

Journal of legal and social studies

Issn: 2507-7333

Eissn: 2676-1742

The Protection of Biological and Genetic Resources: Between the Principle of Sovereignty and the Intellectual Property Rights Regime in International Trade Relations

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Date of send: 2026/03/05	date of acceptance: 2026/05/01	Date of Publication: 2026/06/01
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Abstract :

This study addresses the legal and economic controversy surrounding biological and genetic resources in light of the rapid advancements in biotechnology.

The study aims to examine the problematic endeavors of technologically advanced nations to monopolize economic returns through the instrumentalization of intellectual property regimes, which has led to the emergence of biopiracy practices and a widening developmental gap with developing nations. Conversely, the study explores the efforts of provider states to assert their permanent sovereignty over natural resources and traditional knowledge, pursuant to the Convention on Biological Diversity (CBD). This legal framework imposes preventive mechanisms, notably Prior Informed Consent (PIC) and the fair and equitable sharing of benefits arising from the exploitation of these resources within international trade relations.

Keywords: Genetic Resources ; Biotechnology; Biopiracy ;Intellectual Property Rights ; Prior Informed Consent; Access and Benefit-Sharing.

Introduction

Biological and genetic resources represent a fundamental source of food, medical, and therapeutic substances among States. The utilization of these resources is multifaceted, encompassing the production of food commodities, the development of pharmaceutical products—such as medicines, vaccines, and related preparations—as well as cosmetic goods, including perfumes, hygiene materials, and therapeutic products. Moreover, these resources play a pivotal role in the manufacture of innovative materials and products within the textile and food industries, such as the creation of flavors and colorants, and in the development of new plant varieties and plant protection products (pesticides) for agricultural purposes.

Given their essential nature, these materials and products—particularly those of nutritional and pharmaceutical significance—constitute some of the most widely exchanged goods in international trade.

Due to the importance of these resources, it has become necessary to preserve and develop them in order to prevent their depletion and extinction. However, the conservation and protection of biological resources do not imply their exclusion from commercial activity; on the contrary, trade, industrial development, and the exploitation of such resources should be encouraged. Nevertheless, the preservation and utilization of biological resources have raised numerous challenges, particularly within North–South trade relations.

While developing countries possess immense genetic resources and traditional knowledge indispensable for deriving new varieties of plants and animals, as well as for the broad development of pharmaceuticals, developed countries hold modern scientific expertise, manufacturing techniques, and biotechnological capabilities enabling them to produce new biological components. These are then monopolized through the application of intellectual property rights systems designed to protect innovations in the biological field.

The issue of protecting and exploiting biological resources has thus become a major source of tension in international trade relations—between the industrialized, technology-exporting countries seeking to impose high standards of intellectual property protection, by safeguarding new innovations through patents or specific plant protection systems in accordance with the 1994 TRIPS Agreement; and the developing countries, which are either importers or owners of these biological assets and have expressed concern that global protection may

lead to massive monopolies, higher commodity prices, and harm to their national objectives. These developing countries advocate for a system facilitating access to biological resources within their territories in exchange for the fair and equitable sharing of benefits arising from their utilization, the preservation of the traditional knowledge of local communities, and the non-restriction of the sovereign rights of the State over the exploitation of these resources, in accordance with the principle of sovereignty over natural wealth enshrined in the 1992 Convention on Biological Diversity and its supplementary protocols.

In light of the foregoing, the following research problematic arises:

What is the most appropriate legal framework for the protection of biological and genetic resources in light of the Convention on Biological Diversity and the TRIPS Agreement?

To address this research problematic, the study adopts a two-part analytical framework. The first part examines the application of intellectual property rights to biological diversity, focusing initially on the globalization of the intellectual property regime within international trade policy, and subsequently on the protection of biological resources through intellectual property law. The second part explores the divergence between the principle of sovereignty over biological diversity and intellectual property rights, analysing both the role of intellectual property in facilitating the biopiracy of biological resources and the mechanisms for protecting these resources under the principle of sovereignty.

The First Topic: The Application of Intellectual Property Rights to Biological Diversity

The importance of biological resources has significantly increased with the emergence of what is known as *biotechnology*, which focuses on the utilization of natural wealth as raw material in various industrial sectors, particularly in the food and pharmaceutical industries through the production of medicines. During this period, the attention of knowledge- and technology-owning States shifted toward ensuring the protection of their innovations and securing exclusive rights to their exploitation through the system of intellectual property rights, which became a cornerstone of their international trade policy (First Requirement). This protection has been primarily implemented through patent systems and plant variety protection regimes (Second Requirement).

First Requirement: The Globalization of the Intellectual Property Regime within International Trade Policy

The issue of intellectual property rights (IPRs) emerged as a novel subject within the framework of the Uruguay Round negotiations¹, following a proposal by the United States administration to ensure the protection of intellectual and creative outputs, particularly in relation to the technological patents held by American corporations.

The protection of intellectual property rights came to constitute a pivotal concern in the trade policy of major industrialized nations, especially the United States of America. In this regard, the President's Commission on Industrial Competitiveness, in its 1985 report, recommended the necessity of implementing and safeguarding technological innovation in order to address the threat of losing the United States' competitive position amid the rapid growth of global technology markets². Consequently, U.S. trade representatives succeeded in incorporating the issue of intellectual property rights as a central topic within the Uruguay Round negotiations.

Section One: The Conclusion of the TRIPS Agreement³.

The TRIPS Agreement did not come into existence easily; its adoption was preceded by numerous obstacles and complex negotiations, primarily driven by conflicting interests between developed countries—led by the United States of America—and developing nations.

The history of intellectual property rights thus witnessed a turning point that differed substantially from previous developments. The proposal to include intellectual property rights within the framework of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) initially met with strong opposition from developing countries, particularly Brazil, South Africa, and India. However, following extensive consultations, a compromise solution was reached, allowing the GATT negotiations to address intellectual property issues strictly from a *commercial perspective*. which ultimately resulted, at the conclusion of the negotiations, in the adoption of the **Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)**, signed in Marrakesh, Morocco, on **14 April 1994**.

The Agreement entered into force on 1 January 1996 for developed countries — that is, one year after the entry into force of the Agreement Establishing the

World Trade Organization (WTO) on 1 January 1995 — and on 1 January 2000 for developing countries, with a grace period extending until 1 January 2005, and on 1 January 2006 for least-developed countries⁴.

Section Two: The Objectives of the TRIPS Agreement .

The TRIPS Agreement seeks to universalize the protection of all forms of intellectual property related to trade by establishing new legal standards for the protection and enforcement of these rights. It also aims to organize the mechanisms for applying such protection in order to prevent and resolve disputes that may arise from their violation.

Furthermore, the Agreement places significant emphasis on safeguarding high-technology industries, notably biological and genetic engineering sectors, which are often described as the core of the technological revolution, as well as on the protection of the pharmaceutical industry. Through this approach, TRIPS integrated intellectual property protection into the multilateral trading system for the first time, thereby transforming it into a fundamental component of international economic law⁵.

Second Requirement: The Protection of Biological Resources under Intellectual Property Law.

The protection of new biological innovations has been primarily grounded in the application of intellectual property rights, particularly through the **patent system** (section 1) and the **special regime for the protection of plant varieties** (section 2).

Section One: The Protection of Biological Resources through Patents.

In light of the advances achieved in biotechnology—whose raw material consists of living matter, whether of human, plant, animal, or even microbial origin—this field has established itself alongside traditional industrial technologies. Consequently, companies active in the biotechnology sector have recognized the necessity of protecting their biological inventions through **patent rights**, which confer upon the inventor exclusive rights and the ability to benefit from the commercial exploitation of the invention.

This development led biotechnology corporations to exert pressure on the governments of developed countries to enact robust legislation guaranteeing the protection of their biological inventions. As a result, this issue was incorporated

into the final negotiations of the Uruguay Round, which culminated in the establishment of the **World Trade Organization (WTO)** through the Marrakesh Agreement of 1994—one of whose principal agenda items was the protection of trade-related intellectual property rights.

The protection of new biological products, or of the processes and methods used to obtain them, is thus ensured primarily through **patent protection (First)**. This system applies to numerous fields encompassing all living organisms—animals, plants, and microorganisms alike (**Second**). Such protection produces **legal effects** both in favor of the inventor and against third parties who may infringe upon the patented invention (**Third**).

First : The Concept of Patent.

The **TRIPS Agreement** did not establish a unified definition of what constitutes an *invention*, thereby leaving Member States the discretion to determine the concept of invention within their respective national legislations. This approach was intended to provide a broad margin of flexibility, considering the evolving technological and scientific circumstances inherently linked to the notion of invention.

Scholarly definitions of *patent* have varied considerably. Among the most notable, **Saeed Ahmed Al-Khouli** defined a patent as: “An official certificate issued by a competent administrative authority of the State to the inventor or discoverer, by virtue of which the latter acquires the right to exclusively exploit his invention or discovery agriculturally, commercially, or industrially, for a limited period and under specific conditions.”⁶

patent has also been defined more generally as: “A certificate granted by the State to the inventor, conferring upon him the right to exclusively exploit his invention for financial gain for a specific period and under certain prescribed conditions.”⁷

In Algerian legislation, Article 2, paragraph 3, **of Ordinance No. 03-07** of 19 June 2003 relating to patents defines a patent as: “A document granted for the protection of an invention,” provided that the invention satisfies the conditions for patentability, namely *inventiveness*, *novelty*, *industrial applicability*, and *legality*.

Patent protection within the biological field has witnessed a qualitative transformation due to the emergence of biotechnology, which the **Convention on Biological Diversity (1992)**⁸ defines as: “Any technological application that uses

biological systems, living organisms, or derivatives thereof to make or modify products or processes for specific use.” This same definition was reiterated in **Article 8(d)** of the **Nagoya Protocol**⁹ on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization, which supplements the Convention on Biological Diversity.

Second: The Scope of Patenting Living Biological Resources.

The **TRIPS Agreement** protects all inventions, whether pertaining to the *final product* or the *manufacturing process*, across all fields of technology, including innovations based on biological resources, provided that certain conditions are met—namely, inventiveness, novelty, and industrial applicability¹⁰.

The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) codified the provisions governing patents in Section 5, under Articles 27 to 34. Pursuant to these provisions, patents may be granted for any invention, whether it concerns a product or an industrial process, and in all fields of technology, provided that it is new, involves an inventive step, and is capable of industrial application.

A preliminary reading of **Article 27(3)(b)** of the Agreement indicates the possibility of excluding *plants* and *animals* from patentability. However, a closer examination of the phrase “*other than microorganisms*” and the reference to *plants and animals produced by non-biological or microbiological processes* reveals that the provision, in fact, opens the door widely to the patenting of microorganisms, genetically modified animals, and transgenic plants.

Third: The Legal Effects of Patenting Biological Resources

Under the provisions of the **TRIPS Agreement**, a patent grants its holder protection for a period of twenty (20) years, starting from the date on which the patent application is filed¹¹. A patent gives rise to exclusive rights in favor of its owner, while also imposing certain obligations upon them. The holder of a patent enjoys exclusive rights over the use and exploitation of the invention, in addition to the right of disposition as a consequence of ownership. In principle, the granting and enjoyment of patent rights shall take place without any discrimination as to the place of invention, the field of technology, or whether the products are imported or locally produced¹².

1. The Exclusive Right of Exploitation.

According to **Article 28 of the TRIPS Agreement**, a patent confers upon its owner, where the subject matter is a tangible product, the right to prevent third parties who have not obtained his consent from **making, using, offering for sale, selling, or importing** that product for such purposes. Where the subject matter of the patent is an **industrial process**, the patent holder has the right to prevent third parties from using the process without authorization, particularly in respect of offering for sale, selling, or importing the product obtained directly by means of that process.

Accordingly, a **product patent** differs from a **process patent** in that the former may concern a *substance* (such as a chemical composition) or a *set of substances* (such as a strain or cells). The protection conferred by a product patent extends to preventing others from producing, selling, or importing that product. In contrast, a **process patent** relates to the operations performed, for example, on living matter to apply a specific procedure or method. The protection conferred thereby includes preventing others from using the procedure, or from using, selling, or importing the product obtained through that procedure or method. However, such protection does not extend to the product itself if it can be obtained by another means independent of the patented process. Therefore, a product patent affords its holder stronger protection and imposes stricter limitations on subsequent uses and research than does a process patent¹³.

2. The Right of Disposition over the Patent.

The patent holder is entitled to dispose of the patent in accordance with the law. They may **assign, transfer, sell, donate, or mortgage** the patent, which also passes to the **heirs** upon the owner's death. Furthermore, the patent holder may **license** or **transfer** the patent to others through assignment or contractual arrangements permitting third parties to exploit the patented invention.

Section Two: Protection of Plant Varieties - Application of the *Sui Generis* System.

Article 27(3)(b) of the **TRIPS Agreement** provides that Member States are free to determine the intellectual property protection rules to be incorporated into their national legislation, provided that they are obliged to protect plant varieties, whether through patents, a *sui generis* system specifically designed for such varieties, or a combination of both.

First: Definition of a New Plant Variety

The International Convention for the Protection of New Varieties of Plants was concluded on 2 December 1961, establishing the International Union for the Protection of New Varieties of Plants (UPOV), an intergovernmental organization headquartered in Geneva. The **UPOV Convention** aims to provide and promote an effective system of protection for plant varieties, with the objective of encouraging the development of new varieties.

The Convention obliges all Member States to protect all new plant varieties, irrespective of the method used to obtain them, whether through sexual or asexual reproduction, or through the use of genetic engineering techniques¹⁴.

The protected *variety* is defined as: “Any plant grouping within a single botanical taxon of the lowest known rank, which—irrespective of whether it fully satisfies the conditions for the grant of a breeder’s right—can be:

- distinguished by the characteristics resulting from a given genotype or combination of genotypes;
- distinguished from any other plant grouping by at least one of the said characteristics; and
- considered a unit with regard to its suitability for being propagated unchanged.”¹⁵

The protection of plant varieties requires the fulfillment of substantive conditions, namely: **novelty, distinctness, uniformity, and stability (NDUS)**¹⁶, in addition to the requirement of **an appropriate denomination** for the variety¹⁷

Second: Legal Effects of Plant Variety Protection under the *Sui Generis* System

The **plant breeder** enjoys a term of protection of not less than twenty (20) years from the date of the grant of the breeder’s certificate. In the case of trees and vines, the protection period shall be at least twenty-five (25) years from the same date¹⁸.

This protection confers **extensive exclusive rights**, extending even to materials other than the protected variety itself, and also grants the breeder provisional protection during the period between the filing of the application and the formal grant of the breeder’s right.

1. Primary Exclusive Rights

Under the **1991 Act of the UPOV Convention**, the scope of the breeder's rights has been expanded. The breeder is entitled to prevent any third party, without his authorization, from performing any of the following acts with respect to propagating material of the protected variety:

- Production or reproduction (multiplication);
- Conditioning for the purpose of propagation;
- Offering for sale;
- Selling or otherwise marketing;
- Exporting;
- Importing;
- Stocking for any of the aforementioned purposes.¹⁹

2. Extension of the Breeder's Rights to Non-Protected Materials

The breeder's rights are not confined solely to the protected variety itself, but may also **extend to non-protected materials**, as follows:

(a) The Contracting States may strengthen protection by **extending the breeder's rights to products directly obtained from harvested material** of the protected variety.

(b) The breeder's rights may also **extend to essentially derived varieties** and to **certain other varieties** closely related to the protected one.

The Second Topic: The Principle of Sovereignty over Biological Diversity and Intellectual Property Rights — Two Conflicting Regimes

While developed countries seek to ensure the protection of their rights under the principles of intellectual property, developing countries, on the other hand, call for limiting such absolute protection, invoking their sovereign rights over their biological resources and emphasizing the need for recognition of traditional knowledge systems.

Developing countries consider the control exercised by developed nations over biological resources—originally derived from their own territories and improved through the contribution of local communities and their traditional knowledge—as a form of **biological piracy**. Consequently, they argue that such practices must be curtailed out of **respect for States' sovereignty over their natural resources**.

First Requirement: Intellectual Property Rights and the Piracy of Biological Resources

Developing countries consider it necessary to curb the absolute protection afforded to biological resources under intellectual property rights, as such protection promotes private ownership of natural resources without regard to the rights of the source countries, where these resources are often collectively owned by entire communities. This practice is therefore deemed a form of **biological piracy** (Section One).

In this context, developing countries rely on their sovereign rights over their biological resources, and insist on the recognition of prevailing traditional knowledge systems (Section Two).

Section One: The Concept of Biopiracy

The concept of **biopiracy** involves an examination of its definition, which essentially revolves around acts of appropriation, followed by illustrative examples drawn from real-world instances of biological piracy.

First: Definition of Biopiracy

The concept of **biopiracy**—also referred to as **biological piracy**—is relatively recent and has emerged in connection with the development of biotechnology. The Commission on Intellectual Property Rights defines it as: “The appropriation of the knowledge of farmers and indigenous communities and of their genetic resources by individuals or institutions seeking to obtain monopolistic control over such resources and knowledge through patents, plant breeders’ rights, or other forms of intellectual property protection.”²⁰

The human rights activist **Vandana Shiva** defines **biopiracy** as: “The use of intellectual property systems to legitimize exclusive ownership and control over biological resources, products, and processes that have been used for centuries within non-industrial cultures.”²¹

It is evident from these definitions that **biopiracy** refers to acts of appropriation carried out by developed countries to monopolize the **natural or biological resources** of developing nations — without compensation, authorization, acknowledgment, or regulation of their exploitation — in order to satisfy their own needs at the expense of local and indigenous populations.

Second: Examples of Biopiracy.

One example of the misappropriation of biological resources in the **pharmaceutical field** is the application submitted by the **Fox Chase Cancer Center** of the University of Philadelphia to the European Patent Office for a **patent on the plant *Phyllanthus niruri*** as a treatment for viral hepatitis, despite the fact that this plant has long been used in traditional Indian medicine to treat insomnia²².

As for **biological piracy in the agricultural and food sectors**, a well-known case concerns the **Texas Rice Research Center**, which obtained a **patent on certain Basmati rice strains**. The patented varieties contained genetic material derived from strains originally developed by Indian farmers — even though the Indian subcontinent is the primary producer and exporter of premium Basmati rice.²³

Section Two: The Effects of Biopiracy

Countries possessing **biological diversity**—which are predominantly **developing nations**—constitute the primary victims of **biopiracy**, due to the numerous adverse consequences resulting therefrom, most notably:

First: The monopolization by technologically advanced countries and multinational corporations of the traditional knowledge held by indigenous communities concerning biological diversity.

This practice effectively transforms the collective rights of those communities into exclusive proprietary rights, enabling such corporations to derive financial benefits and profits through the commercial exploitation of these resources, whether by granting licenses or by selling the resulting products and crops.²⁴

An illustrative example of such monopolization is the case of **the U.S. company Agracetus**, which, in 1994, obtained an extensive patent covering all genetically modified soybean varieties—a crop that was originally cultivated in China as a food source and is now widely used for food, oil production, and animal feed.

This patent led to a complaint filed by a competing American corporation, Monsanto, which argued that the alleged invention lacked an inventive step and was not novel. However, once **Monsanto acquired Agracetus**—along with its

patent—it withdrew the complaint, thereby consolidating control over the patented genetic material.²⁵

Rice constitutes the main agricultural crop for nearly half of the world's population, particularly in Asia. A study conducted between 1982 and 1991 revealed that there were **160** biotechnology patents relating to rice, the majority of which were held by U.S. and Japanese corporations. Even more striking is the fact that over half of these patents were concentrated in the hands of only thirteen companies. This situation provoked widespread protests by farmers in India and Thailand, who took to the streets to denounce the patenting of rice by an American company, viewing it as an act of biopiracy threatening their livelihoods and traditional agricultural heritage²⁶.

Second: The phenomenon of biopiracy entrenches the **dependence of biodiversity-rich countries on patent holders**, since patents confer **exclusive rights** upon their owners and prohibit others—particularly developing countries—from using or exploiting the patented seeds or genetic materials without authorization. Consequently, these countries are **compelled to purchase** the very resources for which they originally provided the **knowledge or biological material**, and that too at **exorbitant prices**.

Third : Biological resources are often exploited and patented solely for commercial gain at the international level—particularly in relation to medicinal plants—which leads to artificial scarcity and, ultimately, to a rise in global prices²⁷

Second Requirement: Protection of Biological Resources on the Basis of Sovereignty Principle.

The Agreement on Trade-Related Aspects of Intellectual Property Rights, through Article 27(3)(b), has conferred legal legitimacy on the intellectual appropriation of living organisms. By doing so, it transforms biological resources into commodities comparable to other goods, which poses a threat to biological diversity and undermines the objectives of the Convention on Biological Diversity.

It would have been more appropriate for the TRIPS Agreement to take into account the multiple roles played by biological resources in the food and pharmaceutical industries of developing countries. It would also have been preferable to integrate rights related to biotechnology within a specific legal regime that takes into consideration the priorities and concerns of the international

community, in a manner consistent with the Convention on Biological Diversity and the International Treaty on Plant Genetic Resources for Food and Agriculture. These instruments aim to affirm States' sovereignty over their natural resources by requiring prior consent for access to genetic resources (Subsection One), ensuring the fair and equitable sharing of benefits arising therefrom (Subsection Two), and respecting the rights and traditional knowledge of local communities (Subsection Three).

Section One: Obtaining the Prior Informed Consent of the Competent Authorities

The principle of obtaining prior informed consent (PIC) as a prerequisite for access to biological resources finds its foundation in the procedural rights accorded to all human beings. More importantly, this right is firmly rooted in the collective and pre-existing rights of indigenous peoples over their lands, territories, and resources, as well as in their right to self-determination.

The objective of this procedural safeguard is to ensure that consent is granted freely, without coercion or intimidation, and that it is explicit, prior, and informed, meaning that it must be given before any access activities take place and based on full awareness of the potential implications and uses of the resources.

This mechanism not only protects the **sovereign rights of states** over their biological resources but also reinforces the participation of local and indigenous communities in decisions related to the access and utilization of their genetic and biological heritage. It thus constitutes a cornerstone of equitable and sustainable governance of biodiversity, in harmony with the objectives of the Convention on Biological Diversity (CBD).

The Convention on Biological Diversity (CBD) is one of the international instruments that recognizes and upholds the principle of Prior Informed Consent (FPIC), explicitly enshrining it in Article 15²⁸.

This system is founded upon a set of **core principles**, namely²⁹:

- (a) Legal clarity and certainty;
- (b) Facilitated access to genetic resources;
- (c) Any restrictions on access to genetic resources shall be transparent, established by law, and not inconsistent with the objectives of the Convention;
- (d) Prior approval of the competent national authority (or authorities) of the provider country, as well as the consent of relevant stakeholders—such as

indigenous and local communities—depending on the circumstances and in accordance with domestic legislation.

The **Prior Informed Consent (PIC)** system includes the following elements:

- (a) The competent authority (or authorities) responsible for granting prior consent;
- (b) The timetable and applicable deadlines;
- (c) The intended use specifications;
- (d) The procedures for obtaining prior consent;
- (e) Consultation mechanisms for the relevant stakeholders.

Prior informed consent is obtained from the competent authorities, depending on the location of the genetic resources:

For **genetic resources found in their natural habitat**, prior informed consent shall be granted by the Contracting Party providing such resources, through its designated national authorities³⁰.

As for **genetic resources located outside their natural habitats**, prior informed consent shall be obtained from the entities responsible for the conservation and maintenance of those resources³¹

Section Two: The Fair and Equitable Sharing of Biological Resources within Commercial Relations

The fair and equitable sharing of benefits constitutes the cornerstone of the system governing access to genetic resources and benefit-sharing. It represents the complementary aspect that maintains the balance with “appropriate access.” This principle is also recognized as one of the key objectives of the **Nagoya Protocol (2010)** on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization³²

First: The Method of Benefit-Sharing

Article 5 of the Nagoya Protocol, along with Article 15, paragraphs 3 and 7, stipulates that the sharing of benefits arising from the utilization of genetic resources — as well as subsequent applications and commercialization — shall be carried out in a *fair and equitable* manner with the Party providing such resources, which is the country of origin of those resources or the Party that has acquired the genetic resources in accordance with the Convention. This sharing shall be based on *mutually agreed terms (MAT)* between the parties involved.

Where necessary, Parties are required to adopt *legislative, administrative, or*

policy measures to ensure that the benefits arising from the utilization of genetic resources — including subsequent applications and commercialization — are effectively shared.

Second: Types of Benefits

The benefits to be shared are those derived from the *utilization of genetic resources*, including their *derivatives*, as well as those arising from *subsequent applications and commercialization*.

The nature of such benefits varies: they may be *tangible or intangible, quantifiable or non-quantifiable*, and are often classified as *monetary and non-monetary*, as enumerated in the *Annex to the Nagoya Protocol* ³³— largely mirroring the list contained in *Annex II of the Bonn Guidelines*.

1. Monetary Benefits³⁴: Monetary benefits may include the following:

- (a) Access fees or fees per sample collected or otherwise acquired;
- (b) Up-front payments;
- (c) Direct payments;
- (d) Payment of royalties;
- (e) License fees in the case of commercialization;
- (f) Special fees to be paid to trust funds supporting the conservation and sustainable use of biological diversity;
- (g) Salaries and preferential terms where mutually agreed;
- (h) Research funding;
- (i) Joint ventures;
- (j) Joint ownership of relevant intellectual property rights³⁵

2. Non-Monetary Benefits: it includes, but are not limited to, the following:

- (a) Sharing of research and development results;
- (b) Collaboration, cooperation, and contribution in scientific research programs, including, as far as possible, biotechnological research activities of the provider country of genetic resources;
- (c) Participation in product development;
- (d) Collaboration, cooperation, and contribution in education and training;
- (e) Access to ex-situ facilities of genetic resources and related databases;
- (f) Transfer of knowledge and technology to the provider of genetic resources under fair and most favorable terms, including on mutually agreed and preferential terms, where so agreed, particularly the transfer of knowledge and

technology that utilize genetic resources, including biotechnology, or that are relevant to the conservation and sustainable use of biological diversity; and other forms of non-monetary benefits.

Section Three: Protection of Traditional Knowledge of Local Communities

Genetic resources encompass two complementary aspects: the *tangible* and the *intangible*. The tangible aspect refers to the biological resources they contain, while the intangible aspect relates to the information and knowledge utilized — including the *traditional knowledge* associated with them — which forms an essential component of the equation linking access to biological diversity and sustainable development.

Traditional knowledge plays a key role in harnessing the benefits of biological resources, as it significantly reduces the time required for research and discovery. However, exploiting such knowledge without acknowledgment or compensation constitutes a form of *biopiracy*. To prevent this, adequate protection and formal recognition of traditional knowledge must be ensured.

The *Nagoya Protocol* further developed the principles set forth in the *Convention on Biological Diversity* concerning the rights of indigenous and local communities, by defining the conditions for accessing their traditional knowledge. It emphasizes the interconnection between genetic resources and traditional knowledge, urging States to take into account customary law, community protocols, and traditional practices. The Protocol also requires Parties to adopt measures governing access to the traditional knowledge of indigenous and local communities associated with genetic resources³⁶.

Article 7 of the Nagoya Protocol (2010) refers the issue of access to traditional knowledge to domestic legislation, whereby each Party shall, as appropriate, take measures to ensure access to traditional knowledge associated with genetic resources held by indigenous and local communities, through their prior informed consent or approval and involvement, and upon mutually agreed terms.

In implementing their obligations, Parties are required to consult with the local communities possessing traditional knowledge associated with genetic resources and to obtain their consent in accordance with the provisions of this Protocol, subject to national legislation and the customary laws of local communities. They shall also establish mechanisms to inform potential users of traditional knowledge

of their obligations, including measures made available through access and benefit-sharing mechanisms for access to such knowledge³⁷.

Conclusion:

Biological resources are considered an important economic asset, particularly with the advent of biotechnology and the expansion of production, which has made wealthy producing countries economically superior and socially secure due to their possession of technology and the appropriation of these resources. These countries seek to monopolize the benefits through the application of intellectual property systems to prevent other countries from utilizing them, thereby widening the gap between them and the developing countries that possess genetic resources. The latter strive to protect their genetic resources and traditional knowledge through the principle of sovereignty enshrined in the Convention on Biological Diversity, which requires prior informed consent from the countries owning the resources and fair and equitable sharing of the benefits arising from their utilization.

Therefore, and in order to achieve a balance between the interests of developed and developing countries, the following measures are proposed:

- Uphold the precautionary principle by enacting legislation that excludes the granting of patents on living products, in accordance with international agreements such as the Convention on Biological Diversity, including the repeal of Article 27(3)(b) of the TRIPS Agreement.
- Countries possessing biological resources should establish national registers to inventory the genetic resources under their sovereignty.
- Conclude a trade agreement regarding the international trade of biological resources, ensuring that developing countries participate more effectively in establishing the rules and obligations regulating international trade in biological resources. This should include providing technical and technological assistance to these countries initially, followed by phased implementation as a prerequisite for compliance with stricter rules, giving priority to the Convention on Biological Diversity over the TRIPS Agreement.

¹ **D. M. Nachane**, Intellectual Property Rights in the Uruguay Round: An Indian Perspective, Economic and Political Weekly, Vol. 30, No. 5, Feb 1995, p. 257.

² President's Commission on Industrial Competitiveness, Global Competition: The New Reality, John A. Young, chairman, Washington, D.C.: U.S. Government Printing Office, 1985.

³ Agreement on Trade-Related Aspects of Intellectual Property Rights.

⁴ **Mekhloufi, Abdel-Salam.** "Ittifaqiyyat Himayat Huquq al-Milkiyya al-Fikriyya al-Murtabitat bi-t-Tijara: TRIPS — Adat li-Himayat at-Tiknulujia am li-Ihtikariha?" *Journal of North African Economics*, University of Chlef, No. 3, December 2005, p. 116.

⁵ **Souhila Djemouh,** "Ittifaqiyyat Huquq al-Milkiyya al-Fikriyya, TRIPS: Ta'thiruha 'ala al-Iqtisad al-'Arabi wa-Ittijah al-'Alaqāt al-Tijariyya (al-Urduniyya – al-Amrīkiyya)", *Al-Academia Journal of Social and Human Studies*, Department of Economic and Legal Sciences, Issue No. 17, January 2017, p. 103.

⁶ **Saed Ahmed Al-Khouli,** *Huquq al-Milkiyya as-Sina'iyya*, Dar Majdalawi for Publishing and Distribution, Amman, 2004, p. 80.

⁷ **Samih Al-Qallubi,** "Almilkiyya as-Sina'iyya wifqan li-ahkam Qanun Himayat Huquq al-Milkiyya al-Fikriyya raqm 82 li-sanat 2002 wa-la'ihatih at-Tanfidiyya wa-Ittifaqiyat TRIPS", Dar Al-Nahda Al-Arabiya, Cairo, 5th Edition, 2005, p. 57

⁸ **Convention on Biological Diversity**, opened for signature at the Rio Earth Summit, June 5, 1992; entered into force December 29, 1993.

⁹ **Nagoya Protocol**, adopted on October , 29 2010; entered into force on October, 12 2014.

¹⁰ Abdullah Hussein Al-Khashroum, **Al-Wajiz fi Huquq al-Milkiyya al-Sina'iyya wa al-Tijariyya.**, Dar Wael for Publishing, Amman, Jordan, 1st Edition, 2005, p. 39.

¹¹ Article 33 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), 1994.

¹² **Article 27(1) of the Agreement**, which provides: "Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step, and are capable of industrial application. Subject also to the provisions of Article 65(4), Article 70(8), and Article 27(3), patents shall be granted, and the rights attached thereto shall be enjoyable without discrimination as to the place of invention, the field of technology, or whether products are imported or locally produced."

¹³ **Sharifa Najem,** *Mawad al-saydaliyya bi-qawanin al-milkiyya al-sina'iyya fi dhil al-tashri'at al-wataniyya wa al-ittifaqiyat*, Magister's Thesis, Faculty of Law, University of Algiers, 2009, p. 41.

¹⁴ **Aït Tafati Hafida,** "International Protection of New Plant Varieties," presentation at the Study Day on Intellectual Property, Faculty of Law and Political Science, Mouloud Mammeri University, Tizi-Ouzou, 2013, p. 2.

¹⁵ Article 01 /06 de la Convention internationale pour la protection des obtentions végétales UPOV 1991: « on entend par "variété" un ensemble végétal d'un taxon botanique du rang le plus bas connu qui, qu'il réponde ou non pleinement aux conditions pour l'octroi d'un droit d'obtenteur, peut être :

- défini par l'expression des caractères résultant d'un certain génotype ou d'une certaine combinaison de génotypes,
- distingué de tout autre ensemble végétal par l'expression d'au moins un desdits caractères et ;
- considéré comme une entité eu égard à son aptitude à être reproduit conforme ».

¹⁶ Article 06, 07, 08 de la Convention UPOV 1991

¹⁷ Article 20 de la Convention UPOV 1991.

¹⁸ Article 19 de la convention UPOV 1991.

¹⁹ Article 14/01 de la convention UPOV 1991.

²⁰ Intellectual Property Rights Commission, *Report on Integrating Intellectual Property Rights and Development Policy*, London, 2003, p. 74.

²¹ **Vandana Shiva**, *Protect or Plunder?: Understanding Intellectual Property Rights (Global Issues)* Zed Books, London, 2001, p.49.

²² Ibid, p.53.

²³ Ibid, p.57.

²⁴ **Martin Khor**, *Intellectual Property, Biodiversity and Sustainable Development: Resolving the Difficult Issues*, Zed Books, Third World Network, 2002, p.20-21.

²⁵ Ibid, p. 26.

²⁶ Idem.

²⁷ **Vandana Shiva**, Op.Cit, p.68.

²⁸ Article 15, paragraph 5 of the 1992 Convention on Biological Diversity, **ratified by** Presidential Decree No. 95/163 of 6 June 1995 (Official Gazette No. 32 of 12 June 1995), provides that: “*Access to genetic resources shall be subject to the prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party.*”

²⁹ Paragraphe 26 de lignes directrices de Bonn sur l'accès aux ressources génétiques et le partage juste et équitable des avantages résultant de leur utilisation, Secrétariat de la Convention sur la diversité biologique, 2002 : <http://www.cbd.int/doc/publications/cbd-bonn-gdls-fr.p>

³⁰ Paragraphe 28 de lignes directrices de Bonn.

³¹ Paragraphe 32 de lignes directrices de Bonn.

³² **Article 1 of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization (2010)**: “The objective of this Protocol is the fair and equitable sharing of the benefits arising from the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and technologies, and by appropriate funding, thereby contributing to the conservation of biological diversity and the sustainable use of its components.”

³³ Article 5(4) provides that: “The benefits may include monetary and non-monetary benefits, including, but not limited to, those listed in the Annex.”

³⁴ Appendice 02 des lignes directrices de Bonn, op cit

³⁵ Ibid.

³⁶ Articles 7, 12 and 16 of the Nagoya Protocol (2010).

³⁷ Articles 12 of the Nagoya Protocol (2010).

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