmidae) discovered by citizen scientists and DNA barcoded in the field applying a novel MinION-based workflow. *Journal of Natural History* 2020;**54**:1697–1697.

European Commission. *EU Grants: How to Complete Your Ethics Self-Assessment: V2.0*. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/how-to-complete-your-ethics-self-assessment_en.pdf (December 12, 2025a, date last accessed)

European Commission. Guidance document on the scope of application and core obligations of Regulation (EU) No 511/2014 of the European Parliament and of the Council on the compliance measures for users from the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation in the Union 2021/C 13/01. 2021b:https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=oj:JOC_2021_013_R_0001.

European Parliament and Council. *Regulation - 511/2014 - EN - EUR-Lex*. https://eur-lex.europa.eu/eli/reg/2014/511/oj/eng (November 19, 2025, date last accessed)

Ferrari ML, Chesneau O, Clermont D *et al.* Clarification on the implementation of the Nagoya Protocol in France for the access and sharing of benefits arising from the utilization of microbial genetic resources. *International Journal of Systematic and Evolutionary Microbiology* 2024;**74**, DOI: 10.1099/ijsem.0.006262.

German Research Foundation. Guidelines for Research and/or Development Projects Involving Access to Genetic Resources and/or to Traditional Knowledge Associated with Genetic Resources. 2021.

Heinrich M, Scotti F, Andrade-Cetto A *et al.* Access and Benefit Sharing Under the Nagoya Protocol—Quo Vadis? Six Latin American Case Studies Assessing Opportunities and Risk. *Frontiers in Pharmacology* 2020;**11**, DOI: 10.3389/fphar.2020.00765.

Kim E, An SL, Choi JB *et al.* RETRACTED: Taxonomic study on the montanellus species group of the genus Cyclommatus (Coleoptera: Lucanidae) from Borneo Island, Malaysia, and Indonesia. *Journal of Asia-Pacific Biodiversity* 2020;**13**:372–9.

Law Y-H. This amazing blue tarantula is a new spider species—but did researchers break the law when they studied it? *Science* 2019, DOI: 10.1126/science.aax1678.

Law Y-H. Illicit centipede raises thorny question: Should journals have refused to publish a paper about it? *Science* 2021, DOI: 10.1126/science.abh0269.

Marden E, Abbott RJ, Austerlitz F *et al.* Sharing and reporting benefits from biodiversity research. *Molecular Ecology* 2021;**30**:1103–7.

Margo A. Bagley, Arti K. Rai. The Nagoya Protocol and Synthetic Biology Research: A Look at the Potential Impacts. *Virginia Public Law and Legal Theory Research Paper, Emory Legal Studies Research Paper* 2014.

Morgera E. *Fair and Equitable Benefit-Sharing in International Law*. New York: Oxford University Press, 2024.

Normand V, Oliva MJ, Müller S *et al.* The contribution of access and benefit-sharing (ABS) to the sustainable development goals. 2021.

Online document - ABSCH, Courtesy translation French law 2016-1087. *TITLE V ACCESS TO GENETIC RESOURCES, FAIR AND EQUITABLE BENEFIT - SHARING Courtesy Translation*. https://absch.cbd.int/api/v2013/documents/728A5D5D-21BB-3058-0A10-D752E62C3F25/attachments/211500/Title%20V_Law%20on%20biodiversity%20dated%208th%20of%20August%202016_French%20%20ABS%20legislation.pdf (November 17, 2025, date last accessed)

Online document - Ministère de la Transition écologique, de la Biodiversité et des Négociations internationales sur le climat et la nature. *Access to Genetic Resources and Associated Traditional Knowledge and Sharing of the Benefits Arising from Their Utilization (ABS)*. https://www.ecologie.gouv.fr/sites/default/files/documents/Access-to-genetic-resources-and-associated.pdf (November 17, 2025, date last accessed)

Rabitz F. Biopiracy after the Nagoya Protocol: Problem Structure, Regime Design and Implementation Challenges. *Bras Political Sci Rev* 2015;**9**:30–53.

Rahi P. Regulating access can restrict participation in reporting new species and taxa. *Nat Microbiol* 2021;**6**:1469–70.

Robinson DF, Von Braun J. New Challenges for the Nagoya Protocol: Diverging Implementation Regimes for Access and Benefit-Sharing. In: Correa C, Seuba X (eds.), *Intellectual Property and Development: Understanding the Interfaces*. Singapore: Springer Singapore, 2019, 377–403.

Schneider XT, Stroil BK, Tourapi C *et al.* Responsible Research and Innovation Framework, the Nagoya Protocol and Other European Blue Biotechnology Strategies and Regulations: Gaps Analysis and Recommendations for Increased Knowledge in the Marine Biotechnology Community. *Marine Drugs* 2022;**20**:290.

Simm K. Benefit-sharing: a look at the history of an ethics concern. *Nat Rev Genet* 2007;**8**:496–496.

Sirakaya A. Where access and benefit-sharing comes from: A historical overview. *GenResJ* 2022;**3**:74–88.

Smith D, Da Silva M, Jackson J *et al.* Explanation of the Nagoya Protocol on Access and Benefit Sharing and its implication for microbiology. *Microbiology* 2017;**163**:289–96.

Webpage - ABS Strategy, German Nagoya Protocol HuB. *Build Your ABS Strategy – Checklist – Nagoyaprotocol-Hub*. https://www.nagoyaprotocol-hub.de/abs-strategy/ (November 17, 2025, date last accessed)

Webpage - ABS world, German Nagoya Protocol HuB. *Understanding the ABS World – Infographic – Nagoyaprotocol-Hub*. https://www.nagoyaprotocol-hub.de/abs-world-infographic/ (November 17, 2025, date last accessed)

Webpage - ABSCH, Convention on Biological Diversity. *ABSCH | Access and Benefit-Sharing Clearing-House*. https://absch.cbd.int/en/ (November 17, 2025, date last accessed)

Webpage - Afribiota project. *Afribiota Project: Childhood Malnutrition*. https://www.pasteur.fr/en/international/international-programs/afribiota-project-childhood-malnutrition (November 17, 2025, date last accessed)

Webpage - CITES. *Convention on International Trade in Endangered Species of Wild Fauna and Flora | CITES*. https://cites.org/eng/disc/text.php (November 19, 2025, date last accessed)

Webpage - Convention on Biological Diversity. *Convention on Biological Diversity*. https://www.cbd.int/ (November 17, 2025, date last accessed)

Webpage - ENV DECLARE, EU Commission. *ENV DECLARE - Nagoya IT System*. https://audiovisual.ec.europa.eu/en/video/I-193088 (November 17, 2025, date last accessed)

Webpage - Fast Track, Leibniz Institute DSMZ. *New ´fast Track´ Access and Benefit-Sharing Agreement for Costa Rican Microbes*. https://www.dsmz.de/press/press-releases/singleview/new-fast-track-access-and-benefit-sharing-agreement-for-costa-rican-microbes (November 17, 2025, date last accessed)

Webpage - Formulaire 15786*02, Service Public Entreprendre. *Declaration Regarding Access to Genetic Resources and Benefit-Sharing Arising from Their Utilisation (Formulaire 15786*02) | Entreprendre.Service-Public.Fr*. https://entreprendre.service-public.fr/vosdroits/R57747 (November 17, 2025, date last accessed)

Webpage - Global Microbiome Conservancy. *Global Microbiome Conservancy*. https://microbiomeconservancy.org/ (November 17, 2025, date last accessed)

Webpage - Légifrance. *Arrêté Du 3 Septembre 2019 Relatif Aux Espèces Modèles - Légifrance*. https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000039180351 (November 17, 2025, date last accessed)

Webpage - Ministère de l'Agriculture, de l'Agro-alimentaire et de la Souveraineté alimentaire. *Ressources Génétiques : L'application Du Protocole de Nagoya En France | Ministère de l'Agriculture et de La Souveraineté Alimentaire*. https://agriculture.gouv.fr/ressources-genetiques-lapplication-du-protocole-de-nagoya-en-france (November 17, 2025, date last accessed)

Webpage - NP parties, Convention on Biological Diversity. *Parties to the Nagoya Protocol*. https://www.cbd.int/abs/nagoya-protocol/signatories (November 17, 2025, date last accessed)

Webpage - Strain Deposit, Leibniz Institute DSMZ. *Leibniz Institute DSMZ: Strain Deposit*. https://www.dsmz.de/collection/nagoya-protocol/strain-deposit (November 17, 2025, date last accessed)

Webpage - Sustainable Development 15: Life on Land. https://globalgoals.org/goals/15-life-on-land/ (November 17, 2025, date last accessed)

Webpage - UiT The Arctic University of Norway. *H2020 and the Nagoya Protocol - New Developments on Participant Portal | UiT*. https://en.uit.no/nyheter/artikkel?p_document_id=527259 (November 17, 2025, date last accessed)

Webpage - UK Environment Agency and Department for Environment, Food & Rural Affairs. *Weevil Used to Control Floating Pennywort in the Cam Washes*. https://www.gov.uk/government/news/weevil-used-to-control-floating-pennywort-in-the-cam-washes (January 9, 2026, date last accessed)

Weiland S, Hickmann T, Lederer M *et al.* The 2030 Agenda for Sustainable Development: Transformative Change through the Sustainable Development Goals? *PaG* 2021;**9**:90–5.

Zheng X. Empowering indigenous peoples and local communities: A human rights-based appraisal of the compliance mechanism of the Nagoya Protocol. *Rev Euro Comp Intl Enviro* 2021;**30**:61–72.

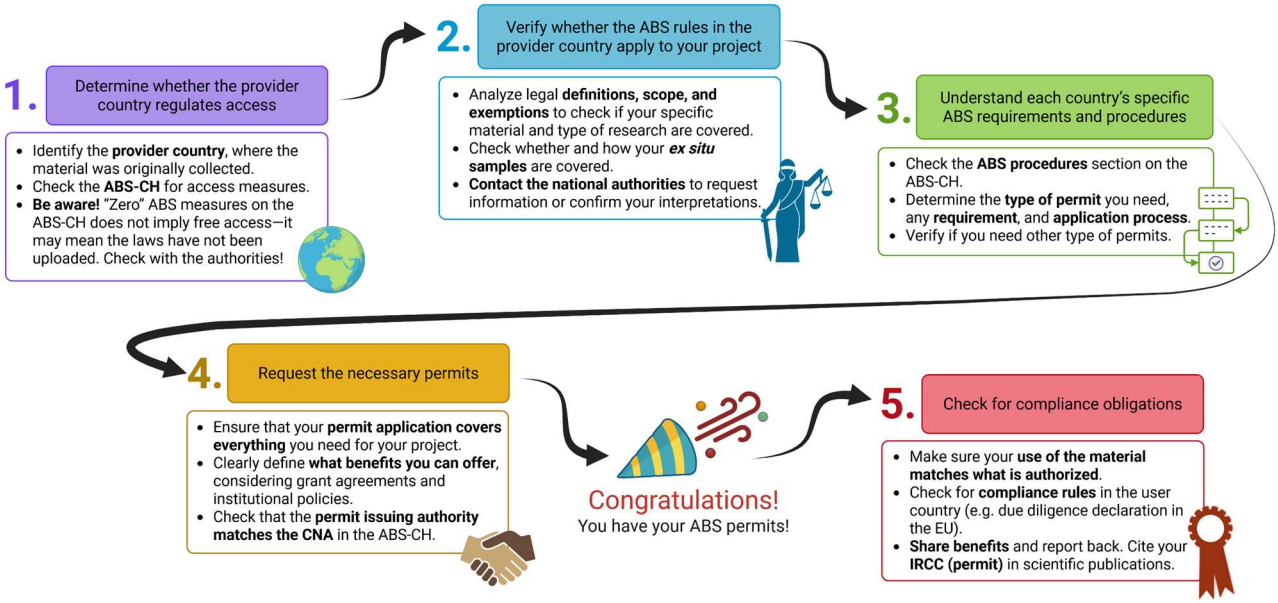

Figure 1. Step by step guide to comply with the Nagoya Protocol. *Visual guide outlining the main steps for navigating ABS obligations.*

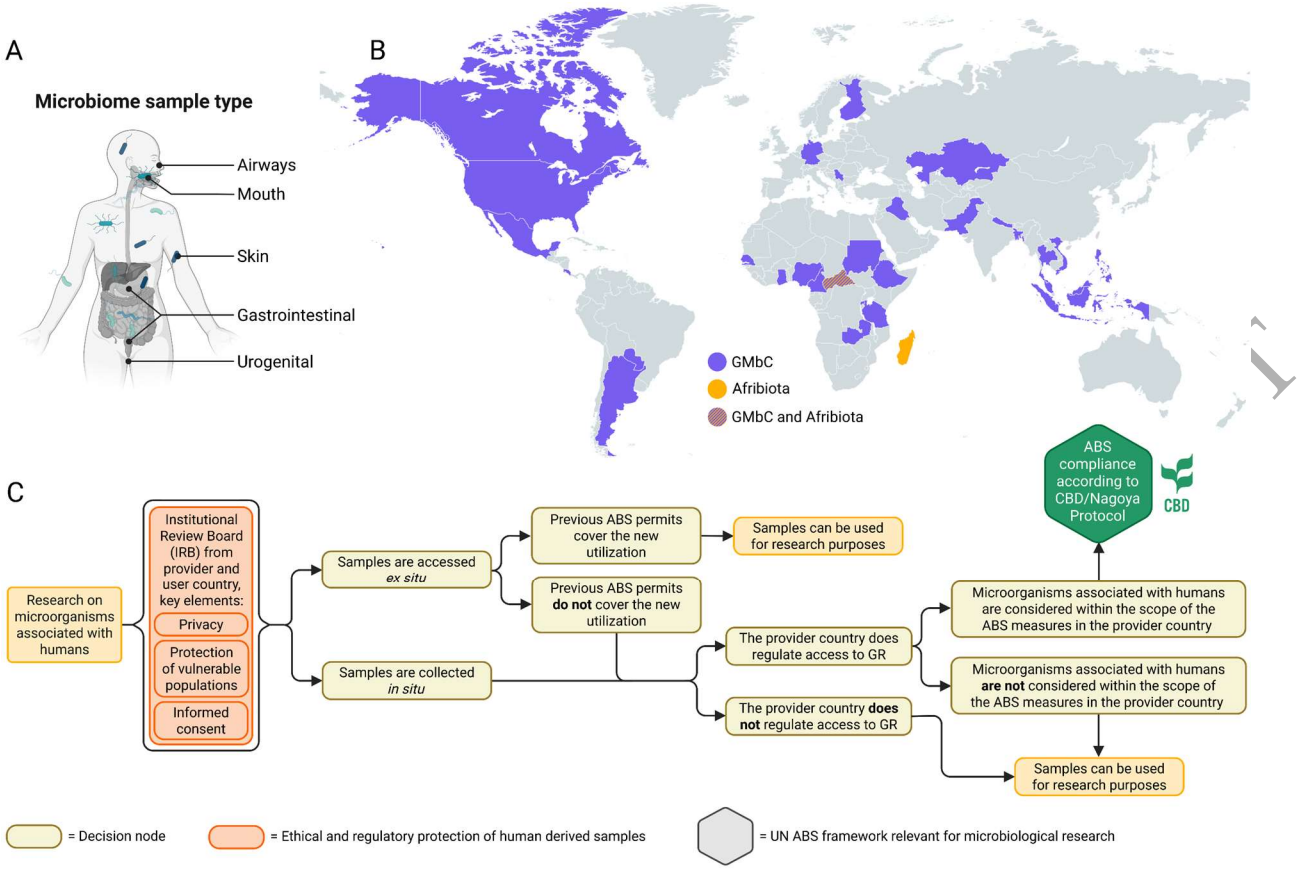

Figure 2. Navigating human-derived microbiome utilization and sample (re)use.

The body of every single human being is home to a variety of different microbiomes (A). Geographically distant human communities may have patterns in their associated microbiomes, which can help understand how lifestyle, diet, environment, and other differences alter human microbiomes and may be related to health or disease. International initiatives such as the Global Microbiome Conservancy (GMbC) and Afribiota have developed collaborations in diverse geographical areas to address this type of research questions (B). However, in addition to the imperative to utilize human samples ethically and fairly, the lack of legislative uniformity in regulating ABS for human microbiomes and microorganisms makes it difficult for researchers to navigate the path to legally accessing these microbiological GR (C). Furthermore, (re)use of ex situ *samples originally collected for other projects, shared by collaborators, or obtained from biobanks may also prove intricate and lead to a complex ABS journey (C). Despite the difficulties in navigating this fragmented regulatory landscape, research consortia like the GMbC and Afribiota demonstrate that human microbiome research can be both NP-compliant and scalable, serving as models for global collaboration (B).*

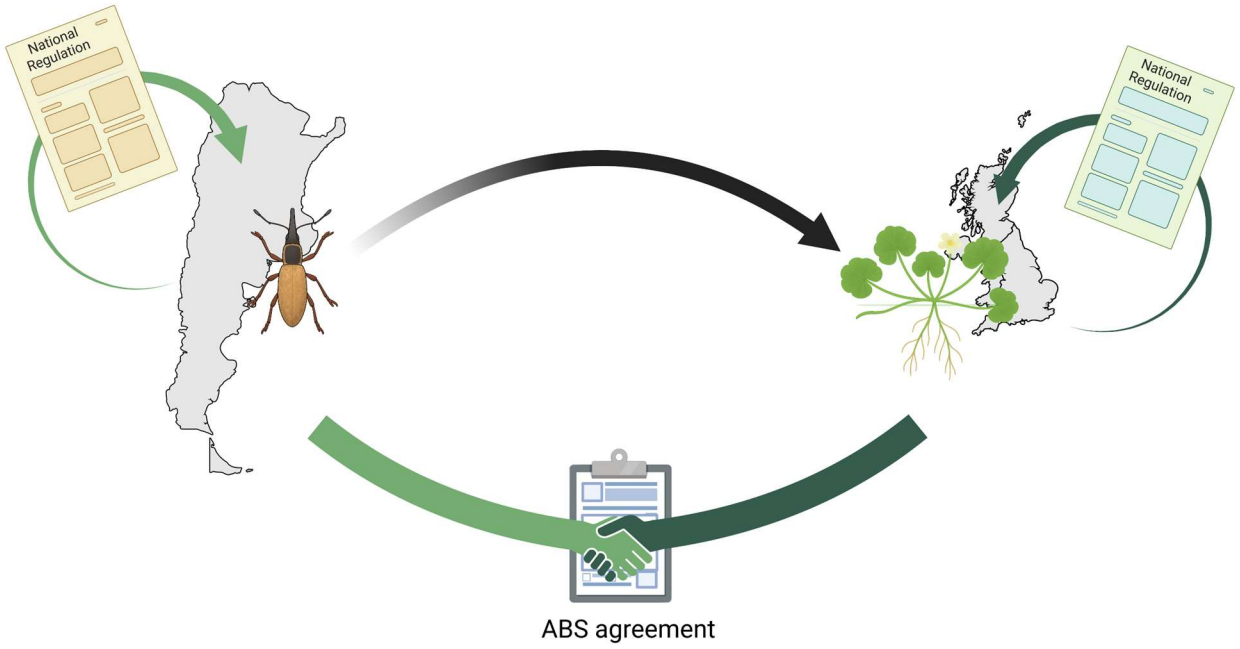

Figure 3. Research on invasive species and its biological control is covered by international and domestic regulation. *Before research on GR begins, it requires compliance not only with ABS regulations in the provider country but also with regulations on import and use in the user country. Adherence to different national regulations is challenging and researchers must be perseverant in navigating frameworks for the ethical and equitable governance of biological material use.*

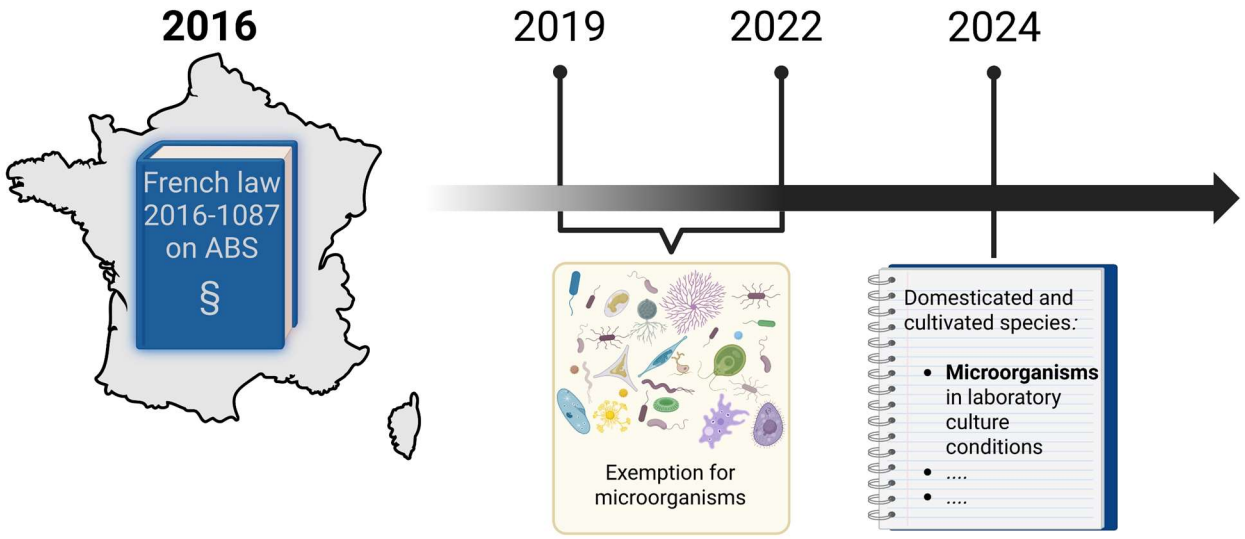

Figure 4. Evolution of French ABS regulation for microorganisms. *Three years after coming into force in 2016, the French ABS regulations established a pilot exemption for access to microbial genetic resources from 2019 to 2022. Between 2022 and 2024, microorganisms were re-integrated into ABS regulations, but as of 2024, clarification was provided that, when grown in culture media, they are considered under the "domesticated and cultivated species scheme" and therefore excluded from ABS obligations. Furthermore, "genetic resources collected by the laboratories to prevent and control the serious risks for human health" are also excluded from ABS obligations.*

Table 1. Acronyms.

Acronym	Definition
ABS	Access and Benefit-Sharing
ABS-CH	ABS Clearing-House
aTK	associated Traditional Knowledge
CABI	Centre for Agriculture and Bioscience International
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNA	Competent National Authorities
DEFRA	Department for Environment, Food & Rural Affairs (UK)
EU	European Union
FuEDEI	Fundación para el Estudio de Especies Invasivas
GR	Genetic Resource(s)
ICNP	International Code of Nomenclature of Prokaryotes
IPLCs	Indigenous Peoples and Local Communities
MAT	Mutually Agreed Terms
MAyDS	Ministerio de Ambiente y Desarrollo Sostenible (Ministry of the Environment and Sustainable Development)
MTA	Material Transfer Agreement
NP	Nagoya Protocol
PIC	Prior Informed Consent
SDG	United Nations Sustainable Development Goal
SENASA	Servicio Nacional de Sanidad y Calidad Agroalimentaria (The National Food Safety and Quality Service)
UK	United Kingdom
UN	United Nations

USA	United States of America