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OPEN-ENDED WORKING GROUP
ON THE POST-2020 GLOBAL
BIODIVERSITY FRAMEWORK
Fourth meeting
Nairobi, 21-26 June 2022
Item 5 of the provisional agenda*

CO-LEADS' REPORT ON THE WORK OF THE INFORMAL CO-CHAIRS' ADVISORY GROUP ON DIGITAL SEQUENCE INFORMATION ON GENETIC RESOURCES SINCE THE THIRD MEETING OF THE OPEN-ENDED WORKING GROUP ON THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK

Note by the co-leads of the Informal Co-Chairs' Advisory Group on digital sequence information on genetic resources

I. INTRODUCTION

A. Background

1. At part I of the third meeting of the Open-ended Working Group on the Post-2020 Global Biodiversity Framework, held virtually from 23 August to 3 September 2021, the Co-Chairs of the Working Group, Mr. Basile van Havre (Canada) and Mr. Francis Ogwal (Uganda) reported that together with the Executive Secretary they would establish an informal Co-Chairs' advisory group on digital sequence information on genetic resources to advance discussions in accordance with specified terms of reference[1]. The group would be led by the co-leads of the contact group that had been established on this matter, namely Ms. Lactitia Tshitwamulomoni (South Africa) and Mr. Gaute Voigt-Hanssen (Norway).

2. At part II of its third meeting, held in Geneva from 14 to 29 March 2022, the Working Group adopted recommendation 3/2 on digital sequence information on genetic resources, in which it requested the Informal Co-Chair's Advisory Group to continue its work on the assessment of consequences of potential policy approaches, options or modalities for benefit-sharing arising out of the utilization of digital sequence information on genetic resources and to provide advice on the following areas:[2]

(a) Hybrid approaches, options or modalities;

(b) The findings from the assessment of policy options[3];

(c) Elements of a definition for digital sequence information on genetic resources, based on the work of the Ad Hoc Technical Expert Group on Digital Sequence Information on Genetic Resources and any other relevant information;

(d) Legal feasibility;

* CBD/WG2020/4/1.

[1] CBD/WG2020/3/5, Appendix, at 166.

[2] Para 12 of WG2020 recommendation 3/2

[3] Referred to para. 8 of WG2020 recommendation 3/2.

(e) Tracking and tracing, and their implications for the potential policy approaches, options or modalities;

(f) The next steps in the approach that should be considered on the way forward to finding a solution on the fair and equitable sharing of the benefits arising out of the utilization of digital sequence information on genetic resources in the context of the post-2020 global biodiversity framework;

(g) The role, rights and interests of indigenous peoples and local communities, and the need to take these into account in considering potential policy approaches, options or modalities;

(h) The roles and interests of, and implications for, the scientific research community, private sector, civil society organizations, and databases dealing with digital sequence information on genetic resources;

3. The working Group also requested the Co-Chairs of the Working Group to invite representatives of the scientific research community, private sector, civil society organizations, and databases dealing with digital sequence information on genetic resources to the discussions of the Informal Co-Chairs' Advisory Group.[4]

4. The present note provides a report on the work of the Informal Co-Chairs' Advisory Group following part II of the third meeting of the Working Group. It includes: a summary of organizational matters (section I. B), the outcomes of the work of the Informal Co-Chairs' Advisory Group (section II), and the co-leads' conclusions and recommendations of the co-leads are provided (section III).

B. Organizational matters

5. The Informal Co-Chairs' Advisory Group held a virtual kick-off meeting on 19 April to agree on its organization of work, on rules of engagement and on the workplan and stakeholders to be involved or invited to deliver presentations to the group. A total of eight virtual meetings of approximately 3 hours duration were convened by the co-leads since the close of the third meeting of the Working Group. The organization of work, including the list of presenters for each session, is presented in the annex I to the present document.

6. As agreed between members of the Informal Advisory Group, meetings of the group were not recorded and were only open to members of the group as well as other selected participants as requested in recommendation 3/2, paragraph 11 (annex II). Participants were reminded at the start of each session that the Informal Advisory Group was not mandated to negotiate text, rather it was established to provide advice and feedback to the Co-Chairs of the Working Group and the Executive Secretary and help build a common understanding and reflect on key issues surrounding digital sequence information on genetic resources ahead of the fourth meeting of the Working Group.

7. The discussions of the Informal Advisory Group were conducted by co-leads Ms. Lactitia Tshitwamulomoni (South Africa) and Mr. Gaute Voigt-Hanssen (Norway), with the technical and administrative support of the Secretariat. All meetings and discussions of the Informal Advisory Group were conducted in English.

8. For each of the topics set out in recommendation 3/2 (reproduced in para. 2 above), experts were invited to provide presentations, followed by a round of questions to the presenters from the participants. The floor was then open for a substantive discussion in which he participants in the Informal Advisory Group could bring their own expertise and experiences and could pronounce themselves on the substantive issues.

9. The Group also heard an update on the work of the ongoing assessment of policy options, that had been mandated by the Co-Chairs, as well as a report of informal discussions on DSI facilitated by the Meridien Institute.

[4] Para 11 of WG2020 recommendation 3/2

II. OUTCOMES OF THE INFORMAL CO-CHAIRS ADVISORY GROUP: CO-LEADS' SUMMARY OF THE DICUSSIONS

A. Definition and scope of DSI

10. The topic of the definition and scope of DSI was discussed during the meeting of the Informal Advisory Group on 28 April 2022. The outcome of the AHTEG was presented to start the discussion. It touched on terminology, as well as scope of the Convention on Biological Diversity and/or the Nagoya Protocol before refocusing on the scope of DSI itself. Two experts were invited in addition to the presenters.

11. From the presentations and the questions and answers that followed, these main points emerged:

(a) Genes (DNA) contain code (DNA sequence) which is transcribed via RNA to generate proteins (group 1). The expression of the genes in proteins may be affected by epigenetic factors. Proteins also contain code (protein sequence) (group 2). Through biosynthesis proteins produce cell metabolites (group 3);

(b) The amount of sequence and information processing from group 1, to 2, to 3 is increasing, corresponding both to an increasingly difficult task for tracking and tracing, but also increasing value of the information;

(c) Data are held in public and private databases, where they are curated for specific purposes. Content from INSDC is transmitted to over 1,700 other public databases, and an unknown number of private ones, where data is repurposed. Any change in management would affect all these databases.

12. The general discussion that followed yielded the following points:

(a) *Scope of DSI* - A discussion on the scope of DSI looked at whether it is included in the definition of genetic resources, whether it is in scope of the Convention on Biological Diversity and/or the Nagoya Protocol, and therefore whether or not it should be included in the post-2020 global biodiversity framework;

(b) *Terminology* - The importance of determining an appropriate term for DSI was raised. Some in the Advisory Group voiced that a potential solution to the divergence on a definition of DSI could be to focus further work on the scope of DSI in the context of ABS, rather than a definition per se;

(c) *Implication of broader or narrower scopes for DSI* - Using a narrower scope for DSI could allow for the implementation of a broader range of policy options (i.e., tracking and tracing, legal certainty); however, a broader scope would maximize the opportunity for benefit-sharing. Different policy options may require a certain definition, or the assessment of the impact of the different potential scopes of DSI on those policy options, while recognizing the difficulty that such an assessment would present. The Parties agreed that there needs to first be an agreement on the overall goal. If we find clear triggering points to benefit-sharing, we may not need to have a clear scope of DSI;

(d) *Scope and definition must be future proof* - Scientific developments move faster than policy/law. With technological advances and rapid innovation, such as the use of artificial intelligence in protein structure analysis, researchers could soon work around DNA-only information by instead using metabolites and protein information to avoid benefit-sharing measures. Legislation written today using a narrow definition of DSI could therefore be at risk of quickly becoming obsolete while wider scope might help encompass some of this information. Need to reassure countries that their genetic resources used for commercial purposes will result in benefit-sharing. At the same time, business require legal certainty and transparency, or there might be a chilling effect on use of DSI;

(e) *What the overall goal of a DSI system would be* - If the overall goal is an efficient system, the consideration of derivatives takes us further from the genetic resource and therefore becomes more difficult to implement and maintain. Being vague on the scope of DSI would create legal uncertainty, so in the end we must have a firm scope;

(f) *The need for a definition of DSI* – some participants find that the scope of DSI itself does not have to be directly linked to the policy of ABS, and neither is the ability to link a protein or metabolite to a particular sequence. Others, on the other hand, find that we need a common understanding of what is covered in the system in order to define a solution for it. A "working definition" could be a potential way out of this.

B. Role of indigenous peoples and local communities, and traditional knowledge

13. After several presentations on the topic, the participants, presenters, and two additional experts were invited for this topic.

14. From the presentations and the questions and answers that followed, these main points emerged:

(a) Some important concepts need to be acknowledged, such as the sacred essence of life and the connection of all living things, which DSI is connected to;

(b) Genes are not individual but interact with other genes in other species, and with their environment. Traditional knowledge and practices of breeding and habitat modification have impacted gene sequences and their interactions with other genes and their environment;

(c) Genes migrate naturally between sovereign jurisdictions of species distribution;

(d) An open license system, such as is implemented in GBIF, would be simple and make indigenous people visible;

(e) Initiatives are creating TK labels that will allow transparency and acknowledgement in the future but is not applicable at this time.

15. The general discussion that followed yielded the following points:

(a) *Inclusion of IPLCs in benefit-sharing modalities* – Despite some differences of views on some topics developed below, there was a general agreement that IPLCs have been and continue to play a significant role in the conservation of biodiversity and should benefit from a policy on DSI, the extent and modalities of which should be discussed at a later stage of the discussion;

(b) *Scope of DSI or scope of benefit-sharing modalities* - Views in the Advisory Group diverged on whether or not the contribution of indigenous peoples and local communities should be part of the scope of DSI itself, as per the work of the AHTEG. The inclusion of associated traditional knowledge or IPLC ownership of the genetic resource could be included in the scope of a solution on DSI rather than in the definition of DSI per se. Some participants suggested to include the contribution of IPLCs to some DSI through a modality on benefit-sharing such as, for example but not limited to, their systematic recognition in publications, or some other acknowledgement mechanism;

(c) *Whether or not Traditional knowledge should be considered to be within the definition of DSI* – Many areas of high biodiversity have been tended and shaped over long times by the people who inhabit that land through their knowledge and cultural practices. It was acknowledged that there did not need to be TK in the definition of DSI for IPLCs to be included in the benefit-sharing. Some participants mentioned a need to acknowledge that IPLCs are the stewards of biodiversity, as well as acknowledging their special relationship to Mother Earth.

C. Tracking and tracing

16. During the meeting of the Informal Advisory Group on 11 May 2022, several researchers and database managers presented their views on the feasibility tracking and tracing for the policy options on DSI.

17. From the presentations and the questions and answers that followed, these main points emerged:

(a) Tracing is the ability to determine how an object came to being and where it goes. Tracking determines who has used a particular object and to what end;

(b) Digital object identifiers, or DOI, are a flexible, permanent, normative tool. However, they are not tracking and tracing tools in themselves. Since some people use them in publications, we can trace their usage, but it is not a good system to track downstream use of a sequence since many sequence uses don't lead to a publication;

(c) blockchains can be a good tool for some specific purposes. however, a wider application of blockchain would have fundamental hurdles:

(i) One block can handle one MB of data. Metadata would therefore be too large to be attached to the actual sequence;

(ii) Blockchain is open and transparent to all, which presents issues of confidentiality (patients' data from pathogens, location of endangered species, etc.);

(iii) Blockchain cannot control the rights to access the data;

(iv) Blockchain is inherently less efficient than centralized databases and current technologies require very high energy consumption and corresponding carbon emissions;

(v) In some rare cases, blockchain can split into multiple chains, and the data cannot be reconciled after the fact. In those cases, the tracing would become impossible;

(vi) It is very expensive.

(d) Some databases are publicly accessible, but their data is not in the public domain. A non-anonymous access, or some terms and conditions could be attached to accessing or downloading the data, and still be public, accessible, and free;

(e) The collaboration and interoperability needed between existing databases in order to be able to track and trace DSI has major implications on time and budget for the policy options that rely on data traceability;

(f) Open data itself is not a means to ensure benefit-sharing;

(g) The main benefit-sharing coming from private databases at the moment is about publications and citations;

(h) There are fundamental questions that tracking and tracing cannot answer:

(i) How different does a sequence need to be in order to be considered for benefit-sharing?

(ii) How far does a synthetic sequence need to be from a natural one to stop being considered for benefit-sharing?

(i) Tracking and tracing in public databases may impede the current policy of open data and its benefits for research and innovation;

(j) Only 4 per cent of patents have a single sequence from a public database, and so could potentially be traced to a single country of origin. The median number of sequences per patent is 10 and can go to hundreds easily in certain industries. Many patents also use consensus sequences, not traceable to the original sequences.

18. The general discussion that followed yielded the following points:

(a) *Whether or not Traceability of DSI is needed for a solution* - Traceability of the country of origin of DSI was a topic of divergence, and whether traceability is essential to a fair and equitable solution, or whether fairness and equity could be achieved through benefit-sharing modalities that do not require knowing the country of origin of a particular sequence. While technically and administratively feasible in some cases, a system of tracking and tracing might not be efficient nor cost-effective at this point in time.

The Advisory Group recognized that most DSI used by scientists are not retained in a commercial product, complicating the question of the scope of sequences needing tracing;

(b) *The practicality of tracking and tracing of DSI* - The group discussed the various challenges related to the scalability of tracking and tracing from some examples using genetic resources, or in smaller or more specialized databases. Traceability may be technically feasible, but questions remain if it could be efficient or economically and environmentally feasible;

(c) *What is needed for tracking and tracing to result in benefit-sharing* - There would need to be proof of the value of tracking and tracing, but this would require some form of implementation of a track and trace system. Tracking and tracing would best be done within the existing databases instead of the creation of a new structure. This would require cooperation between data providers, standardization, and transparency. If Parties wanted to go in this direction, they would need to start this cooperation between systems and setting up the standards now;

(d) *Tracking and tracing will help or hinder future-proofing* – Some Parties supported the view that tracking and tracing would be increasingly useful, as more and more DSI would have a country of origin attached to the sequence in databases. However, other participants argued that the use of multiple sequences for most types of R&D and the increased use of partial sequences may add complication to tracking and tracing. Also, the use of DSI may trend towards the integration with synthetic biology, where parts of DNA are used from multiple strands, and recombined. It then becomes very challenging to trace back to the original genetic resource, and a bilateral system would become nearly impossible. Another concern was that benefit-sharing requirements for certain strands could lead to disclosure of private/confidential information;

(e) *The nature of the benefit-sharing that would come from tracking and tracing* - Currently, the only benefits shared are the source of the DSI in publications. Some Parties advocated for a stronger share of benefits to the country of origin while others advocated for benefit-sharing not to be relating to track and trace, such as in a multilateral system based on the commercialization of products.

D. Hybrid approaches

19. In this session, the participants to the Advisory Group were the ones presenting the proposal from their Party (Columbia) or group (IPLCs), or their existing hybrid domestic system in the case of Brazil.

20. This topic consisted of presentations and a discussion, but not so many external facts. Here are some of the main points that emerged:

(a) *A multi-lateral mechanism should be at least part of the solution on DSI* - While some participants defended the advantages of a solely multilateral system and others those of a mix of multilateral and bilateral, no participant advocated for a fully bilateral system for benefit-sharing from DSI on genetic resources;

(b) *Whether a hybrid solution would be desirable* - On the one side, a hybrid solution offers flexibility to couple with a multilateral system with current national systems. To be feasible, a hybrid system needs specific trigger points, like product registration, where it would be decided if a benefit-sharing obligation would apply, and if it would be bilateral or multilateral. A potential challenge could be different interpretations of "use" in different jurisdictions. Also, most commercialized/patented products have multiple, going up to tens or hundreds of sequences, so the instances where DSI would be sourced from a single country would likely be few. Would it be worth having a hybrid system set up for so few transactions? Another challenge of a bilateral option is for sequences which occur in various countries and in various organisms at the same time;

(c) *Traditional knowledge* - In terms of traditional knowledge, the challenge is that spiritual beliefs cannot be integrated by others but could use a tagging system to provide ethical guidance. Some participants argued that TK needs to be considered under a bilateral system, as ensuring benefits from a multilateral system is more difficult. If the global systems cannot integrate tracking and tracing for TK, it

could be done through national and regional databases with similar terms and conditions, requiring technical assistance and capacity-building;

(d) *The impact of a bilateral system on legal certainty* – There was a debate as to what case scenarios would create legal uncertainty, when existing bilateral agreements could be challenged, and whether or not this system would create an incentive for jurisdiction shopping;

(e) *The cost of a bilateral mechanism is prohibitive* - The issue of the cost to maintain a bilateral system was discussed as being exorbitantly costly for governments, researchers, and private industries, both in terms of time, qualified staff and money compared to the benefits that these systems yield. Compliance also seemed to be a point of lesson learned from the Nagoya experience as being difficult and costly. The cost of a bilateral system is not reduced in a hybrid system compared to a solely bilateral one. However, for some participants, the need to consider fairness and state sovereignty over their natural resources was a higher priority.

E. The role of stakeholders

21. Representatives from both private industry and academic research communities, from databases and from the food pharmaceutical and DSI services industries all presented their views on a potential policy for access and benefit-sharing of DSI.

22. From the presentations and the questions and answers that followed, these main points emerged:

(a) The emergence of e-DNA allows for the fast and massive discovery of new species, particularly for microorganisms. Taxonomy in the traditional sense of naming new species is no longer relevant in this context, and species are being characterized beyond their naming through sequence number, blurring the lines between sequence and genetic resource;

(b) Proteins are being characterized increasingly through AI, and so may be created in science laboratories, inspired by nature but not found in nature, and without the need to access sequences or a genetic resource. Therefore, a solution on DSI that would only focus on sequences might become irrelevant as science and innovation progress in that field;

(c) Both Parties and stakeholders expressed their appreciation of the process established in this particular meeting. Parties praised the fact that they could finally listen to, discuss, and understand the point of views of the various stakeholders, something they had not had the opportunity to do until now. From the stakeholders' view, they voiced their appreciation for their increased understanding of the thought-process of the Parties, and their own role in the process on DSI. Both sides took the floor to ask that more of these engagements are put in place in the future to allow for tensions to be diffused, and more trust and confidence to continue to be built as the discussions on DSI move forward.

23. The general discussion that followed yielded the following points:

(a) *legal simplicity and clarity* - Private industry, businesses, and databases all want legal simplicity and clarity in order to avoid jurisdiction shopping or slowing down research and innovation. They also agreed that the current bilateral system as well as the proposed policy options on DSI show a compliance culture, and they regret the lack of incentives for benefit-sharing;

(b) *Scope of the policy with regards to technology* - Private industry, businesses, and databases agreed that even if tracking and tracing were technically feasible, there are future uses of DSI where the genetic resource from which the sequence or a derived product originates from would not be possible as the protein or metabolite would be synthesized in the laboratory. The importance of future proofing a policy solution in the face of future scientific advancements brought consensus. The approach should not be forever but include the obligation of a regular reassessment of its relevance and need for amendments;

(c) *Scope of the Convention on Biological Diversity and the Nagoya Protocol* - Some expressed the view that human pathogens should not be included under the Convention while others felt that it was appropriate for human pathogens to be under the Convention;

(d) *Traditional knowledge* - Many products derive indirectly from traditional knowledge, and so the inclusion of traditional knowledge in benefit-sharing, or of labels on TK in databases was discussed but no clear path forward emerged'

(e) *Scope of the discussion on DSI with regard to the other topics under the Convention on Biological Diversity* - Participants disagreed on whether the current discussion on DSI should stay separate from the one on resource mobilization as they are currently two separate discussions around the post 2020 global biodiversity framework.

F. Legal feasibility

24. The group heard presentations from three different points of view on the legal feasibility of a potential DSI solution.

25. From the presentations and the questions and answers that followed, these main points emerged:

(a) The Convention on Biological Diversity offers a relevant legal basis and a COP decision on DSI could trigger an evolutive treaty interpretation, through the reading of articles 12 C and 17 in particular, but also Articles 16 and 18. On this basis, the Convention on Biological Diversity could take a decision without needing to resolve all the details;

(b) The text of the Convention and of the Nagoya Protocol were carefully crafted to include constructive ambiguities, which would be difficult to reopen. Any new treaty or protocol, or any amendment to the Convention on Biological Diversity or the Nagoya framework, could heavily impact parties that have already implemented them in their national legislations;

(c) A mixed solution was proposed in one of the presentations as a combination of a multilateral platform for capacity-building, learning, oversight, and priority setting, as well as a multi natural fund that would be benefiting from seed funding, giving it time to test multiple models and sources with payments. This model would be co-developed by parties, scientists, and other stakeholders.

26. The general discussion that followed yielded the following points:

(a) *Legal feasibility in the context of the Convention on Biological Diversity*: some members of the Advisory Group pointed out that if the Conference of the Parties agrees to something, it would be legal *de facto* (as long as it did not conflict with international law). Accordingly, rather than considering whether policy options are legally feasible, it might instead be more constructive to focus on the legal implications of the policy options, such as questions of legal certainty and simplicity, as well as the political will to implement a solution. Additionally, it was flagged that the idea of opting in or opting out of a system, as suggested in some proposals, can create a fragmentation of the legal landscape, and affect legal certainty and clarity;

(b) *Model of stakeholders' involvement:* The stakeholder community is currently supporting parties in their discussions on DSI. However, some members of the group proposed that instead, the stakeholders should take the lead in the discussion process on DSI and seek the support of governments to culminate in a win-win mechanism for DSI;

(c) *Reflection on Article 10 of the Nagoya Protocol*: while some members of the group saw no substantive benefit in triggering Article 10 and seeing it as of very lengthy process and negotiation, others saw it as an opportunity to use and already existing legal framework and to fill the gap of resources needed to reverse the loss of biodiversity;

(d) *Sharing of benefits and sharing of data:* The group discussed the benefits of data access, which should be part of the contribution of parties in order to benefit from a potential multilateral fund. The pooling of data is beneficiary for research and innovation and should be encouraged for mutual benefits. Some of these obligations on international scientific cooperation already exist and need not be reinvented, but rather enforced through a solution on DSI. The issue of compelling private entities to share data Would require this solution to yield some benefits for them.

G. Next steps necessary

27. The co-leads clarified the plans for a coleads' report of the work of the Informal Advisory Group in the form of an information document, and a summary of this report in a pre-sessional document in the six UN languages.

28. It was noted that the fourth meeting of the Working Group had been requested to continue negotiation on DSI building on the work of the third meeting and taking into account the work of this advisory group, in order to allow the Working Group to fulfill its mandate of preparing a recommendation on DSI for consideration by the Conference of the Parties at its fifteenth meeting. Some members suggested that it would be useful to work on a strong set of principles for the Conference of Parties at its fifteenth meeting, noting that those principles would be part of a larger picture of a decision on an actual solution for DSI. The group considered that the assessment of policy options using the framework, currently being worked on by the independent consultant, would be useful to facilitate the finalization of the decision at the fifteenth meeting of the Conference of the Parties.

Annex 1

ORGANIZATION OF WORK OF INFORMAL CO-CHAIRS ADVISORY GROUP

Date and time[5]	**Agenda**	**Presenters**
19 April 7:30 – 10:30	**Organizational meeting** 1. Introductions 2. Review of workplan and list of stakeholders invited to participate or present	
28 April 7:30 – 10:30	**1.Definition/scope of DSI** - Report of the AHTEG on DSI 2020 - Study on the concept, scope, and current use of DSI commissioned for the AHTEG on DSI	**Presenter** - Christopher Lyal, Co-Chair, Ad-Hoc Technical Expert Group on DSI in March 2020 **Contributing Experts** - Maui Hudson, University of Waikato (New Zealand) - Sabina Leonelli, Professor of Philosophy and History of Science, University of Exeter
	2. Role of IPLCs in modalities	**Presenters** - Paul Oldham, director at One World Analytics - Jennifer Tauli Corpuz, global policy and advocacy lead at Nia Tero (Philippines) **Contributing Experts** - Maui Hudson, University of Waikato (New Zealand) - Sabina Leonelli, Professor of Philosophy and History of Science, University of Exeter
11 May 7:30 – 10:30	**1. Tracking and Tracing**	- Marco Marsella, IT Specialist and Senior Advisor, Global Information System, FAO - Andrew L Hufton, scientific coordinator at the Leibniz-Institut (Germany) - Juncai Ma, director of National Microbiology Data Center and of WFCC-MIRCEN World Data Center of Microorganisms (China) - Nobuyuki Fujita, Department of Molecular Microbiology, Faculty of Life Sciences, Tokyo University of Agriculture (Japan)
	2. Hybrid approaches	- Esteban Neira (Colombia) - Preston Dana Hardison, representative of the international indigenous forum on Biodiversity - Carlos Rollemberg (Brazil)
26 May	**1. The roles and interests of stakeholders and the**	**Scientific research**

[5] All times are in EDT (Montreal).

7:30 – 10:30	**implications on DSI policy options for various sectors**	- Maria Mercedes Zambrano, Corporacion Corpogen (Colombia) **Databases** - Tim Hirsch, Global Biodiversity Information Facility (Denmark) - Ilene Mizrachi, National Center for Biotechnology Information (United States) **Private sector** - Axel Braun, IFPMA (Switzerland) - Bupe Mwambingu, Basecamp Research (United Kingdom) - Markus Wyss, DSM Nutritional Products (Switzerland)
9 June	**1. Legal feasibility**	- Elisa Morgera, Professor of Global Environmental Law, Strathclyde Centre for Environmental Law and Governance, University of Strathclyde Law School, Glasgow (United Kingdom) - Akiho Shibata, Professor of International Law, Graduate School of International Cooperation Studies (GSICS), Kobe University (Japan) - Margo A. Bagley, Asa Griggs Candler Professor of Law, Emory University School of Law, Atlanta (United States)
	2. Updates - Outcomes from the informal meeting of the Meridian Institute on DSI in the context of the CBD and the ITPGRFA, April 2022	- Julian Portilla and Marielena Octavia, Meridian Institute
	- Justin Ram, consultant, independent assessment of the proposed policy options using the framework developed by the IA	- Secretariat, on behalf of Justin Ram, Consultant
	3. **Next steps in the step-by-step approach to find a solution**	

Annex II

LIST OF PARTICIPANTS IN THE INFORMAL CO-CHAIRS ADVISORY GROUP ON DIGITAL SEQUENCE INFORMATION ON GENETIC SEQUENCES

Africa	
Benson Mburu Kinyagia	Kenya
Mphatso Kalemba	Malawi
Pierre du Plessis	Namibia
Ben Durham	South Africa
Samson Gwali	Uganda
Christopher Simuntala	Zambia

Asia and the Pacific	
Fu Wei Zhao	China
C. Achalender Reddy	India
Safendrri Komara Ragamustari	Indonesia
Hitoshi Kozaki	Japan
Belal Qtishat	Jordon
Won Seog Park	Republic of Korea

CEE	
Galina Mozgova	Belarus
Zlata Grabovac	Bosnia and Herzegovina
Eliška Rolfová	Czech Republic
Elzbieta Martyniuk	Poland
Peter Manka	Slovakia

GRULAC	
Patricia Gadaleta	Argentina
Diego Pacheco	Bolivia
Carlos Rollemberg	Brazil
Esteban Neira	Colombia
José Alfredo Hernández	Costa Rica
Aide Jimenez	Mexico

WEOG	
Hugo-Maria Schally	European Union
Benoit Piguet	France
Thomas Greiber	Germany
Min Hahn	Switzerland
Chloe Johnson	United Kingdom of Great Britain and Northern Ireland

WEOG (Non-Party)	
Katlyn Scholl	United States of America

IPLC	**Region/country**
Faith Nataya	Africa
Jennifer Corpuz	Asia
Claudia Regina Sala De Pinho	Brazil
Polina Shulbaeva	CEE

María Yolanda Terán Maigua	Latin America and Caribbean
Preston Dana Hardison	North America
John Locke	Pacific

STAKEHOLDERS	ORGANIZATION
Silent Observer	
Suhel al-Janabi	ABS Capacity Development Initiative, Germany
Scientific Research/Academia	
Amber Hartman Scholz	Leibniz Institute DSMZ, Germany
Cecilia Cristina Carmaran	Buenos Aires University, Argentina
Chris Lyal	Natural History Museum, United Kingdom
David Nicholson	Wellcome Sanger Institute, United Kingdom
Georgina Catacora-Vargas	AGRUCO, Agroecology Research Center, Faculty of Agricultural and Livestock Sciences, University Mayor de San Simón, Bolivia, Bolivia
Halima Benbouza	National Council of Scientific Research and Technologies, Algeria
John Kress	Earth Biogenome Project, USA
Kassahun Tesfaye Geletu	Ethiopian Biotechnology Institute, Ethiopia
Manuela da Silva	Fundação Oswaldo Cruz, Brazil
Margaret Karembu	International Service for the Acquisition of Agri-biotech Applications, Kenya
Maria Mercedes Zambrano	Corporacion Corpogen, Colombia
Michael Halewood	Bioversity International, Italy
Michelle Rourke	Law Futures Centre at Griffith University, Australia
Databases	
Guy Cochrane	European Bioinformatics Institute, United Kingdom
Ilene Mizrachi	National Center for Biotechnology Information, USA
Masanori Arita	National Institute of Genetics, Japan
Saurabh Raghuvanshi	Indian Biological Data Centre, India
Tim Hirsch	Global Biodiversity Information Facility, Denmark
Private Sector	
Axel Braun	International Federation of Pharmaceutical Manufacturers and Associations, Switzerland
Cyril Lombard	value chain consultant, South Africa
Daphne Yong-d'Hervé	International Chamber of Commerce, France
Dominic Muyldermans	CropLife International, Belgium
Giuliane Bertaglia	Agroicone, Brazil
Glen Gowers	Basecamp Research, United Kingdom
Naoto Koyama	Japan Bioindustry Association, Japan
Civil Society	
David Smith	CABI, United Kingdom
Edward Hammond	Third World Network, Malaysia

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