



Proposals of indigenous peoples and local communities from Brazil for multilateral benefit-sharing from digital sequence information

Adriana de Souza de Lima, Cristiane Gomes Julião, Elizete Maria da Silva, Alberto Franca Dias, Jhonny Martins de Jesus, Marciano Toledo da Silva, Emmanuel Duarte Almada, Jaqueline Pereira de Andrade, Nurit Bensusan, Sofia Zank & Gustavo Taboada Soldati



One of the main themes of the 16th Conference of the Parties to the Convention on Biological Diversity is Digital Sequence Information (DSI): genomic or related data deposited in publicly accessible databases in a digital language. These sequences are important for research in areas such as biodiversity conservation and bioprospecting. Some characteristics of organisms that stimulate the commercial use of biodiversity may have been developed by Indigenous Peoples and Local Communities, and therefore, they have associated traditional knowledge. We present proposals of the Brazilian Indigenous Peoples and Local Communities on this topic.

The 16th Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) will discuss Digital Sequence Information (DSI) associated with genetic resources and the multilateral benefit-sharing mechanism¹. This negotiation is crucial for the survival of the Convention on Biological Diversity, which has been weakened by the failures of the “Strategic Plan for the Convention on Biological Diversity” (Decision VI/26) and the “Strategic Plan for Biodiversity 2011–2020 and Aichi Biodiversity Targets” (Decision X/2), even with the announcement of the Kunming-Montreal Global Biodiversity Framework. Negotiations between the Parties may lead to decisions on DSI that could undermine the objectives of the Convention, especially benefit-sharing, thus weakening the Nagoya Protocol². The challenge lies in balancing the interests and rights of the actors involved—Parties, academia, businesses, Indigenous Peoples, and Local Communities—while ensuring the sovereign rights of countries over their genetic resources, access to biodiversity, fair and equitable benefit-sharing, and technology transfer, all within the framework of a non-binding treaty.

To implement the multilateral mechanism, it is necessary to determine whether benefit-sharing applies only to the economic exploitation of products or also to services. It is also necessary to

determine whether benefit-sharing applies to all users, only commercial users, users in sectors highly dependent on DSI, or those who benefit indirectly. The percentage of benefits to be shared is also under discussion, with a 1% proposal requiring a definition of the calculation base value. Similar decisions are pending for non-monetary benefit-sharing. Other essential points yet to be defined relate to the resource distribution mechanism, such as the fund chosen to operationalize the mechanism and the funding priorities, such as conservation, sustainable use, support for Indigenous Peoples and Local Communities, technology transfer, and capacity-building. There is a proposal to create an equation based on variables still under negotiation for the distribution of resources among the Parties. For disbursing resources, project-based or direct allocation options have been proposed. Additionally, the recommendation encourages, suggests, or mandates changes in the management of public databases, such as the need to inform about the multilateral mechanism, the requirement for a declaration that the user depositing DSI has complied with the national laws of the country where the access took place, and the inclusion of geographic origin metadata and, where applicable, associated traditional knowledge.

This text presents conceptual and textual propositions from the indigenous peoples and local communities of Brazil for developing the multilateral benefit-sharing mechanism for using digital sequence information associated with genetic resources. We start from the premise that broad discussion and popular participation contribute to developing an inclusive mechanism, emphasizing the right to consultation. The propositions presented were developed by representatives of indigenous peoples, traditional peoples and communities, and family farming (peasants) of Brazil within the structure of the Genetic Heritage Management Council, the highest authority of the national system for access and benefit-sharing. These representatives are part of the leading social movements representing these three segments: the Articulation of Indigenous Peoples of Brazil (APIB), the National Network of Traditional Peoples and Communities (RedePCTs), and Via Campesina. The development of the propositions was supported by academics who are allied with social movements. It included the participation of members from the Ministry of the Environment and Climate Change, the Ministry of Science, Technology and Innovation, and the Ministry of Social Development and Assistance. The propositions were based on Decision CBD 15/9 and Recommendation CBD/WGDSI/REC/2/1 and were designed to strengthen the rights of Indigenous

Peoples and Local Communities^{3,4} while also initiating a process of historical reparation in the use of global biodiversity².

Some proposals for the multilateral mechanism presented in the scientific literature

Given the complexity of the topic and the involved actors, various texts present propositions parallel to the negotiations conducted under the Convention on Biological Diversity. These propositions aim to balance the broad and transparent production of scientific knowledge, benefit-sharing, capacity building, and the conservation and sustainable use of biodiversity. Some texts suggest dissociating access from benefit-sharing⁵⁻⁷, based on the assumption that broad and facilitated access to digital sequence information (DSI) (Open Access) encourages equitable sharing of benefits². In this case, there is no deep concern with the traceability of DSI or the user, as long as benefit-sharing occurs in a fair and equitable manner. Regarding data management, the Open Access approach is defended^{1,6,8} based on: (a) anonymity, i.e., no registration required to access databases; (b) absence of fees; (c) reusability of DSI, meaning that after depositing in a database, researchers can use it without restriction; and (d) interoperability, with information being quickly processed, read, and analyzed, including sharing between databases⁸. This defense is based on the argument that it promotes extensive production of new scientific knowledge while reducing costs, time, and labor^{6,8}.

Another data management approach, the FAIR Principles, aims to ensure the findability, accessibility, interoperability, and reusability of digital assets. In this case, DSI should receive a unique and global identifier, have associated metadata, and be indexed in a search mechanism that may or may not have a procedure for authentication or authorization⁹. Thus, it adds to the Open Access approach the possibility of metadata, authentication, and authorization, making it slightly more restrictive if the user depositing a DSI desires⁹. However, ref. 10, assuming that research mixes millions of sequences resulting in synthetic “hybrid” sequences that cannot be attributed to a specific natural sequence, conclude that the geographic origin of a DSI is not a good indicator for benefit-sharing.

Considering these data management principles, the Open Access approach denies the rights of indigenous peoples and local communities, specifically the right to determine the use and sharing of their knowledge^{2,3}. This approach violates the Convention on Biological Diversity, the ILO Convention 169, and the UN Declaration on the Rights of Indigenous Peoples, thus qualifying as violating international law. Some propositions address this gap, such as the creation of participatory projects with direct benefits to Indigenous Peoples, national laws for protecting Indigenous data, the development of principles like the CARE Principles, Local Contexts Notices, and researcher education^{2,3,11-14}. However, they do not fully address the rights of indigenous peoples and local communities with an efficient, feasible, comprehensive, and effective mechanism.

Proposals of indigenous peoples and local communities of Brazil to multilateral benefit-sharing from digital sequence information

We understand that the complex negotiation process around benefit-sharing implies losses and gains. However, we are alarmed by the fact that the rights of indigenous peoples, such as autonomy over their territories, traceability of traditional knowledge, and consent, are often the weak or forgotten link in the equation (Fig. 1). Our proposals aim to textually guarantee these rights within the framework of the

multilateral mechanism, as we agree with ref. 12, who conclude that “Trust relationships have failed colonized, low-income, and vulnerable communities to date.” In general, existing texts and propositions adhere to Open Access, FAIR, or CARE principles. We choose to avoid this approach, as we believe that each principle addresses parts of the processes involved in the negotiations, but not all. We have organized our propositions into three major dimensions: (1) values, principles, and objectives of the multilateral benefit-sharing mechanism for the use of digital sequence information associated with genetic resources; (2) governance of data and public databases; and (3) benefit-sharing.

Values, principles, and objectives of the multilateral benefit-sharing mechanism for using Digital Sequence Information associated with genetic resources.

We start from the understanding that the preambular paragraphs of a document outline its values, principles, and the rationale behind a decision. The document CBD/WGDSI/REC/2/1 includes only one preambular paragraph; we suggest adding five paragraphs that: (a) highlight international milestones that qualify Indigenous Peoples and Local Communities as “rights holders,” especially the right to prior, informed consent, the right to participate in decisions affecting their ways of life and territories, and the right to benefit-sharing from the economic exploitation of their associated traditional knowledge. We suggest references to Convention 169 of International Labor Organization and United Nations Declaration on the Rights of Indigenous Peoples; (b) recognize the management and knowledge systems of Indigenous Peoples and Local Communities as the primary and most effective strategy for biodiversity conservation; (c) acknowledge the intrinsic and inseparable connection between traditional knowledge, territories, and biodiversity conservation, and therefore the need to ensure and implement the right of Indigenous Peoples and Local Communities to their territories; (d) recognize that biodiversity and territories managed by Indigenous Peoples and Local Communities are under increasing pressure from various sources, such as climate collapse, corporate agriculture, resource extraction, mining, extensive infrastructure or energy projects, which constitute processes of environmental violence and racism; and (e) acknowledge that the multilateral benefit-sharing mechanism is an unparalleled opportunity for historical reparation in the use of global biodiversity and associated traditional knowledge.

Governance of data and public databases. We propose that all users of public databases be registered with personally identifiable information. All accesses, such as deposits, searches, and database sharing, should be recorded and associated with users. Users depositing a Digital Sequence Information (DSI) must: (a) declare that they have complied with the access and benefit-sharing laws of the country of origin where the access was conducted; (b) declare awareness of the multilateral access and benefit-sharing mechanism; (c) provide data on the geographical origin of the collection that generated the information; and (d) provide data on the Indigenous People or Local Community holding knowledge about the genetic resource that generated the DSI, including any licenses that this social group may have regarding the information, when applicable. These metadata (user, access type, geographical origin, and associated traditional knowledge) should be inseparable from the DSI following its entire lifecycle, including during information sharing between databases. These proposals aim to reduce the inability to track, although they still need to provide a complete solution. We believe these proposals do not require high costs or complex, non-existent technologies. We agree on

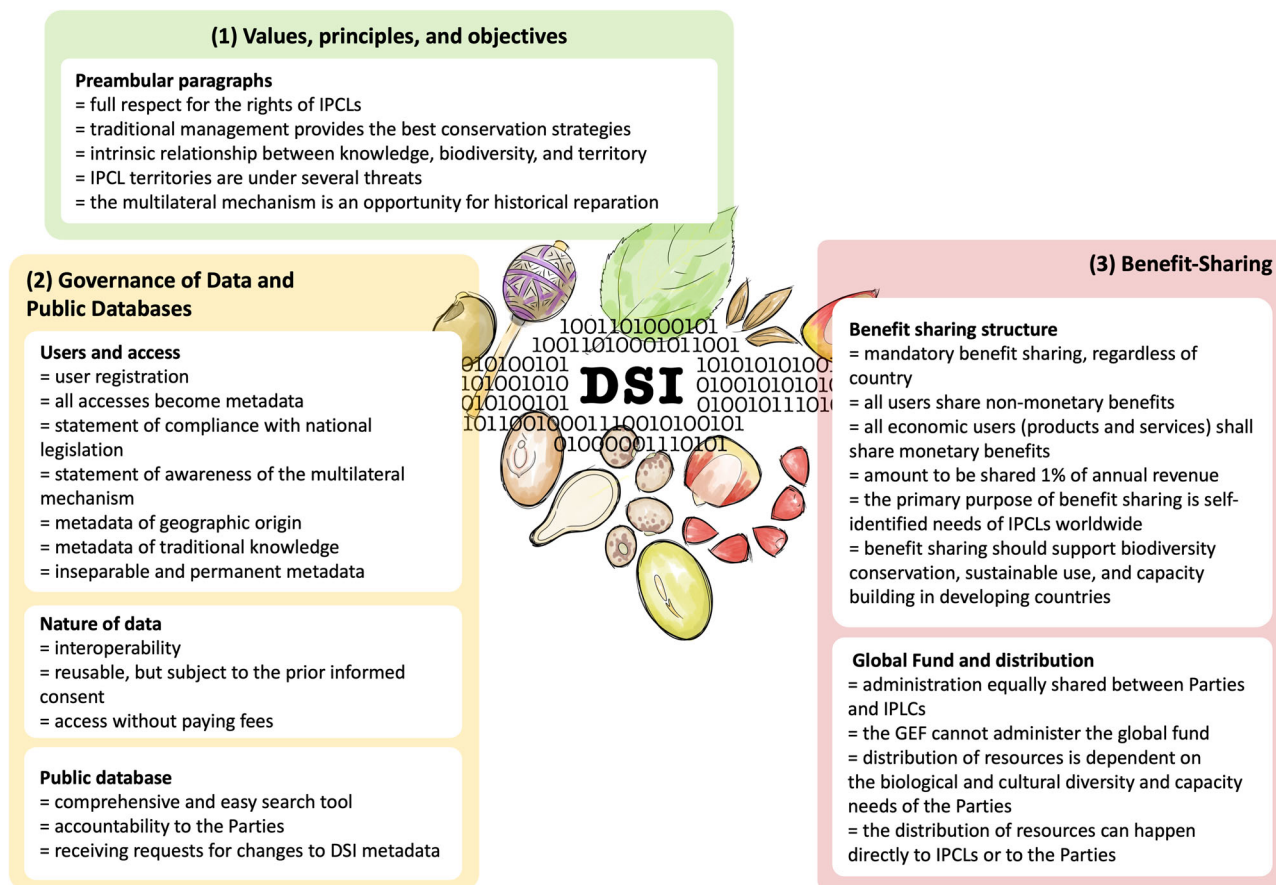


Fig. 1 | Summary of proposals of indigenous peoples and local communities (IPCLs) from Brazil for multilateral benefit-sharing from digital sequence information. GEF global environment fund.

data interoperability for machine-reading and sharing between databases. However, we emphasize that the described metadata needs to be shared in addition to the digital sequence information. We propose that digital sequence information be broadly reusable, provided that the Indigenous People or Local Community has a license for this reuse if it has associated traditional knowledge. We suggest that users not pay a fee to access the deposited digital sequence information. We propose that all public databases feature a search tool capable of identifying all accesses and users of digital sequence information, regardless of the database in which the access was made. We propose that public databases be responsible for responding to inquiries from the Parties and receiving requests from the Parties to modify digital sequence information pertaining to their sovereign rights.

Benefit-sharing. We propose that all users of digital sequence information (DSI) must engage in benefit-sharing. We emphasize that benefit-sharing should be mandatory, disregarding terms such as “are encouraged to,” “will,” and “should.” We suggest that all users who economically exploit products and services based on DSI must share monetary benefits equivalent to 1% of their annual revenue coming from products and services based on DSI, regardless of the country. Using annual revenue as the basis for calculation facilitates and standardizes the process globally. We propose that all users, regardless of their individual circumstances, must share non-monetary benefits,

regardless of whether they provide monetary benefit-sharing. We also propose that academic institutions and databases should share non-monetary benefits. Non-monetary benefits include technology transfer, capacity building and development, and technical and scientific cooperation. The main goal of monetary and non-monetary benefit-sharing is to meet the self-identified needs of Indigenous Peoples and Local Communities worldwide, particularly ensuring the use and management of their territories while respecting their consultation processes and autonomy. In addition to this primary goal, benefit-sharing should support biodiversity conservation, sustainable use, and capacity building in the use of DSI in developing countries. Utilizing the clearing-house mechanism of the convention on biological diversity can facilitate non-monetary benefit-sharing. We propose that the management and administration of the global fund be equally shared between the Parties and representatives of indigenous peoples and local communities. We believe that the global environment facility cannot manage the global fund, as its board representation is unequal, with developed countries having direct and individualized representation, while other countries, often developing, must share a seat. The distribution of resources from the global fund among the Parties should adhere to a formula considering three variables: (a) biological diversity at all levels of the organization, understood as (a.1) species richness, (a.2) endemic species richness, (a.3) level of threat to biodiversity, and (a.4) variety of ecosystems; (b) cultural diversity,

understood as (b.1) diversity of indigenous peoples and local communities, (b.2) diversity of spoken languages, and (b.3) contribution of indigenous peoples and local communities to biodiversity conservation; and (c) capacity needs for conservation and sustainable use of biodiversity, understood as (c.1) level of development. The disbursement of resources from the global fund should occur through direct allocation to indigenous peoples and local communities, to their representative entities, or directly to the Parties. In addition to the principles of inclusion, equity, and transparency, the global fund should be based on the concept of historical reparation to indigenous peoples, local communities, and developing countries. Furthermore, the global fund and the multilateral mechanism should respect the rights of indigenous peoples and local communities.

Summary

The discussion on using digital sequence information (DSI) associated with genetic resources highlights the urgent need to establish a multilateral benefit-sharing mechanism that is inclusive, fair, and fully respects the rights of indigenous peoples and local communities. Promoting the sovereignty of countries and the collective rights of these peoples makes it possible to ensure that scientific advancement occurs responsibly without repeating historical cycles of exploitation. Balancing the production of scientific knowledge with respect for cultural traditions and territorial rights is essential to achieving sustainable and equitable global biodiversity governance. Thus, the proposals presented here adhere to the guidelines of the Convention on Biological Diversity and the Nagoya Protocol and contribute to rectifying historical injustices in the use and access to biodiversity and traditional knowledge, building a future rooted in justice and conservation.

Adriana de Souza de Lima^{1,2}, Cristiane Gomes Julião^{1,3},
Elizete Maria da Silva^{1,4}, Alberto Franca Dias^{1,3},
Jhonny Martins de Jesus^{1,5}, Marciano Toledo da Silva⁶,
Emmanuel Duarte Almada⁷, Jaqueline Pereira de Andrade⁸,
Nurit Bensusan⁹, Sofia Zank¹⁰ & Gustavo Taboada Soldati¹¹ ✉

¹Genetic Heritage Management Council (Brazil) (Conselho de Gestão do Patrimônio Genético), Brasília, Brazil. ²Network of Traditional Peoples and Communities of Brazil (Rede dos Povos Comunidades Tradicionais do Brasil), Brasília, Brazil. ³Articulation of Indigenous Peoples of Brazil (Articulação dos Povos Indígenas do Brasil), Brasília, Brazil. ⁴Peasant Women's Movement (Movimento das Mulheres Camponesas), Brasília, Brazil. ⁵National Coordination for the Articulation of Rural Quilombola (Afrodescendants) Communities (Coordenação Nacional de Articulação das Comunidades Negras Rurais Quilombolas), Brasília, Brazil. ⁶Movimento dos Pequenos Agricultores (Small Farmers Movement), Brasília, Brazil. ⁷Universidade do Estado de Minas Gerais, Rio de Janeiro, Brazil. ⁸Terra de Direitos, Curitiba, Brazil. ⁹Observatory of Sociobiodiversity Economies (Observatório das Economias da Sociobiodiversidade), Brasília, Brazil. ¹⁰Universidade Federal de Santa Catarina, Florianópolis, Brazil. ¹¹Universidade Federal de Juiz de Fora, Juiz de Fora, Brazil. ✉e-mail: gustavo.soldati@ufff.br

Received: 1 October 2024; Accepted: 11 October 2024;
Published online: 16 October 2024

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Acknowledgements

We thank the Serrapilheira Institute for financial support and Henry Novion, Leticia Piancastelli Siqueira Brina, and Keila Macfaden Juarez for their technical support for the meeting that resulted in the presented proposals. We also thank Manuela da Silva (Fiocruz) for supporting Brazil's Indigenous Peoples and Local Communities.

Author contributions

All authors (A.d.s.d.L., C.G.J., E.M.d.S., A.F.D., J.M.d.J., M.T.d.S., E.D.A., J.P.d.A., N.B., S.Z., and G.T.S.) conceptualized and reviewed the manuscript collaboratively. G.T.S. created Fig. 1.

Competing interests

The authors declare no competing interests.

Additional information

Correspondence and requests for materials should be addressed to Gustavo Taboada Soldati.

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