Genetic Resources

ORIGINAL ARTICLE

Genetic Resources (2022), 3 (6), 74–88
DOI: 10.46265/genresj.PPUF5169
https://www.genresj.org
ISSN: 2708-3764

Where access and benefit-sharing comes from: A historical overview

Aysegül Sirakaya *,[a,b]

[a] *Faculty of Law, Lund University, Sweden*
[b] *Abyss Consulting, Sweden*

Abstract: The international legal system of access and benefit-sharing of genetic resources (or ABS) under the Convention on Biological Diversity (CBD) is an ever-evolving field as its material, temporal and activity scope is still under discussion to meet the needs of the advancement of research and development activities as well as the questions of fairness and equity that evolve with them. Activities, such as research and development with digital sequence information (DSI), currently take considerable space in the negotiations and the lack of consensus between the Global North and the Global South continues. This paper gets its raison d'être from this lack of consensus and aims to provide a better understanding of the debate around the fair and equitable sharing of benefits arising from genetic resources as well as the sovereignty of states over their natural resources. As such, the paper provides an analysis of all relevant documents at the international level, starting from the UN Charter to the final text of the CBD with the hope of reminding the ongoing negotiations over the CBD why we have ABS in the first place and what the international community historically aimed for when regulating genetic resources at the international level. Looking back at why we had the first legally binding ABS instrument in the first place, and why we thought this instrument would achieve fairness and equity in dealing with genetic resources, will serve the interests of all Parties to the CBD and will hopefully enable them to interpret the provisions based on their overarching aim and reasoning.

Keywords: CBD, ABS, access and benefitsharing, Convention on Biological Diversity, benefitsharing, global multilateral benefitsharing mechanism, Nagoya Protocol, Plant Treaty negotiations, ITPGRFA, genetic resources, plant genetic resources

Citation: Sirakaya, A. (2022). **Where access and benefit-sharing comes from: A historical overview**. *Genetic Resources* 3 (6), 74–88. doi: 10.46265/genresj.PPUF5169.

© Copyright 2022 the Authors.

This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Introduction

International law provides for mechanisms for biodiversity conservation and restoration to compensate for the utilization of nature by humans. One of the major mechanisms is the fair and equitable sharing of benefits arising from the use of genetic resources (UNEP, 1992), which is a bilateral legal instrument based on state sovereignty over natural resources. The system of access and benefit-sharing (ABS) aims to fairly distribute benefits between the providers of genetic resources (such as biodiversity-rich countries) and users of genetic resources (such as biotechnology or pharmaceutical companies, universities, collections such as botanical gardens or genebanks) deriving from scientific research and development on genetic resources (GR). The ABS system prescribes the Parties to the Convention on Biological Diversity (CBD) and to the Nagoya Protocol (Secretariat of the Convention on Biodiversity, 2011) to implement national legislation on providing fair access to GR users while receiving fair and equitable benefits. States are then encouraged to channel benefits into biodiversity conservation and sustainable use.

Next to the ABS system established under the CBD, specialized ABS instruments exist on specific types of GR and their specific types of use. One of them is the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) dealing with the conservation and sustainable use of all plant genetic resources for food and agriculture (FAO, 2004). The ITPGRFA facilitates access to the genetic materials of 64 crops in the Multilateral System for research, breeding and training for food and agriculture.

*Corresponding author: Aysegül Sirakaya (aysegul.sirakaya@jur.lu.se)

Received: 03.08.2022 | Accepted: 31.10.2022 | Published online: 29.11.2022

Another specialized ABS instrument is the World Health Organization Pandemic Influenza Preparedness Framework (or WHO PIP Framework). Its purpose is the sharing of H5N1 and other influenza viruses with human pandemic potential, access to vaccines and sharing of other benefits (WHO, 2021). Both the ITPGRFA and the PIP Framework function on a multilateral basis, meaning that these two specialized ABS instruments serve as pools of GR and operate under standardized agreements each Party uses. Lastly, there currently is an ongoing discussion at the international level regarding the provisions related to the bioprospecting activities taking place in areas beyond national jurisdiction under the United Nations Convention on the Law of the Sea. The negotiations are yet to be finalized, however, the issue of benefit-sharing deriving from the utilization of marine genetic resources in areas beyond national jurisdiction will be a part of this new international legal instrument (United Nations General Assembly A/RES/72/249, 2017).

ABS under the CBD, as a bilateral instrument for creating incentives for conserving biodiversity within national jurisdiction, has been an active legal concept subject to national implementation since 1992. Its success is being measured by the Global Biodiversity Outlook (Secretariat of the Convention on Biological Diversity, 2020). Additionally, ABS has found its place in several targets within the United Nations Sustainable Development Goals, such as Goal 10 Target 10a, Goal 15 Target 6, and Goal 17 Target 6. It is also highly likely that targets related to ABS will be an indispensable part of the Post-2020 Global Biodiversity Framework under the CBD (CBD/POST2020/WS/2019/8/3, 2019). Therefore, ABS provides a tangible contribution to the achievement of international targets related to biodiversity conservation.

The report published by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) in May 2019 states that our nature and ecosystems are in rapid and constant decline (IPBES, 2019). With the current trajectories, we cannot meet global targets such as the Sustainable Development Goals. Likewise, the fifth Global Biodiversity Outlook, conducted under the auspices of the CBD to assess whether international conservation goals (such as the Aichi Global Biodiversity Targets) have been met, warns us that none of our targets has been met due to the lack of effective restoration and conservation initiatives (Secretariat of the Convention on Biological Diversity, 2020).

With the success of all global environmental targets jeopardized, it emerges the need to review international legal obligations that aim to halt biodiversity loss and thereby contribute to achieving these targets, including how ABS – being one of the major instruments in financing and incentivizing biodiversity conservation – was negotiated. This requires looking back at the original reasons and principles behind the implementation of an international access and benefit-sharing system. Additionally, the current ongoing discussions on the scope and mechanisms of the international ABS system, such as whether GR include digital sequence information (DSI), make such a retrospect even more necessary.

This paper provides a historical review of the developments at international fora that led to the negotiation and adoption of ABS provisions under the CBD, to serve as a guide for why the international community needed a bilateral ABS system in the first place. Additionally, the paper can serve for further evaluations on why ABS may or may not have achieved its anticipated objectives regarding establishing the norms of fairness and equity in dealing with GR while ensuring sustainable use and biodiversity conservation. The scope of the paper is limited to the historical events and negotiations up until the adoption of the CBD. This choice is motivated by two reasons. Firstly, the paper aims to elaborate on the discussions deriving from the concept of state sovereignty over natural resources and how sovereignty affected the use and provision of GR. Because of this, the paper solely focuses on the bilateral ABS framework under the CBD, and only refers to the ABS regime under the Food and Agriculture Organization of the United Nations (FAO) as a reference point in the historical events that led to the adoption of the ABS mechanisms under the CBD. Secondly, the paper analyzes the negotiations that led to the adoption of the CBD and not the Nagoya Protocol. This is because the paper does not aim to provide a fully comprehensive analysis of all concepts within the ABS regime generated under the CBD. It rather aims to provide a glimpse into the history of the dynamics and needs that led to the generation of the international ABS framework under the CBD starting from its establishment by the United Nations and the development of the concept of the sovereignty of states over their natural resources. These were fuelled by the aftereffects of colonization, which palpably affected the dynamics between the Global North and the Global South. Therefore, this paper does not include the analysis of the negotiations that led to the adoption of the Nagoya Protocol, nor does it include the negotiation processes and adoption of other specialized ABS instruments. Nonetheless, I wholeheartedly agree with the importance of also reviewing the post-CBD negotiations which aimed at clarifying the concept of ABS, genetic resources as well as the activities of access and benefit-sharing, their legal provenance, and their purpose. For this reason, I have previously conducted research specifically on the post-CBD negotiations that led to the adoption of the Nagoya Protocol (Sirakaya, 2022). However, the scope of the present paper is not related to the clarification of the concepts generated by the CBD, but it is related to the historical reasons why we needed these concepts in the first place.

Sovereign rights over natural resources vs common heritage of mankind

United Nations Biosphere Conference

Until the 1950s there existed no discussion on the provenance of GR and their utilization under international law. The first time the international community took on the subject was in 1950 during the United Nations Scientific Conference on the Conservation and Utilization of Resources. At that time, delegates acknowledged that states varied considerably in their political, economic and social institutions. Additionally, it was pointed out that world resources were not distributed proportionally to states' populations or national boundaries. Therefore, the free and full exchange of resources was seen as key for each nation to specialize in those products derived from such resources for which it enjoys the greatest comparative advantage or least comparative disadvantage. Consequently, tariffs, duties, cartels, quotas, monetary manipulations and various other political and economic devices were generally recognized as constituting the major obstacles to improved utilization of global resources. The conference had a demonstrable preference towards unrestricted access to the world's resources (as the term GR was not yet pronounced at the international level), thus neither the limits to utilization nor the subject of conservation of these resources made it on the agenda of this conference.

The introduction of the concept of states' rights over their natural resources dates to the Charter of the United Nations. The permanent sovereignty of states over their natural resources has been under discussion within the United Nations General Assembly starting from 1952. Ten years later, the United National General Assembly Resolution 1803 (XVII) (1962) was adopted, which articulated that states and international organizations shall strictly and conscientiously respect the sovereignty of peoples and nations over their natural wealth and resources in accordance with the Charter of the United Nations and the principles contained in the resolution (United Nations General Assembly A/RES/3171, 1973). These principles were set out in eight articles concerning, inter alia, the exploration, development and disposition of natural resources. The Resolution further detailed that in cases where authorization is granted for the exploration, development or deposition of these resources, the profits derived must be shared in the proportions freely agreed upon, between the investors and the recipient state. The Resolution, therefore, was the first international legal document that initiated the conversation on the states' sharing in the benefits derived from the exploration or exploitation of natural resources within their national jurisdiction.

The concerns over the conservation of the Earth's resources started building up during the 1960s when technological advances enabled humankind to develop a more enhanced understanding of the finiteness of the biosphere. The Apollo 8 mission of 1968 demonstrated to humankind the vulnerability of our planet by displaying the first photograph of the Earth ever taken from space suggesting the Earth had no other place like it anywhere close and thus was the only place life existed. This realization provided a wake-up call and moved environmentalism to mainstream international discussions (Attenborough and Hughes, 2020; Meadows and Randers, 2013)

As a response to this mainstream awakening, the United Nations Educational, Scientific and Cultural Organization (UNESCO) convened the International Biosphere Conference (IBC) in 1968. Next to being one of the first international high-level conferences that emphasized the importance of nature conservation, it was also the first international conference that introduced the concept of 'genetic resources' to policymakers. More specifically, in its recommendations related to GR utilization, the IBC suggested that special efforts had to be taken urgently to preserve the rich GR that evolved over millions of years and were being irretrievably lost as a result of human actions. Recommendations included the preservation of samples of all significant ecosystems, the establishment of special protected areas and living collections for both remnant and endangered species as well as long-domesticated species such as cereals and cattle. The IBC recommended the Member States of UNESCO, as well as FAO, to take vigorous efforts in implementing these recommended measures to avoid the loss of GR which could never be recovered.

Stockholm Conference and Declaration 1972

During the same year as the Biosphere Conference in 1968, the Club of Rome, an informal organization consisting of scientists, members of academia, economists and civil servants started conducting a study on the factors that limited global growth. The outcome document, *Limits to Growth*, produced future projections arguing that the economic system had to be significantly altered to address the ecological capacity of the Earth (Meadows *et al*, 1972). Following these efforts, combined with the growing public awareness of global environmental problems, the United Nations General Assembly, in its meeting in 1968, agreed to organize the first international high-level conference to bring together all the United Nations bodies and Member States to generate the first global agenda for the environment. The General Assembly, in its Resolution 2398, stipulated that it was "desirable to provide a framework for comprehensive consideration within the United Nations of the problems of the human environment in order to focus the attention of Governments and public opinion on the importance and urgency of this question and also to identify those aspects of it that can only or best be solved through international cooperation and agreement." (United Nations General Assembly Resolution 2398 (XXIII), 1968) With this consensus, policymakers proceeded with the preparations for the first global conference on the environment, also known as the conference that led to the estab-

lishment of the United Nations Environment Programme (UNEP).

During the preparation of the Stockholm Conference on the Human Environment, the divide between developed and developing nations regarding their perception towards environmental problems and their willingness to take part in limiting growth became apparent to the global forum. This demonstrated that the developing world suffered from environmental problems due to poverty, and the developed world's environmental problems were related to the increased use of natural resources. The developing world initially approached the first global conference on the environment with suspicion, as they were afraid that environmental measures would result in reduced development aid and increased tariffs for products from developed countries. Nonetheless, it was apparent that the developing world also suffered from environmental problems, especially related to urbanization, and unlike the developed world, they did not have the means to deal with them. Therefore, the Stockholm Conference was the first time both parties acknowledged the interdependence of their economic development and environmental resilience (Johnson, 2012). On top of demonstrating the interdependence of the two worlds, the Stockholm Conference produced the first document introducing sovereign rights related to natural resources to the international legal arena.

Indira Ghandi's plenary speech during the conference served as a mirror to this interdependence between developing and developed nations. The speech stressed the delicate balance between environmental protection and restriction of industrial activities proposed by the developed world versus the need for economic and industrial development emanating from the developing world. Ghandi argued that, let alone conservation, the developing nations had no means of providing incentives to limit harm to nature:

> "On the one hand the rich look askance at our continuing poverty – on the other they warn us against their own methods. We do not wish to impoverish the environment any further and yet we cannot for a moment forget the grim poverty of large numbers of people. Are not poverty and need the greatest polluters? For example, unless we are in a position to provide employment and purchasing power for the tribal people and those who live in or around our jungles, we cannot prevent them from combing the forest for food and livelihood; from poaching and from despoiling the vegetation. When they themselves feel deprived, how can we urge the preservation of animals? How can we speak to those who live in villages and in slums about keeping the oceans, the rivers and the air clean when their own lives are contaminated at the source? The environment cannot be improved in conditions of poverty. Nor can poverty be eradicated without the use of science and technology."
>
> *Waldheim* et al *(1972)*

This speech perfectly described the need to ascertain a balance between both the needs of developing and developed countries as well as the cruciality of sharing the benefits of science and technology to eradicate poverty while conserving nature and its resources at a global scale.

Within this atmosphere, the sovereign rights of states over their natural resources became an integral part of the Stockholm Declaration. Principle 21 of the Stockholm Declaration notes that states have the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction (United Nations Doc. A/CONF. 48/14, 1972).

In addition, Recommendation 39 of the Stockholm Declaration (United Nations Doc. A/CONF. 48/14, 1972) requested governments, in cooperation with FAO, to agree to an international programme on preserving the world's GR by establishing an international network to survey international conservation efforts through *in situ* and *ex situ* methods. FAO took this mandate to further expand its seed collections and later to initiate the first access mechanism to these collections. The next section provides an overview of the historical development of access to GR within FAO, predating the CBD.

CGIAR Centres and FAO Conference of 1981

The rapid global population increase after the Second World War revealed a novel need for a smarter way of ensuring food security. Many countries started suffering from food shortages and some even famine. The Indian subcontinent had undergone severe famines during the 1940s which emphasized the need for countries to be self-sufficient in food production. This resulted in increased efforts in research on major cereal crops such as maize, wheat and rice that enabled the establishment of the Consultative Group on International Agricultural Research (CGIAR). Additionally, the CGIAR Centres' objective was to take on the task FAO was mandated regarding establishing an international network to survey international conservation efforts through *in situ* and *ex situ* methods, as prescribed by Recommendation 39 of the Stockholm Declaration. In other words, CGIAR Centres were established as centres that conserve GR and ensure the genetic diversity of crops. In addition, the CGIAR Centres started research on developing new varieties, improving the yield of cereal crops as well

as irrigation techniques, pesticides and fertilizers. This clustered research effort led to the 'Green Revolution', a movement started by the plant breeder Norman Borlaug, a Nobel Prize laureate who developed dwarf maize varieties that could be adapted to various climates (Mooney, 1983).

This success in plant breeding did however generate its drawbacks. The shift from traditional to industrial agriculture, based on the use of a limited number of high-yielding varieties, generated what experts called 'genetic erosion'. As a response, CGIAR Centres started establishing their own genebanks and collections to ensure the conservation of varieties for research (Moore and Tymowski, 2005).

As the CGIAR Centres genebanks and collections kept expanding in the early 1980s, questions and concerns regarding access to and ownership of the conserved varieties were increasingly raised (Rose, 2004; Mooney, 1983). Even though CGIAR Centres claimed that they were freely accessible, there existed no legal basis at the international level that ensured this. In 1981, the FAO Conference stated that there was a need to regulate access to plant genetic resources for food and agriculture (PGRFA) at the international level. This movement resulted in the adoption of the International Undertaking of PGRFA (IUPGRFA) by the FAO Conference in 1983. With this, the Commission on Genetic Resources for Food and Agriculture (CGRFA) was created to manage the operations related to plant genetic resources (PGR) (FAO, 1983).

The International Undertaking of PGRFA was the first international – yet voluntary – instrument aiming to conserve and sustainably use agricultural crops, which would then be made available for scientific research and plant breeding purposes. The International Undertaking stated that GR are a heritage of mankind but did not use the full legal terminology 'common heritage of mankind'. It emphasized, however, that PGRFA should be made available without restriction. More specifically, the Undertaking stated that PGRFA, which include those kept within the premises of CGIAR Centres, were subject to the "universally accepted principle that plant genetic resources are a heritage of mankind and consequently should be available without restriction." (Sullivan, 2004)

The reference made within IUPGRFA to 'heritage of mankind' as opposed to 'common heritage of mankind' received criticism, mainly from the Global South, as to whether the International Undertaking followed the international law principle fully and whether PGRFA were meant to be managed as public goods (Helfer, 2003). This confusion was addressed by Resolution 3/91 of the FAO Conference, stating that the heritage of mankind principle established under the International Undertaking does not contradict the states' sovereign rights over their GR, clarifying that the states are not giving up on their sovereign rights by granting unrestricted access to their PGRFA under the International Undertaking. In its original wording, it recognized that "the concept of mankind's heritage, as applied in the International Undertaking on Plant Genetic Resources, is subject to the sovereignty of the states over their plant genetic resources." (FAO Resolution 3/91, 1991)

The IUPGRFA was also the first instrument which stipulated that governments or institutions holding PGR were expected to adopt measures that would allow access to them and permit their export for the purposes of scientific research, plant breeding or conservation, adding that the samples should be made available based on mutually agreed terms.

The International Undertaking presented measures both related to *in situ* and *ex situ* conservation of PGRFA, while also emphasizing the need to establish an international cooperation structure that enabled all countries to make use of these PGRFA for the benefit of their agricultural development. The aim of making PGRFA available for further research and breeding led to the creation of an international network of genebanks and a need to clarify their legal status as well as those of CGIAR Centres. This goal would also lead to the negotiations for the adoption of the multilateral system within the ITPGRFA, which came into force in 2004.

It is worthwhile noting that PGRFA as well as the negotiations that led to the creation of the IUPGRFA and later ITPGRFA, require a further in-depth study of the dynamics that connect PGR with farmers' rights, food security, securing genetic diversity, as well as the intellectual property regime surrounding the IUPGRFA. The establishment of CGIAR Centres and adoption of IUPGRFA have been included in this article, to the extent that clarifies the mandate provided to FAO by the Stockholm Declaration. Furthermore, even though the dynamics of the FAO multilateral system and the CBD bilateral system differ to a great extent, a historical overview of the development of the ABS system under the CBD would have contained a gap without the mention of the IUPGRFA, the first international instrument dealing with facilitated access to and benefit-sharing of PGRFA.

Convention on Biological Diversity negotiations

Following the introduction of the North-South debate at the international environmental forum during the Stockholm Conference, developing countries expanded their request for social and economic development. They perceived the necessity of emphasizing sovereignty over natural resources within their national jurisdiction, for they aimed to free themselves from the after-effects of the economic order during colonization. Not long after the Stockholm Conference, the Group of 77, a block of developing countries established during the negotiations of the United Nations Conference on Trade and Development in 1964, put forth their Declaration on the Establishment of the New International Economic Order during the UN General Assembly of 1974 (United Nations General Assembly A/RES/S-

6/3201, 1974). While acknowledging that the "interests of the developed countries and those of the developing countries can no longer be isolated from each other, that there is a close interrelationship between the prosperity of the developed countries and the growth and development of the developing countries, and that the prosperity of the international community as a whole depends upon the prosperity of its constituent parts," the Declaration requested the following to be crystallized at the international level:

> "Full permanent sovereignty of every State over its natural resources and all economic activities. In order to safeguard these resources, each State is entitled to exercise effective control over them and their exploitation with means suitable to its own situation, including the right to nationalization or transfer of ownership to its nationals, this right being an expression of the full permanent sovereignty of the State. No State may be subjected to economic, political or any other type of coercion to prevent the free and full exercise of this inalienable right".
>
> *United Nations General Assembly A/RES/S-6/3201 (1974)*

The Declaration proved impactful as the General Assembly adopted Resolution 3281 (XXIX) containing the Charter of Economic Rights and Duties of States, reinstating the sovereignty of states over their natural resources (United Nations General Assembly Resolution 3281 (XXIX), 1974).

The repeated affirmations over the sovereign rights of states, as well as bringing the provenance of GR within CGIAR centres to a legal basis via the IUPGRFA, seemed to have provided temporary confidence to the developing world regarding how fair the global system on GR was (Shackelford, 2008). The industrialization of agriculture in developed countries resulted in the privatization of the sector, which began relying on the sales of seeds and other agricultural products for profit. As a result, the importance of intellectual property (IP) rights in the agricultural sector gained increasing importance. The International Union for the Protection of New Varieties of Plants (UPOV) Convention, adopted in 1961 (UPOV, 1961), followed this trend, aiming at encouraging plant breeding by means of breeder's rights, a sui generis form of an IP right specifically designed for plant breeders. In the case of a variety protected by a breeder's right, the breeder's authorization is required to propagate the variety for commercial purposes except for when the variety is utilized for further breeding (also known as breeder's exemption), for experimental purposes and private and non-commercial purposes as specified in Article 15(1) as compulsory exceptions. States are also invited to consider allowing for an optional exception for farmers saving seeds as specified in Article 15(2), also known as farmer's privilege (Lawson, 2015). The revisions to UPOV in 1972 and 1978 were argued to strengthen breeders' rights and diminish farmers' rights to sell, exchange or harvest seeds from protected varieties, which further raised concerns within the Global South (Tripp *et al*, 2007).

The International Undertaking was implemented specifically to curb these concerns. While serving to do so, the IUPGRFA instead raised concerns in the developed world as the seed industry expressed its worry about the definition of PGRFA. According to the seed industry, the broad definition of PGRFA would result in the necessity of making privately owned plant varieties and special genetic stocks available without restrictions. Following these concerns, a group of developed countries including Canada, France, Germany, Japan, New Zealand, Switzerland, the United Kingdom and the United States of America made reservations about the IUPGRFA arguing for the recognition of intellectual property therein (Ten-Kate and Diaz, 1997). At the same time, developing countries, under the auspices of FAO, exclaimed that the IUPGRFA did not recognize nor reward the contributions of developing countries and their farmers to the conservation and availability of PGR (Moore and Tymowski, 2005). In an attempt to calm the waters and satisfy both sides, FAO adopted a resolution with an amendment to the IUPGRFA. The resolution stated that "plant genetic resources are a common heritage of mankind to be preserved and to be freely available for use, for the benefit of present and future generations" (FAO Resolution 4/89, 1989). It also clarified that this would not extend to the protection of plant breeders' rights within UPOV, allowing the industry to exclude their varieties from the common heritage system of the IUPGRFA. This caused the need for an additional resolution from FAO (FAO Resolution 5/89, 1989) to accentuate that farmers in all countries should be able to "participate fully in the benefits derived, at present and in the future, from the improved use of plant genetic resources, through plant breeding and other scientific methods". The CBD negotiations, therefore, began in a tense atmosphere escalating both in the Global North and the Global South. On the one hand, the North aimed at conserving biodiversity via CGIAR centres, as well as conserving the rights of their rapidly evolving biotechnology sector. On the other hand, the Global South expressed its concerns regarding the IP rights over GR gaining power while establishing the initial global understanding of the need to create a mechanism to share in the benefits of development achieved through the use of GR. The Global South believed that the common heritage of mankind over GR allowed the Global North to rely on the resources of the Global South to maintain their economic prosperity.

In 1988, the Ad Hoc Working Group of Experts on Biological Diversity (AHWG), mandated by UNEP, convened for the first time to discuss the desirability and feasibility of an international framework agreement

on the conservation and sustainable use of biological diversity. The Working Group agreed that the question of access, including the question of free access, to GR should be studied, yet they did not reach a consensus on the notion of biological diversity as a common resource of mankind (UNEP/Bio.Div.1/3, 1989). Additionally, the Working Group agreed that the question of placing an economic value on biological resources should be examined in detail.

The second meeting of the AHWG, convened in 1990, was opened by Dr M. K. Tolba, the Executive Director of UNEP. In his speech, he paid due attention to the preferential treatment for those having jurisdiction and control over GR with respect to genebanks containing them and to essential newly developed varieties obtained through breeding. He also emphasized the international transfer of and favourable access to biotechnology that could be usefully applied or adapted to developing countries needs (UNEP/Bio.Div.2/3, 1990). It is visible from his speech that access to GR and access to technology were regarded as two separate subjects, yet interdependent, to be dealt with rather than access to technology as a result of or deriving from access to GR (UNEP/Bio.Div.2/3, 1990). In fact, at this point, access did not only relate to access to GR but also to technology. The AHWG emphasized that "accessibility to biological diversity, including new varieties, and to related technologies, including conservation technologies, are two sides of one and the same coin and must be an integral part of the planned legal instrument." Subsequently, it became clear to the Working Group that the issue of IP rights relating to the ownership of biotechnology and both the provision of access to GR from biodiversity-rich countries and the provision of access to technology from technology-rich countries needed to be reviewed.

Dr Tolba stipulated that "any new international agreement should not infringe upon the sovereignty of nation States over their natural resources. It must protect the interests of the States in which the resources are located and provide incentives for conservation of biological diversity without inhibiting growth or sustainable development." (UNEP/Bio.Div.2/3, 1990)

The AHWG further discussed the common heritage principle over GR and agreed that this principle did not mean the establishment of collective international rights to resources within national jurisdictions, nor did it infringe upon the permanent sovereignty of states over natural resources. The Group underlined that free access did not mean access free of charge and accessibility should be based on mutual agreement and full respect for the permanent sovereignty of states over their natural resources. Additionally, the AHWG agreed that those having jurisdiction and control over GR should receive preferential treatment for access to their germplasm and varieties developed from these resources.

The second meeting of the AHWG discussed the two types of access and the compensation mechanisms for the provision of access and technology. The experts stated that biotechnology could assist in the conservation of GR which could be funded by enterprises that profit from the use of biotechnology. The AHWG suggested that this could be in the form of a tax to support conservation as well as biotechnology research in developing countries. Additionally, the Working Group discussed that developers of biotechnology would require compensation for the provision of access to their technology.

Regarding the relationship of access to GR with to-be established financial mechanisms for the conservation of biological diversity, the report of the AHWG expressed that there was a consensus that "those who enjoy most the economic benefits of biological diversity should contribute equitably to its conservation and sustainable management." Some of the delegates argued for the potential of biotechnology to foster species conservation by means of adhering an immediate economic value to them and "if developing countries are given the capacity to develop and share the benefits of their biological diversity this will be a good incentive for natural resources conservation." (UNEP/Bio.Div.2/3, 1990)

The third meeting of the AHWG discussed the draft text of the CBD prepared by the International Union for Nature Conservation (IUCN) (UNEP/Bio.Div.3/12, 1990). The Working Group commissioned a study on the relationship between IP rights and access to GR. The report did not discuss what type of access measures could be implemented by provider countries, as it was presupposed that free access would remain the norm since the experts leaned on discouraging any measures including the amendment to the UPOV Convention that would hinder free access to GR (UNEP/Bio.Div.3/6, 1990). Under paragraph 5 of the report, the experts strongly emphasized the 'undeniable' importance of the principle of free access and argued that the IUCN draft should not be allowed to result in a closing up of the system, for that would be against everyone's interests.

During the time of the second meeting of the Ad Hoc Working Group, discussions were ongoing on the revision of the UPOV Convention. The draft revision of the UPOV Convention introduced the concept of dependence, which meant that a variety 'essentially derived' from another variety protected by plant breeder's rights cannot be used commercially without the permission of the breeder of the protected variety. At the same time, it introduced patent coverage over living matter under the agreements of the General Agreement on Tariffs and Trade (GATT).

During the meeting, the AHWG debated that the perception of the value of biological diversity was altering as the development of biotechnology enabled humanity to potentially create technological advancements out of any organism. Therefore, the zones of biological diversity which were perceived to have no economic value, were presently considered to contain value that reflected the potential of GR contained in them (UNEP/Bio.Div.3/3, 1990).

The initial thought about sharing benefits had to do with technology transfer to improve the research capacity of developing countries. The study commissioned by AHWG on the relationship between IP rights and GR explicitly disapproved of monetary compensation for the costs of conservation (UNEP/Bio.Div.3/Inf.4, 1990). It rather supported what was described as compensation mechanisms along the lines of technology-for-nature swaps. The study also argued that developments within UPOV on restricting access to varieties were "disturbing because free access (which she [the expert consultant] stressed did not mean free of charge) had been one of the essential factors in advances in genetics." (UNEP/Bio.Div.3/12, 1990) It was recommended that the UPOV Convention would harness IP rights with the aim of ensuring the more efficient use of biodiversity and also recommended a system of 'paid open access' yet warned that such a system could be endangered by the extension of patent law.

Another study on biotechnology commissioned during the third meeting argued that the AHWG should be wary of the fact that genetic material in private collections and information thereof will not be as easily available as the information on material in public sector genebanks and that the GR collected by seed companies were not likely to be freely exchanged and might be considered as trade secrets (UNEP/Bio.Div.3/7, 1990).

The AHWG lastly commissioned a study on possible financial mechanisms for the conservation of biological diversity (UNEP/Bio.Div.3/5, 1990). As the study underlined that "the market prices of the genetic resources and functions do not reflect their real scarcity value or the ecological costs incurred by their use," it also suggested the establishment of an international multilateral fund to enable their conservation and discourage their excessive use. From the wording of this report, it could be understood that GRs were rather seen as physical, biological material whose excess use would result in negative ecological consequences. The Working Group suggested that contributions to the funding mechanism might be provided by the Parties on an assessed basis. More specifically, "the scale of assessment could be related to a United Nations scale, industrial and commercial exploitation of or trade in genetic resources or on some other equitable basis."

Following the third meeting, a Sub-working Group on Biotechnology (SWG) gathered in November 1990. Under Annex 1 regarding Possible Additional Elements for a Biotechnology Component in a Global Framework Legal Instrument on Biological Diversity, the SWG considered the inclusion of the equitable sharing of the economic benefits derived from biotechnology with the country of origin of the biomaterials used (UNEP/Bio.Div/SWGB.1/5/Rev.1, 1990). Hence, the discussions introduced monetary benefit-sharing arising from the utilization of GR for the first time, despite the previous recommendations discouraging them.

The SWG furthermore added that access to biological diversity should be based on agreements conforming with the sovereign right of states over their natural resources within their national jurisdiction. The SWG stated that access to GR as well as access to technology would not be free of charge and should be based on mutual agreement (UNEP/Bio.Div/SWGB.1/5/Rev.1, 1990). In order to enhance the contribution of biotechnology to the conservation of biodiversity, it was urgently recommended to "increase the numbers of botanical gardens, seed banks and other *ex-situ* conservation facilities in various areas throughout the world, particularly in tropical areas, and to broaden the coverage of existing ones." Consequently, the SWG has foreseen conservation via biotechnology through research and inventory on biodiversity and its conservation. It was not mentioned how shared economic benefits arising from GR utilization could enhance or how it would incentivize conservation.

Shortly after the meeting of the SWG on Biotechnology, the AHWG of Legal and Technical Experts on Biological Diversity gathered for its first meeting, in November 1990 (UNEP/Bio.Div/WG.2/2/5, 1991). This meeting discussed the first CBD draft text, which was rather contested and heavily bracketed (Lawson, 2015). The preamble of the text included the obligation of states to share in any increased knowledge as well as other benefits of the potential of biological diversity amongst bracketed suggestions for various wording such as "equitable sharing of benefits and conservation costs of biological diversity" or "the benefits derived from utilization and the cost of conservation of biological diversity should be shared" next to bracketed clarifications that free access does not mean free of charge. Title VI of the draft text covered access to biological diversity under the same title as access to technology and information thereon. The commentary to this title discussed the details on which types of technology should be subject to access, and regarding the availability of both biological diversity and technology. The text also brought up the role of IP rights regarding these two types of access.

Title VII drafted the heavily bracketed obligation directed at developed countries to transfer technology – that supported biological diversity conservation and sustainable use – to developing countries on a non-commercial and preferential basis. The text also included options for research cooperation between developing and developed countries on scientific research and training, and joint ventures, taking into account the investments made by the private sector to develop these technologies as well as the possibility of establishing a mechanism to "ensure the acquisition of technology from the technology-rich states to the gene-rich developing countries by providing funds to facilitate the necessary access to patents".

At his opening speech for the second meeting of the AHWG of Legal and Technical Experts on Biological Diversity between 25 February and 6 March 1991, Dr Tolba, the Executive Director of UNEP, stated

that access to biodiversity and the availability of biotechnology and other technology relevant to the rational use of biological resources were complementary and inseparable (UNEP/Bio.Div/WG.2/2/5, 1991). He continued that states should receive fair compensation for the provision of access and at the same time, the private sector should receive fair compensation for participating in technology transfer arrangements.

Another SWG on Biotechnology gathered during the second meeting to discuss issues related to access to GR. The SWG discussed the possibility of introducing a prior informed consent mechanism to ensure that access to biological diversity would not endanger viable populations as well as to reflect the sovereignty of states over their GR. The SWG added that access should not be regulated in a manner that resulted in blanket prevention of access. While there was a general consensus on the importance of access to technology for sustainable GR utilization, some delegates in the SWG further requested the inclusion of GR utilization for other purposes such as pharmaceuticals in relation to transfer of technology to developing countries within the framework of the Convention. Some delegations requested further assessment of the transfer of both 'hard' (e.g. computers) and 'soft' (e.g. training) technologies and that technology transfer should not be specifically confined to biotechnology. Additionally, some delegates argued that countries of origin of genetic material shall have equitable and/or preferential access to the benefits and profits arising from commercial exploitation thereof. Regarding the question of how to financially incentivize all these activities, the SWG could not come to an agreement. Some delegates suggested the idea of a multilateral mechanism with a multitude of funding sources whereas some suggested bilateral settings. The SWG, as later clarified in July 1991, defined access as "the right and/or means of acquiring biological resource or technology that can exploit the resource as well as relevant information and know-how, for scientific, commercial or other purposes on conditions agreed upon multilaterally or bilaterally." (UNEP/Bio.Div./WG.2/3/6, 1991) Access to biological diversity was defined to include both physical access to the genetic material and access to information about the genetic material. Access to technology, on the other hand, was defined as access to know-how relevant to the conservation and sustainable use of biological diversity.

During the same meeting, a Multilateral Trust Fund was proposed to undertake the following activities:

"(a) to make money grants to habitat countries to enable these countries to undertake *in situ* or *ex situ* conservation of ecosystems and species;

(b) to provide fair compensation to habitat countries for the use of their genetic resources;

(c) to provide financial assistance to habitat countries to enable them to reach a technological, educational and training level that will facilitate national programmes for the conservation of biological diversity;

(d) to provide financial assistance to habitat countries to enable them to conduct ecological surveys and to monitor technical assistance and strengthen relevant legal instruments for the conservation of biological diversity." (UNEP/Bio.Div/WG.2/3/8, 1991)

In between the second and third CBD negotiating sessions, the first bioprospecting agreement was signed between a provider country and an industrial user. In September 1991, Costa Rica's National Biodiversity Institute (INBio), a private non-governmental entity, and Merck & Co., Ltd, a pharmaceutical company based in the United States announced the freshly concluded bioprospecting agreement. According to the contract, INBio would provide Merck with chemical extracts from wild plants, insects and microorganisms from Costa Rica's conserved wildlands to be used for Merck's drug-screening programme in return for a two-year research and sampling budget of US$1,135,000 and royalties on any commercial products resulting from the use of the samples. INBio agreed to contribute 10% of the budget and 50% of any royalties to the government's National Park Fund for the conservation of national parks in Costa Rica, and Merck agreed to provide technical assistance and training to help establish drug research capacity in Costa Rica (Aldhous, 1991).

This was the first agreement serving the discussions on the economic value of biodiversity as well as its ability to demonstrate how companies can agree to return a portion of the benefits of commercial development to the developing country where GR were accessed (Reid *et al*, 1993).

Following Dr Tolba's recommendation on merging negotiations related to biodiversity and biotechnology, the AHWG was mandated to negotiate both matters and was renamed the Intergovernmental Negotiating Committee (INC). After the Third Negotiating Session/First Meeting of the INC for a CBD, which lacked sufficient progress, the INC met for its fourth session between 23 September and 2 October 1991 (UNEP/Bio.Div/N4-INC.2/5, 1991). The opening speech contained considerations on the negotiations related to the General Agreement on Tariffs and Trade (GATT). This was followed up by CGIAR Centres arguing they should be allowed to freely sell their genetic material to the private sector without having to share profits with GR providers. Likewise, it was contended by some members of the private sector that, if biotechnologies were transferred to developing countries, these developing countries would only be allowed to market their products locally which would constitute a disincentive to developing countries to acquire biotechnology. This was followed up by a speech by Dr Tolba, who shared the estimates of the Global Environmental Fund (GEF) on the financial cost of biodiversity conservation ranging from $500 million to $50 billion per year. He added that the countries with the richest biodiversity were also the ones least able to afford conservation measures and followed up by stating that the proposed economic system of access to resources increasingly depended on the activity of

access to biological diversity, yet the means of assessing the value of biodiversity were lacking. Secondly, regarding access to technology, he contended that "... progress was measured in terms of development and use of sophisticated technologies, yet the way in which new technologies were regulated hindered their dissemination where they were most urgently needed. One hundred or perhaps more species were being made extinct every day as a result of human action. Intensified scientific monitoring and assessment would help to fill in the gaps in knowledge, but it would take years if not decades." (UNEP/Bio.Div/N4-INC.2/5, 1991)

The INC adopted Article 14bis on 'traditional indigenous and local knowledge' in addition to access to GR. The bracketed sentence requested Contracting Parties to acknowledge the contribution of this knowledge to biodiversity conservation and sustainable use and that they should endeavour to reflect the intrinsic economic value of this knowledge within national policies and legislative decisions. Additionally, a less-bracketed version of Article 15 on access to technology was adopted, which was complemented by Article 16 on technology transfer and Article 17 on scientific cooperation, both of which were still heavily bracketed (UNEP/Bio.Div/N4/INC.2, 1991). Article 14 on access to GR was not further discussed in this session.

At the fifth session of negotiations, which took place between 25 November and 4 December 1991, Dr Tolba informed the INC of a positive development, reading the statement recently made by the Netherlands on behalf of the European Community during the United Nations General Assembly. The representative indicated that "the industrialized countries, recognizing their responsibility towards the environment, should commit themselves to reducing the burden they imposed upon it, to the extent of their legitimate share." (UNEP/Bio.Div/N5-INC.3/4, 1991)

This session did not further discuss the abovementioned draft articles related to access to biological diversity and access to technology. The INC, however, released a document regarding the interpretation of the words fair and favourable, fair and most favourable, equitable, preferential and non-commercial, preferential, non-commercial at the relevant international fora (UNEP/Bio.Div/N5-INC3/3, 1991).

During the sixth negotiating session, gathered from 6 to 15 February 1992, the INC prioritized the discussions related to financial resources, new and additional ones, mechanisms to review and manage those financial resources, access to genetic resources, fair distribution of benefits arising from the use of those resources, fair and favourable conditions for access to technology by developing countries, the question of biotechnology, the question of commitments by developed and developing countries, as well as national regulations and policies in dealing with biological resources at the national level. While the brackets from Article 14 were largely removed and Article 14bis was reformulated as Article 7(j), Article 15 on access to technology got merged with Article 16 on technology transfer, which resulted largely in the removal of considerations related to IP rights restricting access to technology. At this point, Article 16 did not contain as strong provisions on access to technology compared to the previous draft as it became less clear what access to technology or transfer of technology stood for. Furthermore, the article read more as a mere recommendation than an obligation (UNEP/Bio.Div/N6-INC4/4, 1992). The seventh and final negotiating session held by the INC between 11 and 19 May 1992, renamed Article 14 as Article 16 and Article 15 as Article 17 (UNEP/Bio.Div/N7-INC5/2, 1992).

After these drafts, the official documentation does not provide information on how these Articles were renegotiated and what the reason behind removing the brackets and deleting certain sentences was. Regarding the final negotiating environment during the United Nations Conference on Environment and Development (also known as the Rio Conference) in 1992, Parson, Haas and Levy state the following:

> "The negotiations were plagued by the conflict over the financial mechanism, the sharing of benefits, and biotechnology regulation. France originally threatened not to sign the treaty because it did not include a list of global biodiversity-rich regions; Japan threatened not to sign because it feared biotechnology regulation. At the last moment, both relented, and only the United States refused to sign the treaty because officials felt that the financial mechanism represented an open-ended commitment with insufficient oversight and control; that the benefit-sharing provisions were incompatible with existing international regimes for intellectual property rights; and that the requirement to regulate the biotechnology industry would needlessly stifle innovation."
>
> *Parson* et al *(1992)*

The Rio Conference adopted several international environmental treaties, including the CBD. In addition, the Conference also adopted the first non-binding action plan of the United Nations with regard to sustainable development, also known as Agenda 21 (United Nations Conference on Environment and Development, 1992), which contained the following paragraph on sovereign rights of states over their GR:

> "Governments should [...] develop measures and arrangements to implement the rights of countries of origin of genetic resources or countries providing genetic resources, as defined in the CBD, particularly developing coun-

> tries, to benefit from the biotechnological development and the commercial utilization of products derived from such resources."

Convention on Biological Diversity

The provisions of the CBD (UNEP, 1992) originate from its three overarching objectives, which are:

- Conservation of biological diversity
- Sustainable use of the components of biodiversity
- Fair and equitable sharing of benefits arising from GR

Article 15 of the CBD reaffirms the states' sovereign rights over their GR. This means that states have the right to regulate access to their GR, which includes the right to determine the conditions of such access and the fair and equitable benefit-sharing resulting from the utilization of GR (Kamau and Winter, 2013). Article 15 paragraphs 3, 4 and 5 of the CBD stipulate that the access granted by a provider country shall be subject to prior informed consent (PIC) and mutually agreed terms (MAT) unless otherwise determined by the provider country. The CBD defined the key principles of a bilateral ABS system between users and provider countries.

Article 15 of the CBD reaffirms the states' sovereign rights over their GR. This means that states have the right to regulate access to their GR, which includes the right to determine the conditions of such access and the fair and equitable benefit-sharing resulting from the utilization of GR (Kamau and Winter, 2013). Article 15 paragraphs 3, 4 and 5 of the CBD stipulate that the access granted by a provider country shall be subject to prior informed consent (PIC) and mutually agreed terms (MAT) unless otherwise determined by the provider country. The CBD defined the key principles of a bilateral ABS system between users and provider countries.

Article 2 of the CBD defines GR as "genetic material of actual or potential value." According to the same Article, genetic material is defined as "any material of plant, animal, microbial or other origin containing functional units of heredity." The right to determine the conditions of access and benefit-sharing of GR is given to the country of origin as well as the country providing GR. Article 2 of the CBD defines the former as "the country which possesses those genetic resources in *in-situ* conditions" and the latter as "the country supplying genetic resources collected from *in-situ* sources, including populations of both wild and domesticated species, or taken from *ex-situ* sources, which may or may not have originated in that country". In relation to the latter definition, the CBD Article 2 defines domesticated or cultivated species as "species in which the evolutionary process has been influenced by humans to meet their needs." This definition is important due to the fact that the CBD also considers countries as providers of those GR that "have existed for some time away from their *in-situ* conditions and have become part of new natural and cultured ecosystems." This article, therefore, refers to two situations under the definition of provider countries. Kamau and Winter (2013) consider this type of GR provider as first-level providers. The latter definition, however, also includes providers of GR from *ex situ* sources, meaning that these resources are kept and conserved outside of their natural habitat. Kamau and Winter consider this type of GR provider as second-level providers. The second-level providers become such by either rightfully obtaining GR from the country of origin (e.g. by entering into PIC or MAT when these are required by law) or by having obtained these resources before 29 December 1993 when the CBD came into force.

Article 8(j) of the CBD states that subject to their national legislation, states should promote the equitable sharing of benefits arising from the utilization of innovations and practices of indigenous and local communities. However, the CBD does not contain a definition and further description of traditional knowledge.

Article 15 and 8(j) are the two main provisions of the CBD relating to ABS. Several other articles of the CBD complement these provisions such as Article 16 on access to and transfer of technology, Article 17 on exchange of information, Article 18 on technical and scientific cooperation, Article 19/1 and 19/2 on biotechnology and distribution of its benefits, Article 20 on financial resources and Article 21 on a financial mechanism.

Article 16 is an important element in understanding the North-South debate that led to the insertion of the third objective of the CBD on fair and equitable sharing of benefits. As explained under the CBD Negotiations section of this article access, in the early drafts of the CBD, was defined as access to biodiversity and technology. This definition did not find its place in the final text that got adopted. Access to technology as an obligation was drafted as a separate article and perceived as crucial in establishing fairness and equity as access to GR would. According to this, governments would have to establish legislative measures to encourage the private sector to provide access to technology based on mutually agreed terms, and, in accordance with international obligations, refrain from imposing restrictions (such as IP rights).

Article 16 obliges Contracting Parties to provide and/or facilitate technologies relevant to the conservation of biological diversity and sustainable use of its components or technologies that make use of GR. As neither the act to "provide" nor to "facilitate" are defined, Contracting Parties have sizeable flexibility in implementing this obligation. According to Glowka *et al* (1994), this could mean the provision of technologies within the public domain. Regarding technology transfer, Article 16(3) states that the Contracting Parties (be it developing or developed states) are obliged to create a framework permitting the transfer of technologies making use of GR. Consequently, the obligation is not transferring technology yet merely creating the condi-

tions enabling the transfer of technology, making what was an equal return for accessing GR in the beginning, a voluntary scheme in the end.

Discussion and conclusion

The history behind the CBD negotiations demonstrates that the need to reinstate sovereign rights of states over their natural resources emanates from the Global North vs Global South debate on inequality resulting from the aftereffects of colonialism. The Global North, or the developed countries, have been historically able to develop products, processes and technologies potentially beneficial to humanity as a whole, by utilizing the genetic resources the Global South, or the developing countries had. In other words, the Global South provided the resources, and the Global North provided the technology for the development of the global society. Nevertheless, the North traded the products developed with the GR of the Global South, yet the Global South had not participated in the benefits of these products. This resulted in the perception of inequality which paved the way for the first decision on state sovereignty on GR under the Stockholm Declaration. The mandate deriving from the Stockholm Declaration initiated the attempts of FAO to establish CGIAR Centres and the first global ABS instrument (though voluntary) under the IUPGRFA. Additionally, the North during the Stockholm Conference emphasized the need to conserve the environment, whereas the Global South underlined that the poverty they were suffering would not enable them to make funds available for conservation as they had overarching priorities related to basic human needs. Therefore, the need for a financing mechanism to allow the Global South to conserve its resources became visible. Moreover, biotechnology was seen as a key to overcoming food crises and poverty, and a solution to the global decline in biodiversity.

The relief the IUPGRFA provided as a multilateral benefit-sharing system operating under the common heritage principle soon lost its power due to the mistrust elevated by IP discussions under the UPOV Convention regarding GR. The Global South believed IP rights and privatization of GR through the storage thereof in private collections would deem the Undertaking obsolete and undermine its free access principle. The Global North, on the other hand, sustained its claims for the amendment of the UPOV Convention for IP rights strengthening as their agricultural sector depended on the sales of seeds and other value-added products developed with biotechnology. With this tension, the negotiations for an international instrument on biodiversity conservation began. Separate from the attempts under the CBD, FAO further developed the multilateral benefit-sharing system of PGRFA firstly by its amendments and later by adopting the ITPGRFA to alleviate the concerns of the Global South, especially risen after the amendment of the UPOV Convention.

During the negotiations on the CBD, the AHWG initially agreed that access should not be restricted, benefit-sharing should be based on technology-for-nature swaps and that money as such would not make up for a benefit that would be mutually beneficial. The AHWG received pressure from the South on basing the CBD on the sovereign rights of states over their GR. The first CBD drafts reflected this demand and also the opinion of the AHWG on the importance of access to technology as well as to GR. Therefore, access in the context of ABS, at that stage, meant access to GR and access to technology. The North had concerns that this would overrule their IP rights on such technologies. The AHWG gathered experts to look into financing mechanisms that would serve as incentives for both access to GR and access to technology. The experts suggested the option of a multilateral benefit-sharing mechanism by which both the biodiversity-rich countries and owners of technology would be compensated for the provision of their assets. Additionally, it was suggested that the fund would provide compensation for access to provider countries by means of funding conservation projects in those countries. On the contrary, some delegations supported a bilateral negotiation mechanism by means of acquiring PIC and negotiating MAT. Both these options made it to the final text, however, the PIC and MAT appeared in the very article on access to GR, whereas the financing mechanism through a multilateral system was indirectly made an option through Article 21.

As for the definition and conceptualization of GR, it is visible from the early international documents that GR were perceived as a tangible, physical source that can potentially be subject to overexploitation. During the CBD negotiations, it was further stated that access to biodiversity meant access to GR and the information related to them. Nonetheless, neither a definition of access, nor a definition of benefit-sharing have been included in the CBD final text.

The overarching aim of the CBD is the conservation of biological diversity. However, the Global South, starting from the preparations for the Stockholm Conference, called out the lack of ability to conserve biodiversity within their territories due to the continuing gap between development and technology as well as economic advancement. During the negotiations, next to restoring justice within access to resources vs technology equilibrium, several discussions took place on how sharing of benefits would allow incentivizing biodiversity conservation. The SWG on biotechnology assumed that applications of biodiversity on GR such as research and creating inventories of GR would result in the conservation of biodiversity. It was however not clarified how sharing any other types of benefits would create incentives for biodiversity conservation. A very important note here, which surely has passed the test of time since the CBD negotiations, is that many countries of the Global South still lack the ability, economic means and technology to be able to utilize and conserve GR. The CBD originally started as an equal exchange between GR and technology, yet the

negotiations as well as concerns of the Global North over the provenance of IP rights resulted in a final text unclear in its motivations, especially regarding the connection between Articles 15 on access to genetic resources and Articles 16 to 21 on transfer of technology and capacity building. Arguably, the emphasis on Article 15 in the ABS realm resulted in an international bilateral ABS framework under the CBD that is developed heavily around the concept of access and weaker around the concept of benefit-sharing. To this day, this reflects on the current discussions as the persisting lack of trust in the ABS system since the benefits of the ABS system are still blurry to many.

In other words, the negotiations to the CBD aimed at introducing fairness and equity into innovation with biotechnology, as well as incentivizing conservation. However, it is doubtful whether the PIC and MAT mechanisms enabled provider countries to acquire the technology and know-how to become users of GR themselves, nor is it clear whether provider countries have been sufficiently financially incentivized with the ABS mechanism the CBD introduced to the international legal realm. By analyzing the historical developments and negotiation documents that led to the CBD, this paper displays the narratives and needs of the Global North and the Global South with the hope of serving as guidance to the negotiations of further clarifications to the ABS system.

Although many concepts have evolved throughout the two decades since the adoption of the ABS system under the CBD, there are many lessons to be recalled regarding the tensions between the Global North and the Global South which persist today. For example, the visible demonstration of this tension often takes over the DSI debate. One of the more topical and lasting conclusions of this paper is that the current debates need to acknowledge the fact that the technological and economic prosperity gap between the Global North and the Global South, most likely on another level than in the late 1980s and early 1990s, continues to impact the prominence of the ABS system and any novel concept which evolved with the current technological advancements, relevant to bioprospecting. Without an effective solution addressing this underlying tension, the Global North and the Global South will continue to disagree on how to address the global biodiversity crisis and environmental justice, which requires all Parties to act evermore sooner than later.

Conflict of interest statement

The author declares that there exists no conflict of interest between the author's role as a postdoctoral researcher/legal advisor and the topics covered under this article.

References

Aldhous, P. (1991). 'Hunting licence' for drugs. *Nature* 353, 290. doi: https://doi.org/10.1038/353290a0

Attenborough, D. and Hughes, J. (2020). A life on our planet (Grand Central Publishing), 1 edition.

CBD/POST2020/WS/2019/8/3 (2019). Report of the Global Consultation on the Post-2020 Global Biodiversity Framework in Relation to Access and Benefit-sharing and the Nagoya Protocol, Nairobi, 25 August 2019. url: https://www.cbd.int/doc/c/54f0/da56/ccd407da8ceadd946d32742a/post2020-ws-2019-08-03-en.pdf.

FAO (1983). International Undertaking on Plant Genetic Resources, Resolution 8/83. Adopted at the Twenty-second Session of the FAO Conference, Rome, 23 November 1983. url: https://www.fao.org/3/x5563E/X5563e0a.htm\#Resolution9.

FAO (2004). International Treaty on Plant Genetic Resources for Food and Agriculture. url: https://www.fao.org/3/i0510e/i0510e.pdf.

FAO Resolution 3/91 (1991). Report of the Conference of FAO, Twenty-sixth Session, Rome, 9-27 Novem-ber 1991. url: https://www.fao.org/bodies/conf/c91/en/.

FAO Resolution 4/89 (1989). Report of the Conference of FAO, Twenty-fifth Session, Rome, 11-30 November 1989, Report C 1989 [108]. url: https://www.fao.org/bodies/conf/c89/en/.

FAO Resolution 5/89 (1989). Report of the Conference of FAO, Twenty-fifth Session, Rome, 11-30 November 1989, Report C 1989 [108]. url: https://www.fao.org/bodies/conf/c89/en/.

Glowka, L., Burhenne-Guilmin, F., and Synge, H. (1994). A Guide to Convention on Biological Diversity. url: https://portals.iucn.org/library/efiles/documents/EPLP-no.030.pdf.

Helfer, L. R. (2003). Intellectual Property Rights and the International Treaty on Plant Genetic Resources for Food and Agriculture. url: https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=2657&context=faculty_scholarship.

IPBES (2019). Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, ed. Díaz, S., Settele, J., Brondízio, E. S., Ngo, H. T., Guèze, M., Agard, J., Arneth, A., Balvanera, P., Brauman, K. A., Butchart, S. H. M., Chan, K. M. A., Garibaldi, L. A., Ichii, K., Liu, J., Subramanian, S. M., Midgley, G. F., Miloslavich, P., Molnár, Z., Obura, D., Pfaff, A., Polasky, S., Purvis, A., Razzaque, J., Reyers, B., Chowdhury, R. R., Shin, Y. J., Visseren-Hamakers, I. J., Willis, K. J., and Zayas, C. N. (Bonn, Germany: IPBES secretariat), 56p. url: https://ipbes.net/sites/default/files/inline/files/ipbes_global_assessment_report_summary_for_policymakers.pdf.

Johnson, S. (2012). UNEP the First 40 Years: A Narrative. url: https://wedocs.unep.org/handle/20.500.11822/8751.

Kamau, E. and Winter, G. (2013). An Introduction to the International ABS Regime and a Comment on Its Transposition by the EU. *Law, Environment and*

Development Journal 9(2), 108–126. url: http://www.lead-journal.org/content/13106.pdf.

Lawson, C. (2015). The Breeder's Exemption Under the 1991 International Convention for the Protection of New Plant Varieties and the Convention on Biological Diversity and Its Nagoya Protocol. *Journal of Intellectual Property Law & Practice* 10(7), 526–535. doi: http://dx.doi.org/10.2139/ssrn.2626689

Meadows, D. H., Meadows, D. L., Randers, J., and Behrens, W. W. (1972). Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind. url: http://www.donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf.

Meadows, D. H. and Randers, J. (2013). Limits to growth. Chelsea Green Publishing.

Mooney, P. R. (1983). The law of the seed: Another development and plant genetic resources (Uppsala, Sweden: Dag Hammarskjoeld Centre), 172p.

Moore, G. and Tymowski, W. (2005). Explanatory Guide to the International Treaty on Plant Genetic Resources for Food and Agriculture. url: https://www.iucn.org/resources/publication/explanatory-guide-international-treaty-plant-genetic-resources-food-and.

Parson, E. A., Haas, P. M., and Levy, M. A. (1992). A Summary of the Major Documents Signed at the Earth Summit and the Global Forum. *Environment: Science and Policy for Sustainable Development* 34(8), 12–36. doi: https://doi.org/10.1080/00139157.1992.9931468

Reid, W. V., Laird, S. A., Meyer, C. A., Gámez, R., Sittenfeld, A., Janzen, D. H., Gollin, M., and Juma, C. (1993). Biodiversity Prospecting: Using genetic resources for sustainable development (USA: World Resources Institute (WRI)).

Rose, G. L. (2004). The International Undertaking on Plant Genetic Resources for Food And Agriculture: Will the Paper be Worth the Trees? In *Accessing Biological Resources: Complying with the Convention on Biological Diversity,* ed. Stoianoff, N., (London: Kluwer), 55-90.

Secretariat of the Convention on Biodiversity (2011). 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. url: https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf.

Secretariat of the Convention on Biological Diversity (2020). Global Biodiversity Outlook 5. url: https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf.

Shackelford, S. J. (2008). The tragedy of the common heritage of mankind. *Stanford Environmental Law Journal* 27, 101–157.

Sirakaya, A. (2022). Is the Nagoya Protocol designed to conserve biodiversity? *Plants, People, Planet* 4(1), 68–75. doi: https://doi.org/10.1002/ppp3.10221

Sullivan, S. N. (2004). Plant genetic resources and the law: past, present, and future. *Plant physiology* 135(1), 10–15. doi: https://doi.org/10.1104/pp.104.042572

Ten-Kate, K. and Diaz, C. L. (1997). The undertaking revisited: A commentary on the revision of the international undertaking on plant genetic resources for food and agriculture. *Review of European Community & International Environmental Law* 6, 284–292. doi: https://doi.org/10.1111/1467-9388.00110

Tripp, R., Louwaars, N., and Eaton, D. (2007). Plant variety protection in developing countries. A report from the field. *Food Policy* 32, 354–371. doi: https: //doi.org/10.1016/j.foodpol.2006.09.003

UNEP (1992). Convention on Biological Diversity. Rio de Janeiro. url: https://www.cbd.int/doc/legal/cbd-en.pdf.

UNEP/Bio.Div.1/3 (1989). UNEP Report of the first session of the Ad Hoc Working Group of Experts on Biological Diversity on its first session UNEP/Bio.Div.1/3, 9 November 1989. url: https://digitallibrary.un.org/record/749006?ln=en.

UNEP/Bio.Div.2/3 (1990). UNEP Report of The Ad Hoc Working Group On The Work Of Its Second Session In Preparation For A Legal Instrument On Biological Diversity Of The Planet UNEP/Bio.Div.2/3, 23 September 1990. url: https://www.cbd.int/doc/meetings/iccbd/bdewg-02/official/bdewg-02-03-en.pdf.

UNEP/Bio.Div.3/12 (1990). UNEP Report of The Ad Hoc Working Group On The Work Of Its Third Session In Preparation For A Legal Instrument On Biological Diversity Of The Planet UNEP/Bio.Div.3/12 13 August 1990. url: https://www.cbd.int/doc/meetings/iccbd/bdewg-03/official/bdewg-03-12-en.pdf.

UNEP/Bio.Div.3/3 (1990). Biological Diversity: Global Conservation Needs and Costs, 12 June 1990. url: https://www.cbd.int/doc/meetings/iccbd/bdewg-03/official/bdewg-03-03-en.pdf.

UNEP/Bio.Div.3/5 (1990). Framework Legal Instrument On Biological Diversity: An Analysis Of Possible Financial Mechanisms, 23 May 1990. url: https://www.cbd.int/doc/meetings/iccbd/bdewg-03/official/bdewg-03-05-en.pdf.

UNEP/Bio.Div.3/6 (1990). Relationship Between Intellectual Property Rights and Access to Genetic Resources and Biotechnology, 20 June 1990. url: https://www.cbd.int/doc/meetings/iccbd/bdewg-03/official/bdewg-03-06-en.pdf.

UNEP/Bio.Div.3/7 (1990). Biotechnology: Concepts and Issues for Consideration in preparation of a Framework Legal Instrument For the Conservation of Biological Diversity, 23 May 1990. url: https://digitallibrary.un.org/record/134998?ln=en.

UNEP/Bio.Div.3/Inf.4 (1990). Relationship Between Intellectual Property Rights and Access to Genetic Resources and Biotechnology (A study prepared for the United Nations Environment Programme*)18 June 1990. url: https://digitallibrary.un.org/record/135024?ln=en.

UNEP/Bio.Div/N4-INC.2/5 (1991). Report of the Intergovernmental Negotiating Committee for a Convention on Biological Diversity on the Work of its Fourth Negotiating Session/Second Session, 2 October 1991. url: https://www.cbd.int/doc/meetings/iccbd/bdn-04-inc-02/official/bdn-04-inc-02-05-en.pdf.

UNEP/Bio.Div/N4/INC.2 (1991). Second Revised Draft Convention on Biological Diversity, 23 July 1991. url: https://www.cbd.int/kb/Results?RecordType=meetingDocument&Event=BDN-04-INC-02.

UNEP/Bio.Div/N5-INC3/3 (1991). Interpretation of the Words and Phrases "Fair and Favourable", "Fair and most Favourable", "Equitable", "Preferential and Non-Commercial", "Preferential", "Non-Non-Commercial" and "Concessional", 19 November 1991. url: https://www.cbd.int/kb/record/meetingDocument/61876?Subject=CBD.

UNEP/Bio.Div/N5-INC.3/4 (1991). Report of the Intergovernmental Negotiating Committee for a Convention on Biological Diversity on the Work of its Third Session/Fifth Negotiating Session, para 5, 4 December 1991. url: https://www.cbd.int/doc/meetings/iccbd/bdn-05-inc-03/official/bdn-05-inc-03-04-en.pdf.

UNEP/Bio.Div/N6-INC4/4 (1992). Report of the Intergovernmental Negotiating Committee for a Convention on Biological Diversity on the Work of its Sixth Negotiating Session/Fourth Session of INC, 18 February 1992. url: https://www.cbd.int/kb/record/meetingDocument/61882?FreeText=UNEP/CBD/COP/13/4.

UNEP/Bio.Div/N7-INC5/2 (1992). Fifth Revised Draft Convention on Biological Diversity, 20 February 1992. url: https://www.cbd.int/doc/meetings/iccbd/bdn-07-inc-05/official/bdn-07-inc-05-02-en.pdf.

UNEP/Bio.Div/SWGB.1/5/Rev.1 (1990). Final Report of the Sub-Working Group on Biotechnology, 28 November 1990. url: https://digitallibrary.un.org/record/749037.

UNEP/Bio.Div/WG.2/2/5 (1991). Report of the Ad Hoc Working Group of Legal and Technical Experts on Biological Diversity on the Work of its Second Session, 7 March 1991. url: https://www.cbd.int/doc/meetings/iccbd/bdn-04-inc-02/official/bdn-04-inc-02-05-en.pdf.

UNEP/Bio.Div./WG.2/3/6 (1991). Note to Facilitate Understanding of Issues Contained in Articles Under Consideration by Sub-Working Group, 29 April 1991. url: https://digitallibrary.un.org/record/749037.

UNEP/Bio.Div/WG.2/3/8 (1991). Note in Treaty Language Containing the Different Options for a Financial Mechanism Based on Solutions Adopted in Other Conventions and Other Multilateral Financial Mechanisms, 29 April 1991. url: https://www.cbd.int/doc/meetings/iccbd/bdn-03-awg-03/official/bdn-03-awg-03-08-en.pdf.

United National General Assembly Resolution 1803 (XVII) (1962). Permanent sovereignty over natural resources, 14 December 1962.

United Nations Conference on Environment and Development (1992). Agenda 21, Rio Declaration, Forest Principles. url: https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf.

United Nations Doc. A/CONF. 48/14 (1972). Stockholm Declaration on the Human Environment, Report of the United Nations Conference on the Human Environment, Stockholm, 5-16 June 1972, at 2 and Corr. 1. url: https://digitallibrary.un.org/record/523249?ln=en.

United Nations General Assembly A/RES/3171 (1973). Permanent sovereignty over natural resources, 17 December 1973. url: https://digitallibrary.un.org/record/191196?ln=en.

United Nations General Assembly A/RES/72/249 (2017). Resolution adopted by the General Assembly on 24 December 2017 [without reference to a Main Committee (A/72/L.7 and A/72/L.7/Add.1)] 72/249. International legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction. url: https://www.un.org/en/ga/72/resolutions.shtml.

United Nations General Assembly A/RES/S-6/3201 (1974). Resolution adopted by the General Assembly 3201 (S-VI). Declaration on the Establishment of a New International Economic Order. 1 May 1974. url: https://legal.un.org/avl/pdf/ha/ga_3201/ga_3201_ph_e.pdf.

United Nations General Assembly Resolution 2398 (XXIII) (1968). Problems of the human environment, 12 November 1968. url: https://digitallibrary.un.org/record/202554?ln=en.

United Nations General Assembly Resolution 3281 (XXIX) (1974). Charter Of Economic Rights And Duties Of States.

UPOV (1961). International Convention for the Protection of New Varieties of Plants of December 2, 1961. Publication no: 221(E). url: https://www.upov.int/edocs/pubdocs/en/upov_pub_221.pdf.

Waldheim, K., Palme, O., Gandhi, I., Ke, T., Westing, A. H., Commoner, B., et al. (1972). III. Human Environment. *Bulletin of Peace Proposals* 3(3), 226–239. url: http://www.jstor.org/stable/44480182.

WHO (2021). Pandemic Influenza Preparedness (PIP) Framework for the sharing of influenza viruses and access to vaccines and other benefits, second edition. url: https://www.who.int/publications/i/item/9789240024854.