Cadernos de Pós-Graduação em Direito Político e Econômico
Published by: Centro de Estudos Acadêmicos Press
ISSN: 1678-2127
Volume 26 *Issue 1,* 2026
Website: https://ceapress.org

Impact of the TRIPS Agreement on the Biodiversity of Developing Countries

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Received: 11/10/2025 **Accepted:25/04/2026** **Published: 08/06/2026**

Abstract:
The TRIPS Agreement is widely regarded as the counterbalancing counterpart to the Convention on Biological Diversity (CBD), whose main objectives include the protection, conservation, and sustainable use of biological resources. Among the most important elements of biodiversity are traditional knowledge and folk medicine. Biodiversity is increasingly exposed to biopiracy through the exploitation of intellectual property systems, which are used to legitimize exclusive ownership and control over biological resources, biological products, and the processes used in their production. Patent claims over biodiversity and the knowledge on which it is based—including the innovations and creative contributions of peoples in developing countries—represent a form of biopiracy carried out under the framework of the TRIPS Agreement and the obligations it imposes on states, particularly developing countries that lack technological capabilities and industrial capacity. The TRIPS Agreement has extended intellectual property protection to all forms of life and biodiversity on the assumption that insufficient protection of intellectual property rights in developing countries constitutes an obstacle to international trade. Consequently, TRIPS has sought to reinforce intellectual property protection to the level considered necessary to safeguard the interests of international commerce.
Keywords: TRIPS Agreement; Convention on Biological Diversity; traditional knowledge and folk medicine; biopiracy; biotechnology; patent.

Introduction:
The TRIPS Agreement was incorporated into the framework of the World Trade Organization (WTO) in response to the perceived inadequacy of intellectual property protection at the international level. It is well established that one of the principal objectives of the WTO is to eliminate tariff and customs barriers among states in order to ensure fair and equitable competition among all member countries. In this context, the essential role of intellectual property in international trade cannot be overlooked, as it constitutes a significant component of global economic relations.

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The TRIPS Agreement has played a significant role in expanding the scope of intellectual property protection to encompass all forms of life and biodiversity. This expansion is based on the premise that insufficient protection of intellectual property rights in developing countries constitutes an obstacle to the proper functioning of international trade. Accordingly, the Agreement was designed to establish a level of intellectual property protection considered necessary to safeguard the interests of global commerce.

At the institutional and normative level, the TRIPS Agreement aims to establish a multilateral framework that ensures adequate and effective protection of intellectual property rights, while also preventing the measures and procedures adopted for the enforcement of these rights from becoming obstacles to legitimate trade. In this respect, the Agreement seeks to reduce distortions and remove barriers that impede international trade. Moreover, Article 7 of the TRIPS Agreement provides that the protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation, as well as to the transfer and dissemination of technology, in a manner that benefits both producers and users of technological knowledge. This objective is intended to promote social and economic welfare while preserving an appropriate balance between rights and obligations.

From the perspective of biodiversity governance, the TRIPS Agreement is often regarded as the opposing counterpart to the Convention on Biological Diversity, whose objectives include the protection and conservation of biological resources. Traditional knowledge and folk medicine constitute some of the most valuable components of biodiversity. These forms of knowledge are generally understood as natural and intellectual resources transmitted across generations within communities, and therefore represent collective intellectual rights belonging to those communities. Much of this knowledge is found in developing countries, where it serves as the basis for numerous patents and provides an essential foundation for a wide range of products, particularly in the pharmaceutical sector.

Biodiversity is increasingly being appropriated through intellectual property regimes that legitimize exclusive ownership and control over biological resources, biological products, and the methods used in their production. Patent claims over biodiversity and the knowledge on which it is based—including the innovations and creative contributions of peoples in developing countries—constitute a form of biopiracy carried out under the protection of the TRIPS Agreement and the obligations it imposes on states, particularly developing countries that lack technological advancement and industrial capacity. Accordingly, in order to address this issue, the following research problem is raised:

Research Problem:

How does the TRIPS Agreement affect the biodiversity of developing countries, and how can the depletion of biodiversity in developing countries be limited?

To answer this research problem, this study is divided into two sections:

First Section: The impact of the TRIPS Agreement on the biodiversity of developing countries

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Second Section: How to limit the depletion of biodiversity in developing countries

First Section: The Impact of the TRIPS Agreement on the Biodiversity of Developing Countries

Biodiversity, or biological diversity, [1]is of fundamental importance because it represents the conditions required for survival and functional performance within many ecosystems. These ecosystems include millions of known species that contribute to maintaining the environmental conditions necessary for the survival of the human species. Biodiversity also contributes to improving human living conditions and enhancing human well-being. Entire human cultures have been closely associated with its products and services. It serves as a genetic reservoir for the emergence and development of species, a source of food and medicine, and a fundamental basis for the sustainability of ecological systems[2]. What, then, is the concept of biodiversity, and what is its relationship with the TRIPS Agreement? Accordingly, this section addresses general concepts related to biodiversity (First) and biodiversity in relation to the TRIPS Agreement (Second).

First: General Concepts Related to Biodiversity

Human beings depend on biodiversity, or biological diversity, in their daily lives in ways that are not always clear or immediately observable. Human health depends fundamentally on the goods and services provided by ecosystems, such as the availability of freshwater, food, and energy sources, all of which are indispensable requirements for the enjoyment of good health.[3]

From a conceptual perspective, biodiversity has been defined as: "the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems."[4]

In another formulation, biodiversity is defined as "the variability among living organisms from all sources, including, inter alia, terrestrial and marine ecosystems,[5]In another formulation,

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[1]Mohammed Adel Askar, *International Rules for the Circulation of Genetically Modified Organisms: An Analytical Study within the Framework of the Cartagena Protocol and the World Trade Organization Agreements*, Arab Studies Center for Publishing and Distribution, Egypt, 2019, p. 08.

[2]Kadem Safia, *On the Necessity of Balancing Intellectual Property Rights and the Protection of Biodiversity*, master's thesis in International Business Law, 2014, p. 1.

[3]Kadem Safia, Ibid, p. 01.

[4]Article 04/05 of Law No. 03-10 of 19 July 2003 concerning the protection of the environment within the framework of sustainable development, Official Gazette No. 43, dated 20 July 2003.

[5]Article 02 of the Convention on Biological Diversity, signed in Rio de Janeiro on 5 June 1992, ratified by Algeria pursuant to Presidential Decree No. 95-163 of 6 June 1995, Official Gazette No. 32, issued on 14 June 1996.

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biodiversity is defined as "the variability among living organisms from all sources, including, inter alia, terrestrial and marine ecosystems."[6]

At the international level, biodiversity is also an important subject of international relations, as it represents a source of innovation and inspiration in many industrial sectors, including agriculture, biotechnology, and strategic sectors central to economic development. It also plays a significant role in international trade, particularly in relation to the promotion of human welfare and the reduction of poverty worldwide.[7]

Developing countries are regarded as the richest countries in terms of biodiversity and genetic resources, which constitute the origin of traditional knowledge and the basis of plants derived from flora and fauna. However, these countries do not benefit from this biodiversity in the same way as developed countries, which are the direct beneficiaries through the industrial processing and transformation of biodiversity into products that can be manufactured and marketed.

Second: Biodiversity and the TRIPS Agreement

The TRIPS Agreement was incorporated into the framework of the World Trade Organization as a result of the weak protection of intellectual property rights. It is well known that one of the most important objectives of the Organization is to remove tariff and customs barriers in trade between states, in order to ensure fair and equitable competition among all members of the Organization.

The TRIPS Agreement is designed to establish a multilateral system that ensures adequate and effective protection of intellectual property rights, while preventing the measures and procedures adopted for their enforcement from becoming barriers to legitimate trade.

Within this framework, the Agreement seeks to reduce distortions and remove barriers that hinder trade[8]. Intellectual property should also be recognized as playing a fundamental role in trade, as it constitutes an important component of global economic relations. Among the most significant provisions of the TRIPS Agreement are those relating to patents[9]. As previously indicated, patents under the TRIPS Agreement have generated wide-ranging controversy because of the provisions they contain, particularly the expansion of the scope within which patents may be granted. In other words, patents are granted in all fields of technology; conversely, this means that patents may also be granted for living organisms, in accordance with Article 27 of the Agreement.

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[6]Article 02 of the Convention on Biological Diversity defined it as follows: "any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific uses."

[7]Kadem Safia, op. cit, p. 03.

[8]Jalal Wafaa Mohammedin, *Legal Protection of Industrial Property: In Accordance with the Agreement on Trade-Related Aspects of Intellectual Property Rights — TRIPS*, New University House, Alexandria, 2004, p. 15.

[9]Pamela OBERTAN, *Le brevet sur le vivant, une menace au droit à l'autodétermination des peuples Autochtones*, mémoire présenté comme exigence partielle de la maîtrise en droit international, Université du Québec à Montréal, décembre 2006, pp. 88–89.

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The Agreement therefore broadened, to the greatest possible extent, the scope of legal protection granted to innovations, as it allowed patents to be obtained for any inventions, whether products or industrial processes, in all fields of technology. This raises questions concerning the situation of developing countries that do not possess technology or industrial capacity, particularly when the matter concerns vital fields such as health, medicine, and food, depending on the legal system of each state.

Environmental protection constitutes a principal motive underlying the Convention on Biological Diversity, unlike the TRIPS Agreement, which does not include environmental protection among its objectives. Nevertheless, the TRIPS Agreement allows the exclusion of patents on environmental grounds, provided that such considerations are not merely the result of a prohibition imposed by the domestic law of the state on such exploitation[10], in accordance with Article 27, paragraph 2, of the TRIPS Agreement. In general, however, the orientation of the TRIPS Agreement tends toward protecting inventions and granting patents for them, even when they are related to biodiversity.[11]

Moreover, the term "environmental protection" is broad, general, and imprecise under Article 27/2 of the TRIPS Agreement, as it extends to all aspects of life. The same applies to the expression "protection of public health of humans, animals, or plants." Accordingly, any state may prevent the granting of a patent or prohibit the entry of certain products into its territory under the pretext of protecting the environment or safeguarding the public health of humans, plants, or animals.[12]

In a dispute between the United States of America and Venezuela concerning the former's prohibition of gasoline imports from the latter on environmental protection grounds, and when the dispute was brought before the Dispute Settlement Body of the World Trade Organization (DSV) on 23 January 1995, the United States government relied on Article 27, paragraph 2, of the TRIPS Agreement. However, the ruling was issued against the United States.

The TRIPS Agreement also permits the patenting of genes, microorganisms, and genetic modification whose basis may be plants or animals. It therefore enables companies to obtain monopolistic rights for investment in this type of patent, thereby contributing to the wider use of genetic engineering, a practice that may also produce negative effects on biodiversity.[13]

Second Section: How to Limit the Depletion of Biodiversity in Developing Countries

[10]Mohammed Hassan Abdel Majid Al-Haddad, *International Mechanisms for the Protection of Industrial Property Rights and Their Economic Impact: A Comparative Study with Islamic Sharia*, Dar Al-Kutub Al-Qanuniya, Dar Shatat for Publishing and Software, Egypt, 2011, p. 199.

[11]Soumia Medaoud, *Biopiracy in Light of the TRIPS Agreement and Biological Diversity*, master's thesis in Intellectual Property, 2014–2015, p. 95.

[12]Amer Mahmoud Al-Kaswani, *The Law Applicable to Intellectual Property Matters: A Comparative Study*, Wael Publishing and Distribution House, Amman, Jordan, 1st ed., 2011, pp. 198–199.

[13]Soumia Medaoud, op. cit, p. 95.

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Developing countries possess immense biological wealth and traditional knowledge, and they hold the largest share of the world's biological stock. However, these resources have been unlawfully exploited through acts of appropriation and infringement[14]. Accordingly, the question arises as to how the depletion of biodiversity can be limited, and what mechanisms and efforts have been undertaken by these countries to reduce such infringements against their biological resources. This will be clarified through two points: the infringements affecting the biodiversity of developing countries **(First)**, and the mechanisms for protecting biodiversity and the efforts made in this regard **(Second)**.

First: Infringements Affecting the Biodiversity of Developing Countries

Biotechnology has acquired a significant role across numerous scientific and industrial fields. However, many of the natural resources that form the basis of biotechnological patents originate in developing countries, including animal and plant resources that are used and exploited by developed countries. This process often takes place through contracts known as bioprospecting contracts, which may lead to the appropriation of biological resources, commonly referred to as biopiracy. Such practices cause substantial harm to developing countries, which are distinguished by the richness, abundance, and diversity of their biological resources. On the one hand, these countries sell such resources without receiving fair compensation; on the other hand, they are later compelled to purchase the resulting products at very high prices.[15]

Biopiracy occurs through the use of intellectual property systems to legitimize exclusive ownership and control over biological resources, biological products, and their methods of production. Claims for patents over biodiversity and the knowledge based on the innovations, creativity, and ingenuity of Third World peoples constitute biopiracy. Piracy-related patents involve a denial of the innovation embedded in national knowledge. The rush by the governments and companies of industrialized countries to grant patents and reward inventors has led to the disregard of the collective and cumulative innovations developed by rural communities over several centuries.[16]

[14]Abdel Rahim Antar, *The International Perspective on the Protection of Biological Wealth and Traditional Knowledge: A Comparative Study*, Arab Studies Center, Egypt, 2014, p. 09.
[15]Martin Khor, *Intellectual Property: Biodiversity and Sustainable Development — Resolving Difficult Issues*, Arabization by Prof. Dr. Al-Sayed Ahmed Abdel-Khalek and Prof. Dr. Ahmed Badie Bileih, Dar Al-Mareekh Publishing, Riyadh, Saudi Arabia, 2004, p. 35.
[16]Vandana Shiva, *Intellectual Property Rights: Protection or Plunder*, Arabization by Prof. Dr. Al-Sayed Ahmed Abdel-Khalek, reviewed by Prof. Dr. Ahmed Badie Bileih, Dar Al-Mareekh Publishing, Riyadh, Saudi Arabia, 2005, p. 79.

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Companies from developed countries are the actors that practice biopiracy by seeking to appropriate the biodiversity and national knowledge of developing countries[17]. This form of piracy continues to increase in the absence of protection systems for such biodiversity and knowledge[18]. From this arises the necessity of preserving biodiversity and promoting sustainable agricultural development in the present and the future[19]. Sustainable development and the continuity of these communities require recognition of their rights over the natural resources used in patents, while companies obtain monopolistic intellectual rights.

The TRIPS[20] Agreement is considered to have conferred legitimacy on this type of patenting of living organisms[21], thereby imposing the globalization of the American model of intellectual property rights. This has resulted in the expansion of patents into the realm of nature, including living organisms such as plants, animals, cells from the human body, as well as all forms of knowledge possessed by peoples concerning medicinal herbs.

Intellectual property law has thus been diverted from a purpose intended to serve human advancement and creativity into a means of invasion and appropriation of natural and genetic resources. These rights have become an instrument for exerting political pressure on developing and poor countries, and a means of preserving the advantages enjoyed by the industries of major powers.[22] It is therefore a myth to believe that patents are a means of creating knowledge, since the essence of a patent remains secret for a period of twenty years and prevents others from exploiting it. Accessing such knowledge is even considered a crime, to the extent that the American legislator linked it to national security as an offence of economic espionage under the

[17]See for further clarification: Frédéric Thomas, *Biodiversité, Biotechnologie et SavoirsTraditionnels: du Patrimoine Commun de l'Humanité aux ABS (Access to Genetic Resources and Benefit-Sharing)*, Armand Colin, *Revue Tiers Monde*, 2006/4, No. 188, pp. 825–842.

[18]Vandana Shiva, Ibid, p. 84.

[19]Martin Khor, Ibid, p. 27.

[20]Marcelo D. Varella, *L'Organisation Mondiale du commerce, les brevets, les médicaments et le rapport Nord-Sud: un point de vue du Sud*, De Boeck Université, *Revue internationale de droit économique*, 2004/2, Vol. XVIII, 1, p. 02.

[21]Ajja Djillali, *Crises of Intellectual Property Rights: A Crisis of Right, a Crisis of Law, or a Crisis of Access to Knowledge*, Dar Al-Khaldounia, Algeria, 2012, pp. 134–135.

[22]Technological control is not merely an economic or industrial process; rather, it is a strategic objective for developing countries. Achieving it requires the availability of several requirements at the domestic level, among which the legal dimension occupies an important place. Developing countries must provide a reasonable legal environment characterized by stability and justice, in the hope of attracting technological investments. Laws protecting intellectual property have become among the most important pillars of economic and scientific development, as they link the outcomes of scientific research with global development in the fields of science and technology. Mohammed Morsi, *The Legal Foundations for Developing Countries' Access to the Stage of Technological Control*, Dar Al-Nahda Al-Arabiya, Cairo, 2013, p. 257.

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1996 law, which defined espionage as: "a violation of intellectual property rights," and punished its perpetrators with fourteen years of imprisonment and a fine of 10 million US dollars.[23]

Accordingly, developing countries have accepted the myth that patents contribute to the promotion of creativity and invention, and that their absence is the cause of their underdevelopment. This has resulted, on the one hand, in the widening of the technological gap between them and developed countries, and, on the other hand, in the loss of their biodiversity, traditional knowledge, and folk medicine transmitted across generations.

Second: Mechanisms for Protecting Biodiversity and the Efforts Undertaken in This Regard

The World Conservation Strategy issued by the International Union for Conservation of Nature, with the contribution of the United Nations Environment Programme, and the provisions it contained concerning the preservation of plants, animals, and natural resources, constituted the driving force behind the conclusion of the Convention on Biological Diversity. Article 1 of this Convention provides for the necessity of conserving biodiversity, using its components sustainably, and ensuring the fair and equitable sharing of the benefits arising from it.[24]

The Convention also provides for enabling contracting states to access genetic resources and establishes the obligation to transfer, obtain, and use biotechnology, while developing strategies to ensure the biosafety of genetically modified organisms that may affect biodiversity and its sustainable use. These matters were later regulated under the Cartagena Protocol of 2000.[25]

In this regard, the Convention on Biological Diversity adopted the principle of state sovereignty over the environment through the exploitation of resources in accordance with each state's own environmental policy. At the same time, each state bears the responsibility to ensure that activities conducted within its jurisdiction or under its control do not cause harm to the environment of other states or to areas beyond national jurisdiction. Article 5 of the Convention on Biological Diversity provides for the necessity that each contracting party cooperate with other parties, either directly or through competent international organizations, for the conservation of biodiversity and its sustainable use.[26]

Article 6 requires each party, in accordance with its capabilities, to develop national strategies, plans, or programmes for the conservation and sustainable use of biodiversity. Article 10 of the same Convention regulates the adoption of measures concerning the use of biological resources

[23]Ajja Djillali, Ibid, p. 138.
[24]Belkacemi Kahina, *Protection of Inventions Resulting from Biotechnology and Plant Varieties under the TRIPS Agreement and UPOV*, doctoral thesis in sciences, Faculty of Law – Said Hamdine – January 2017, pp. 92 and 93.
[25]Belkacemi Kahina, Ibid, pp. 92 and 93.
[26]Article 05 of the Convention on Biological Diversity.

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in order to avoid or minimize adverse impacts on biodiversity, and to protect and encourage the customary use of biological resources.[27]

The Cartagena Protocol on Biosafety adopted the principles of environmental protection in general[28], as well as the protection of biodiversity and activities resulting from the genetic modification of genetically modified organisms. This Protocol emerged from the Convention on Biological Diversity; therefore, it forms part of the obligations of the parties to that Convention. Most of the provisions of this Convention are concerned with genetic resources, particularly those modified through genetic engineering. The Protocol applies to all genetically modified organisms. It also recognized the need of developing countries for assistance and protection, given the nature and scale of the known and potential risks associated with genetically modified organisms.[29]

Conclusion:

Accordingly, no one can deny the considerable benefits that inventions bring to society, particularly in the biological field, where they provide solutions and treatments for serious and incurable diseases, as well as in the field of food, through the improvement of its quality and standards. Investment in inventions is also surrounded by risks and requires considerable effort, extensive research, and substantial financial resources. This necessitates protection through intellectual property rules, since it is, above all, the result of intellectual effort.

However, at the same time, the interests of developing countries must be taken into consideration, as they constitute the primary source of these resources and raw materials from which such inventions are produced. Their authorization must be obtained, and they must be granted fair and equitable compensation. Excessive depletion of the resources of developing countries may create potential risks for their biodiversity and for the environment in general, while making these agricultural societies dependent on biotechnology instead of enabling them to benefit from discovery and research contracts.

On this basis, a legal system must be established to create a balance between the provisions of the TRIPS Agreement and the interests of developing countries that lack advanced technology. This requires legislative intervention in many states, as well as the amendment of provisions regulating patents so that they cover all relevant aspects, including forms of life, and this includes Algerian legislation. Such legislative regulation must be precise and adapted to the specific characteristics and patterns of each society, given the disparity in this technology between developed and developing countries, and in order to preserve the balance between the interests of the patent holder and the interests of society.

[27]See, in this regard, the Convention on Biological Diversity.
[28]See, in this regard, the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Montreal, 29 January 2000.
[29]Belkacemi Kahina, op. cit, p. 139.

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3- Cartagena Protocol on Biosafety to the Convention on Biological Diversity, Montreal, 29 January 2000.

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