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THE ABS CAPACITY DEVELOPMENT INITIATIVE
L'INITIATIVE DE RENFORCEMENT DES CAPACITES POUR L'APA

Second (virtual) Global Dialogue on Digital Sequence Information on Genetic Resources

28 June – 13 July 2021

Organized by:
the ABS Capacity Development Initiative, the South African National Department of Forestry, Fisheries and the Environment, and the Norwegian Government

REPORT

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Table of Contents[1]

I. Background 1

II. Objective and thematic focus of the of the 2nd Dialogue 3

III. Organisation and implementation 4

IV. Dialogue outputs and findings 10

[1] Disclaimer: This report was prepared to inform about the context, organisation key findings of the 2nd global DSI dialogue. It thus contains a compilation of the participants' contributions and discussions. The report, however, does not purport to reproduce all debates and interventions in full and according to the Chatham House Rule, under which the dialogue was held, the information provided is not attributed to the source. The statements in this report do not represent the views or opinions of the GIZ, the Governments of South Africa and Norway, or the cooperation partners of the GIZ. The Secretariat of the ABS Initiative does not assume any liability for the accuracy or completeness of the report.

List of Abbreviations

ABS	Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization
AHTEG	Ad Hoc Technical Expert Group
aTK	associated Traditional Knowledge
CBD	Convention on Biological Diversity
DSI	Digital Sequence Information
GR	Genetic Resources
IPLCs	Indigenous Peoples and Local Communities
OEWG	Open Ended Working Group
R&D	Research and Development
SBI	Subsidiary Body on Implementation
SCBD	Secretariat of the Convention on Biological Diversity
SBBSTA	Subsidiary Body of Scientific and Technological Advice

I. Background

The issue of Digital Sequence Information on Genetic Resources (DSI) has been on the international agenda of the Convention on Biological Diversity (CBD) and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the CBD (Nagoya Protocol) since the thirteenth Conference of the Parties to the CBD (COP 13) and the third Conference of the Parties serving as Meeting of the Parties to the Nagoya Protocol (COP MOP 3) in 2016.

DSI has become an issue because of technological developments, which have led to a massive accumulation of biological data, which can be obtained from publicly accessible databases, usually without restriction and conditions. This DSI can be used for research and development, including for commercial purposes, in the absence of benefit-sharing.

At COP 14 in 2018, Parties took an important step forward with Decision 14/20 on DSI. This decision recognizes the contribution of the use of DSI to scientific research and calls for capacity-building and technology transfer to assist in the access, use, generation, and analysis of DSI for the conservation and sustainable use of biodiversity around the world. The Parties to the CBD also noted that there is a divergence of views regarding benefit-sharing from the use of DSI and they committed to working towards resolving this divergence through an agreed process. Thus, the decision established a science- and policy-based process on how to address DSI in the context of the post-2020 global biodiversity framework. The process entails the submission of views and information, the commissioning and peer review of studies, as well as work by an ad hoc technical expert group (AHTEG). At its meeting in March 2020, the AHTEG elaborated concepts for the scope of DSI and related terminology.

The Global Dialogues on DSI

Despite the encouraging decision on DSI at COP14, it soon became clear that views on DSI diverge widely among Parties and stakeholders. Given the limited time available in the formal CBD process, the governments of Norway and South Africa entered into a strategic partnership in 2019 to establish the Global Dialogues on DSI. The overall objective was to provide an opportunity for various actors to discuss this controversial topic in an informal context, outside of the formal process leading up to the fifteenth Conference of the Parties (COP 15) in Kunming, China, at which further decisions will be made on how to address DSI in the context of the post-2020 global biodiversity framework. The Dialogues were organised by the ABS Capacity Development Initiative, under the auspices of the governments of Norway and South Africa, and in collaboration with the Secretariat of the Convention on Biological Diversity (CBD).

The 1st Global Dialogue on DSI was held in November 2019 in Pretoria. It hosted 65 participants from 27 countries, including policy makers, negotiators and government advisors, as well as practitioners involved in the generation, distribution and/or use of DSI and other experts familiar with the related issues. The two-and-a-half-day meeting focused on exchanging technical information as well as understanding the views, priorities and expectations of the other participants. The two main outputs of the meeting were (i) five basic options for policy models that might govern the future use of DSI, and (ii) a draft list of 'points for consideration' to assess any policy model under discussion. The full report of the 1st Global Dialogue on DSI is available is available in English and French.

To follow up on these results, the 2nd Global Dialogue on DSI was planned for spring 2020 in France. However, due to the outbreak of the global Covid-19 pandemic, the event had to be postponed several times. It ultimately took place in virtual form, in June and July 2021. This report provides detailed information on the 2nd Global Dialogue and its outcomes.

Both Dialogues were held under the Chatham House Rule, which states that "participants are free to use the information received during the meetings, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed." An implication of this rule is that all participants attended the Dialogues in their personal capacity, speaking from their own perspective and not as representatives of a specific country, organisation or stakeholder group.

Overall DSI support process

The Global Dialogues on DSI are part of a broader formal and informal support process, which orientated the thematic focus of each Dialogue event and into which the discussion outcomes are feeding back.

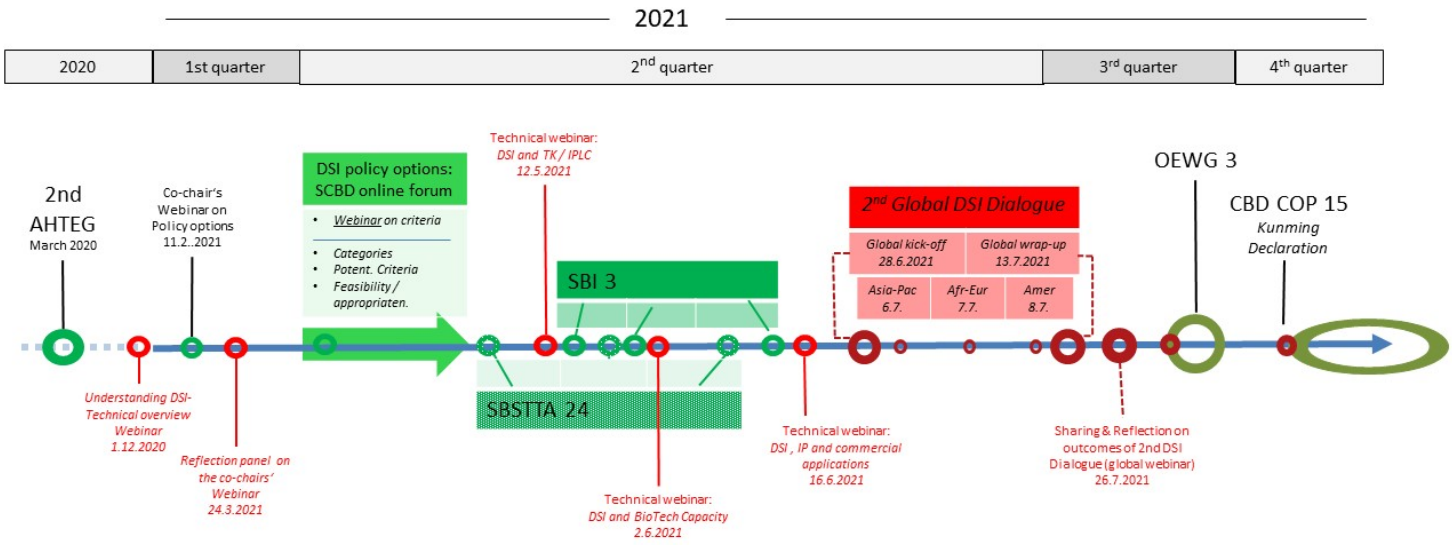
The DSI related process under the CBD (see slide 1) consists of:

- AHTEG 2, 03/2020
- SCBD / OEWG co-chairs webinars[2] and an online discussion forum (12/2020 - 03/2021)
- SBSTTA 24, 03-06/2021
- SBI 3, 03-06/2021
- OEWG 3, 08-09/2021
- COP 15, 10/2021 & 04-05/2022

As part of the *informal* support process, the ABS Capacity Initiative also organised:

- A series of technical webinars on DSI (04 - 06/2021)
- A global panel discussion to reflect on the third co-chairs webinar (03/2021)
- A global panel discussion sharing / reflecting on the outcomes of the 2nd Dialogue (07/2021)

[2] The first webinar of this series “Understanding DSI” on 01.12.2020 was co-organised by the ABS Capacity Development Initiative



Slide 1

II. Objective and thematic focus of the of the 2nd Dialogue

Given that the 2nd Global Dialogue had had to be postponed by more than one year, and that it could only be held in virtual form, the content and structure of the event needed to be considerably adapted. The original idea had been to follow-up directly on the results of the 1st Dialogue. However, the set of policy options and criteria had meanwhile been complemented and refined by other groups and international fora.

The main **objective** of the 2nd Global Dialogue on DSI therefore became "*to identify areas of convergence of views, as well as remaining divergences, regarding the alternatives of a potential international system that ensures or promotes benefit-sharing when using DSI for research and development and in commercial applications*."

The **thematic focus** of the 2nd Dialogue was taken from the third webinar of the co-chairs of the Open-ended Working Group (OEWG) in February 2021. At that webinar, the Secretariat of the CBD had proposed a framework of twelve criteria to consider in developing an international DSI system, which later became part of the OEWG 3 DSI document. The first set of these criteria under the heading "Effective in achieving Goals" (see slide 2) was chosen as thematic focus for the 2nd Dialogue:

1. *Delivers fair and equitable benefits from DSI (associated with GR)*
2. *Facilitates access to DSI and does not disrupt R&D*

with a view to

3. *Contributing to the conservation and sustainable use of biodiversity*
4. *Contributing to sustainable development*

Second Global Dialogue: Where did we come from?

Thematic focus based on Criteria framework proposed by SCBD at the third Co-chairs webinar, and now reflected in DSI OEWG 3 document

Effective in achieving Goals

1. **Delivers fair and equitable benefits from DSI (associated with GR)**
2. **Facilitates access to DSI and does not disrupt R&D**
3. Contributes to the conservation and sustainable use of biodiversity
4. Contributes to sustainable development

Efficient & Feasible to implement

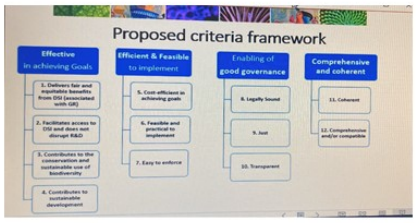
5. Cost-efficient in achieving goals
6. Feasible and practical to implement
7. Easy to enforce

Enabling of good governance

8. Legally sound
9. Just
10. Transparent

Comprehensive and coherent

11. Coherent
12. Comprehensive and/or compatible



Slide 2

These criteria were then subjected to **three main questions** that were discussed over the course of the 2nd Global Dialogue on DSI:

1. **Current reality**:
   What does the situation currently look like regarding these goals?

2. **Desired state**:
   How would you recognize that the ideal situation is achieved?

3. **Change required:**
   How could stakeholder groups contribute to making the desired state a reality?

The three questions had been designed to enable an open and constructive exchange about preferences, priorities, and concerns from different stakeholder perspectives, under the circumstances of a virtual, global, multi-meeting event.

III. Organisation and implementation

The 2nd Global Dialogue on DSI brought together more than 80 participants from a total of 45 countries. Invitations had been extended to representatives of parties to the CBD, to DSI experts from various regions, and to a variety of other stakeholders from groups such as IPLCs, NGOs, non-commercial research, and industry.

All meetings were held in virtual form via Zoom online conferencing. Like the 1st Dialogue, the meetings of the 2nd Dialogue were held in English, according to the Chatham House Rule and were accessible for preregistered participants only.

In order to accommodate the very large span of time zones, the 2nd Global Dialogue was split into three main parts over a period of three weeks. The overall structure was as follows:

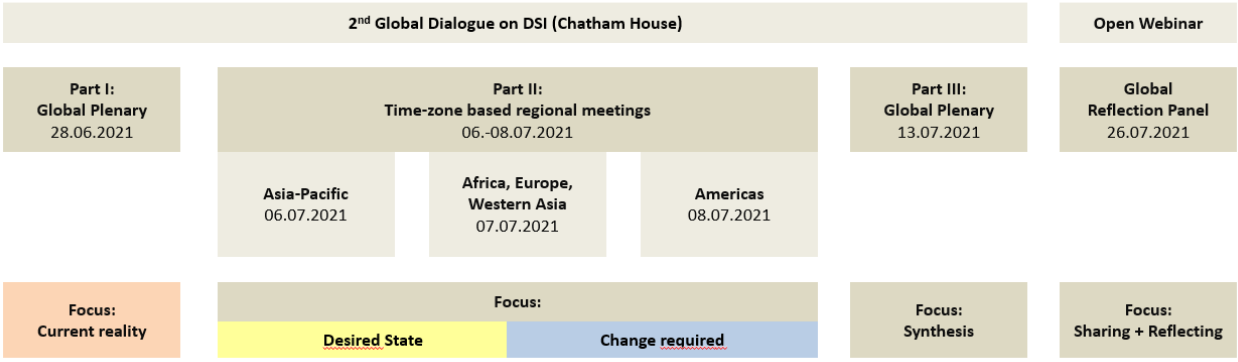
Part 1: Global plenary (2 hours) 28 June

Part 2: Regional meetings, based on time zones (4.5 hours each):

- Countries from the Central, Eastern Asian and the Pacific Region 6 July
- Countries from Europe, Africa and Western Asia 7 July
- Countries from the Americas 8 July

Part 3: Global plenary (2 hours) 13 July

In addition, an open virtual reporting and reflection panel of 1.5 hours was organized on 26 July, to inform a broader set of parties and stakeholders and reflect about the outcomes of the Dialogue (see slide 3). That meeting hosted more than 230 participants from all over the globe. It was held in English with simultaneous interpretation into French and Spanish.



Slide 3

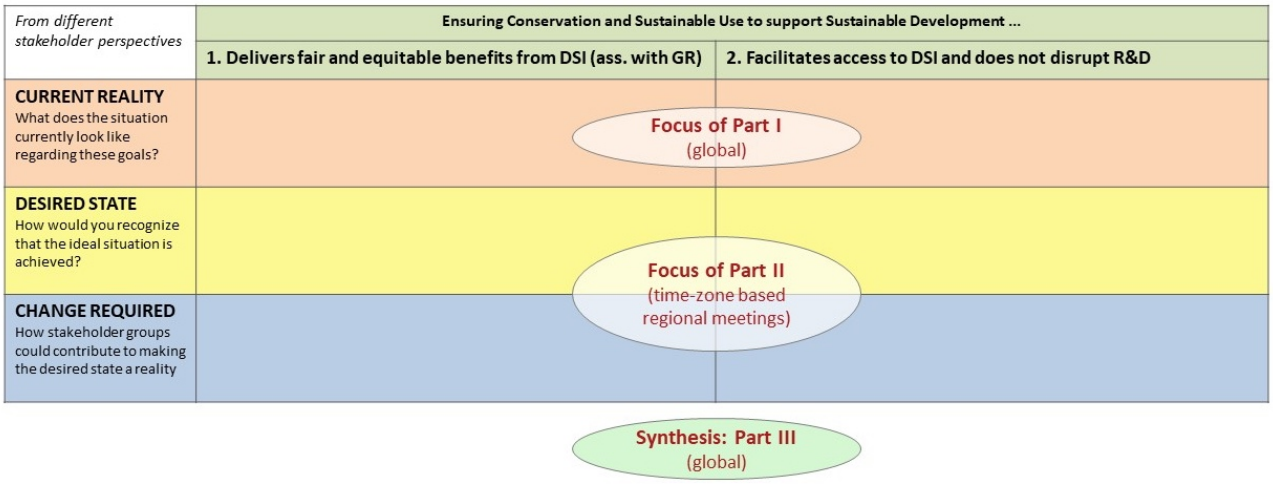
Format to guide the discussions

The Dialogue was organised around a format that intended to orientate the discussions and support the flow from the first global plenary to the time-based regional meetings and back to the final global plenary.

Combining the thematic focus and the three questions outlined above, a matrix was used to collect inputs and contributions from all participants. Each meeting of the Dialogue had its own focus, moving from "Current reality" in Part 1, to "Desired state" and "Change required" in Part 2, to a synthesis discussion in Part 3 (see slide 4).

Second Global Dialogue: How did it go?

Format to guide the discussions



Slide 4

Agenda, flow and methodology

Part 1: Global plenary

The 2nd Global Dialogue was officially opened by the governments of Norway and South Africa as hosts of the Dialogue, and the government of China as incoming presidency of CBD COP 15.

The ABS Capacity Development Initiative provided a brief input on the place of the Dialogue in the overall DSI support process, as well as an initial draft description of the **current reality** with regards to benefit sharing from the use of and access to DSI, based on the discussions during previous formal and informal meetings.

This was followed by a panel of six experienced individuals, who each gave an "elevator pitch" of their own views on that current reality. While they all spoke strictly from their personal perspective, the six "pitchers" had been selected in an attempt to cover and illustrate diverse stakeholder backgrounds, namely: IPLCs; provider governments; databank management; non-commercial research; industry; and benefit-sharing for conservation and sustainable use.

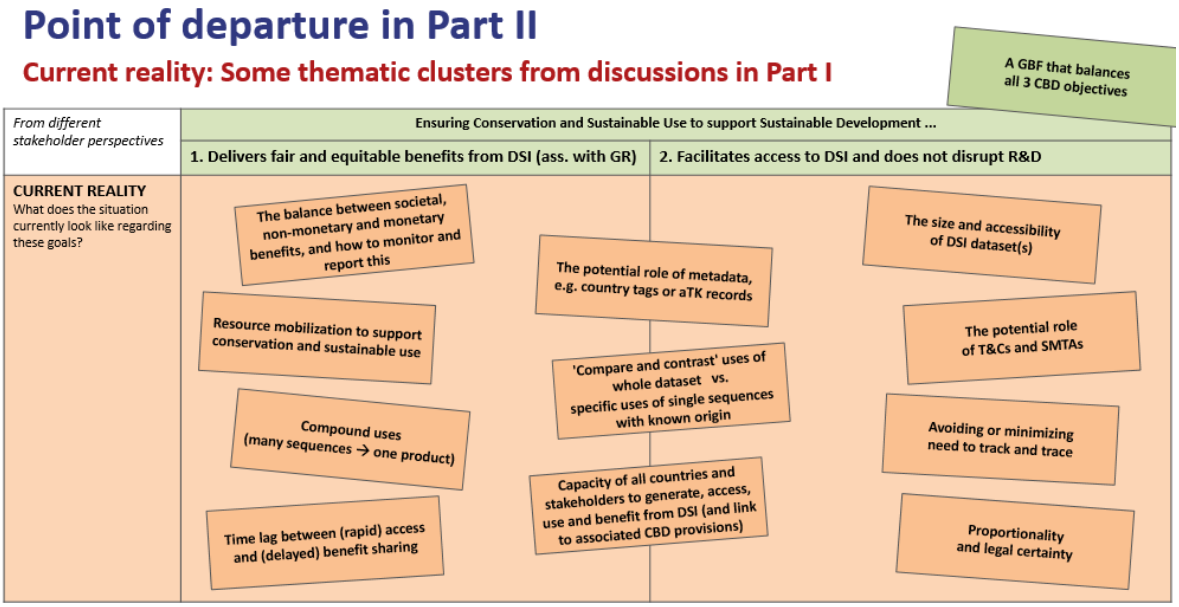
The remainder of the 2-hour meeting was devoted to an open plenary discussion to complement the picture of the current reality from different stakeholder perspectives. The participants were able to contribute orally from the floor ("virtual hand raising") and by using the chat function. Notes were taken throughout the meeting to capture all views and perspectives.

Between Part 1 and Part 2

In the week between Part 1 and Part 2, the ABS Capacity Development Initiative compiled all notes from Part 1 – both the plenary discussion and the chat messages – and anonymised, grouped and

organised the contributions. An extended summary of that compilation was sent to all registered participants of the Dialogue, to support their preparation for Part 2.

From that compilation, a presentation of key thematic clusters was prepared to serve as common point of departure for the three time-zone based meetings in Part 2 (see slide 5). Those identified clusters were explicitly not meant to be prescriptive, but just to kick-start and inspire the subsequent discussions.



Slide 5

Part 2: Regional meetings, based on time zones

The time-zone based meetings started with a brief recap and the presentation of the draft thematic clusters from the discussions in Part 1.

The remainder of each 4.5-hour meeting was further subdivided into two main phases: the first to discuss the **desired state** regarding benefit sharing from and access to DSI; the second to brainstorm **changes required** – more specifically: possible stakeholder contributions – to achieve that desired state. Both phases included group work, group report back and an open plenary discussion.

To discuss the **desired state**, mixed-stakeholder groups were formed to meet in separate virtual breakout rooms. The task for the groups was introduced with the so-called "miracle question", a method that is designed to help people describe a vision in the most practical terms possible:

"Imagine that a miracle has occurred overnight: The situation regarding benefit-sharing and access related to DSI is exactly the way it should be. Existing concerns have been resolved and all stakeholder needs are being met to the largest possible degree. Discuss the following question in your group: How would you recognize that the ideal situation is achieved? Please be as specific as possible: What would you see, hear, do, feel, experience … in this ideal situation?"

To discuss the **change required**, new groups were formed in an attempt to bring rather similar perspectives together, e.g., governments, researchers or IPLCs and NGOs. The task for the groups was

introduced as a brainstorming exercise, underlining that no statement or contribution would be taken as commitment of any kind. To focus the discussion on what might be doable and avoid long wish lists of what everybody else should do, the question was worded in a way to encourage thinking about each group's own possible contributions:
"Think about the desired state that has been sketched out during the last two hours. Consider your own preferences – and also the needs of other stakeholder groups. Discuss the following question in your group: How could the stakeholder group *you* identify with contribute to making the desired state a reality? Please be as specific as possible: How could that group support the change required? What would it need, to be able make those contributions?"

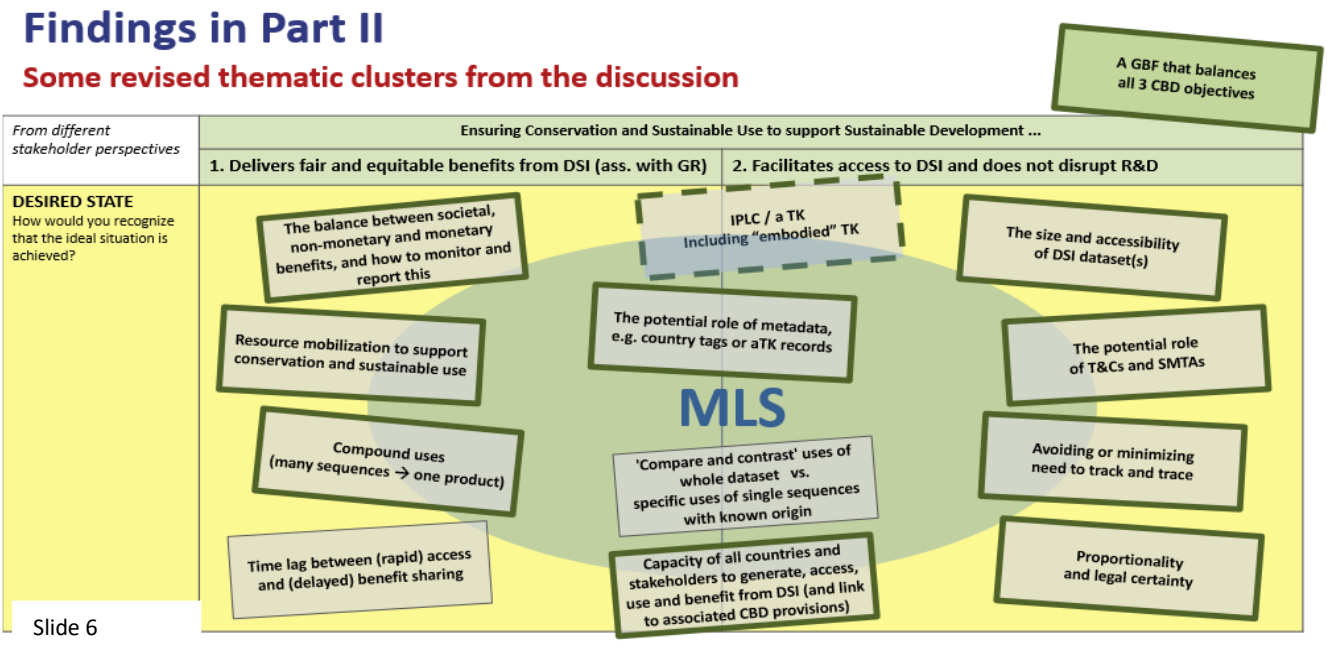
In both rounds of group work, each group was chaired by a volunteer from among the participants and supported by a note taker from the organising team. The note takers used the above format (the matrix) and shared it on screen in the breakout rooms, so that participants could follow what notes were being taken from their discussion. After each group work session, the results were shared and further discussed in plenary.

Between Part 2 and Part 3

In the few days between the last time-zone based meeting and Part 3 of the Dialogue, the organising team collated the results of all three time-zone based meetings, identified main issues and points raised in the discussions, tentatively identified some potential areas of convergence and remaining divergences, and compiled an interim summary presentation for discussion in Part 3.

Part 3: Global plenary

Part 3 began with the interim summary presentation from the time-zone based meetings. It started off with an overview of thematic clusters which have been the focus of the discussions in the regional meetings. Those were to a large extent the clusters identified in the context of the "current reality" (see slide 4). However, in the regional meetings the need to consider IPLCs / aTK (including "embodied" TK in GR and DSI) and the opportunities of a multilateral system to address DSI related benefit sharing were also discussed prominently (see slide 6).



The global plenary went on to consider some potential areas of convergence and divergence as identified by the organising team from the time-zone based discussions.

Mirroring the six "pitchers" in Part 1, six other experienced individuals were then invited as "catchers" to give their own impressions of emerging convergences and remaining divergences. Again, the individuals had been selected in an attempt to cover and illustrate diverse stakeholder backgrounds, while still speaking strictly from their personal perspective, according to the Chatham House Rule.

A final open plenary discussion – on the floor and in the chat – served to capture further participants' views on potential areas of convergence and remaining divergences in benefit-sharing from and access to DSI.

After a brief recap of the way forward by the ABS Capacity Development Initiative, the 2nd Global Dialogue was officially closed by the governments of Norway and South Africa as hosts of the Dialogue, the chairs of the Open-ended Working Group (OEWG), and the government of Egypt as the current presidency of CBD.

Reflection panel

To share and reflect on the outcomes of the 2nd Global Dialogue with a broader audience, a global reflection panel was organised on 26 July 2021. Invitations for this open webinar were extended to all interested actors, and the event was simultaneously interpreted from English to French and Spanish.

The event was opened by the hosts of the Dialogue, Mr Gaute Voigt-Hanssen from the Norwegian Ministry of Climate and Environment and Mr Khorommbi Matibe from the South African Department of Forestry, Fisheries and the Environment.

The ABS Capacity Development Initiative then provided a summary presentation on the process and some key outcomes of the 2nd Global Dialogue.

This was followed by a panel of four individuals, who jointly reflected on the significance of the Dialogue outcomes and possible ways forward: Ms Margo Bagley from the Emory University School of Law, Atlanta; Mr Tim Hodges from McGill University, Montreal; Mr Paul Oldham from One World Analytics, Lancaster; and Ms Rachel Wynberg from the University of Cape Town.

The panel was officially closed by the co-chairs of the CBD Open-Ended Working Group for a post-2020 Global Biodiversity Framework, Mr Basile van Havre and Mr Francis Ogwal.

Recordings of this event in English, French and Spanish are available on YouTube and on the abs-biotrade.info website.

IV. Dialogue outputs and findings

Current reality

As described above, participants were asked in the global plenary, based on the inputs of the organizers (see slide 4), to describe from their individual perspectives the current situation with respect to two goals the dialogue was focussing on:

- delivers fair and equitable benefits from DSI (associated with genetic resources);
- facilitates access to DSI and does not disrupt research and development

Summary of participants' contributions:

1. <u>Delivers fair and equitable benefits from DSI (associated with genetic resources)</u>

- open access to DSI is a (societal) benefit for those who have the capacity to use it effectively. But it is not clear who benefits from the use of DSI. The Corona vaccines based on the use of DSI were quoted as recent examples of problems with distributing benefits – many developing countries are unable to access affordable diagnostics, vaccines, and other treatments. Participants furthermore underlined the disproportionality in capacity regarding a) using genetic resources for creating DSI - most developing countries don't have the capacity to create DSI; and b) using DSI and creating benefits in and for the provider country.
- Regarding benefit sharing in the terms of the CBD monetary benefits from the use of downloaded DSI are not shared - while non-monetary benefits are often indirect (e.g., information and methods useful for conservation) but generally neither quantified nor recorded. But there are many uses of DSI which are not aligned with biodiversity goal.
- Concerning the DSI use from publicly accessible databases, the use may bypass national ABS measures, depriving provider countries and IPLCs of benefits, because due to the policies / rules for databanks users are not able to upload contractual ABS requirements on benefit sharing for DSI generated from genetic resources. Also, country tags in databases are not used consistently
- Much of the DSI embodies TK because selection and breeding activities of IPLCs are shaping biodiversity and genomes but no benefit sharing with IPLCs connected to the use of DSI. Because databanks do not allow recording traditional knowledge associated with genetic resource and the DSI derived from them, benefits deriving from the use of this DSI cannot be shared with the holders of the TK.
- It is known that several commercial products contain newly synthesised sequences developed on the basis of digital sequences stored in databanks. In addition, specific DSI (single sequences derived from genetic resources) can be incorporated into genetically modified organisms used commercially and creating revenues. Single sequences can also be element of patent claims. But no information is available to understand how much DSI is in a product and to determine monetary benefit sharing for such products.
- Participants noted that there are ways to share DSI incorporating benefit sharing requirements. An example is the WHO PIP Framework demonstrating how sharing DSI in a multilateral benefit sharing system could work.

2. <u>Facilitates access to DSI and does not disrupt research and development</u>

- There are three different access models applying to DSI:
  - mostly well-characterised DSI with unrestricted open access;
  - an unknown quantity of DSI privately held and not shared; and
  - "middle ground".
- But DSI is only openly accessible and useful for those who have the necessary ITC capacity.
- There is a worldwide trend towards open access, open science and open innovation which adds general value to society, but discussions on ABS seem to go against the trend, making it harder rather than easier to collaborate and exchange. On the one side a significant and growing number of countries have ABS restrictions on the generation and sharing of DSI in order to protect national or IPLC interests in that genetic resource. On the other side, conditional research funding requires researchers to deposit DSI on open databases and they are obliged to upload DSI to get academic papers published. Thus, important research is hampered or not being done because DSI-related ABS contract conditions cannot be implemented at database level.
- Science builds on open data / open access - a single sequence is not helpful, "comparing and contrasting" is necessary and requires open access. A broad set of DSI is necessary to check and modify single sequences to make them useful in the creation of commercial products.
- A mixture of legal provisions dealing with DSI would create administrative and compliance problems for users. A lack of legal certainty undermines investment in research and product development. Better collaboration around the world enables better research, makes more effective use of open data and generates improved results for conservation, etc.

In addition to these contributions related to the two questions, many observations on general issues were made as e.g.:

- DSI has huge commercial and scientific value.
- There is a high degree of difference in perceptions of reality.
- Creative solutions are necessary, there is no unwillingness to change, rather there is caution not to damage.
- There is a need to engage with IPLCs and share benefits with the custodians of biodiversity.
- There is a need to support on the ground conservation through SDG compliant sustainable use of the components of biodiversity.
- There is a need for proportionality and legal certainty.
- The CBD has specific provisions on access and transfer of technology, technical and scientific cooperation and handling biotechnology and distribution of its benefits which should be taken into account for a DSI benefit sharing system.
- There is a need for different solutions for tangible GR and DSI, as they are very different in nature.
- Prospect of applying the ABS concept of benefit sharing to DSI is very worrying and could paralyze the current practice of non-monetary benefit-sharing.
- The use of DSI is not so special that it needs a special set of rules on benefit sharing.

- The value of DSI is in aggregate format which means we rely on aggregate data for undertaking meaningful science. Individual sequences have little value.
- Monetary benefit sharing for conservation is not a green tax; it is a commitment that a company has with its own future, where it and we all continue to benefit from nature because biodiversity is still intact.
- ABS plays a resource mobilization role which can be undermined if we don't deal with access to DSI and sharing benefits from its use.

Desired state / change required

Building on the discussions in the introductory global plenary, participants were asked in the 3 regional dialogue sessions to reflect from their individual perspectives about the *desired state* and the *change required* with respect to two goals in the focus of the dialogue

- delivers fair and equitable benefits from DSI (associated with genetic resources);
- facilitates access to DSI and does not disrupt research and development.

Summary of participants' contributions from all regional sessions, clustered by the organizers according to thematic fields:

<table>
<tr><th colspan="2">Access to and use of DSI</th></tr>
<tr><td rowspan="2">Desired State</td><td>Delivers fair and equitable benefits from DSI (associated with GR)

- The society is more equitable and fairer in general. How DSI contributes to more equitability is only one part of the picture. This results in a world of greater openness of communities to engage with researchers. Local communities would not feel like they are losing something when researchers come to their territories, because benefits are shared well.

- Public databases are open for everybody. Access to data is a benefit for science and society globally. A benefit sharing program is in place. Low transaction cost fixes benefit sharing rate on commercial products.</td></tr>
<tr><td>Facilitates access to DSI and does not disrupt research and development

- The current open access regime is maintained and enhanced, the bureaucratic and administrative process is minimal and understandable for all stakeholders. Using DSI does not require negotiating with countries anymore, as explicit terms and conditions are implemented to secure benefit sharing.
- Providers are acknowledged as the provider of the sample for the DSI.
- Open access to DSI means also open and equitable access for everyone to medicine or vaccines resulting from accessing DSI.</td></tr>
</table>

Change required	**Delivers fair and equitable benefits from DSI (associated with GR)** - The overarching questions were whether open access to DSI databases means free access and how open access should be organized. There was strong agreement, that open access does not necessarily mean free commercial use. However, open access was strongly supported.
	Facilitates access to DSI and does not disrupt research and development - Maintaining open access requires certain terms and conditions, such as traceability (e.g. country codes) and registration of users who create and use datasets. There is no need for an additional digital environment. The existing infrastructure of databases should remain public and open access but adapt for facilitating compliance with ABS provisions (e.g. “track & trace system”, transaction fees). Databases are supposed to be better linked to other DSI databases. The existing infrastructure continues to be resilient, attractive, effective, adequately funded, and useful for users; as access to data is a benefit for science globally. It should be considered if databases need to be coordinated with the national authorities to secure that the benefit sharing conditions are complied with. - There was consensus that benefits sharing should apply when products based on DSI are commercialized and a potential link with intellectual property rights was identified. Open access to DSI and aggregated data should be ensured, while more equal data sharing is promoted, thus allowing access and distribution of data worldwide in a way that reduces disparities between countries. Equal access to data would also be a benefit for society and science.

Benefit-sharing needs to reach biodiversity custodians, incl. IPLCs	
Desired State	**Delivers fair and equitable benefits from DSI (associated with genetic resources)** - Users of DSI are eager to share benefits. Benefit sharing becomes the norm. There is an automatism established that provides clarity in terms and conditions on how benefits are provided to a providing country. Furthermore, there are good and concrete examples of benefit-sharing. - A mechanism is in place that persuades the users to contribute to biodiversity conservation. - Societal benefits flow from the use of DSI to fight pandemics or hunger - IPLCs or small-scale producers are widely recognized as producers of GR and domestic schemes or a multilateral system for benefit sharing is in place, that provides clear instructions on how benefits are shared.
	Facilitates access to DSI and does not disrupt research and development - The benefit sharing system that is established impresses through its extreme simplicity in how benefits are shared, and it is understood by all the players and minimizes administrative burdens.
Change required	**Delivers fair and equitable benefits from DSI (associated with GR)** - It was discussed how benefits can better reach biodiversity custodians. The participants agreed that multilateral approaches for benefit sharing need to be developed, the current DSI system is already a multilateral system. However, the system has to be more efficient so that the benefits that have to be distributed are not lost. Therefore, more clarity is needed. Preferable would be a system that is characterized above all by its clarity and simplicity, understandable for all stakeholders, and minimized administrative burden. For an efficient working system, it would be furthermore useful if more concrete examples of effective benefit-sharing exist. - Options on how benefits can reach biodiversity custodians, including IPLCs, were discussed. One option mentioned very frequently was the possibility to implement a tracking and tracing system with provenance tags and metadata on embodied TK. On one hand, it was appreciated as a possible tool to ease benefit-sharing or even as a tool that can give data more value. On the other hand, participants raise doubts that it would be possible, or thought it would be too costly to associate TK with GR. - Other participants emphasized that benefits could reach custodians also uncoupled from the provenance of GR or TK, especially if provenance cannot be determined.
	Facilitates access to DSI and does not disrupt research and development - There should be a global fund to ensure benefit sharing.

Provenance and IPLC/TK tags	
Desired State	**Delivers fair and equitable benefits from DSI (associated with genetic resources)** - Information is provided on permit numbers in public databases so that users can be tracked. - "Track and trace" became unnecessary due to overwhelming compliance with the system established for DSI.
	Facilitates access to DSI and does not disrupt research and development - There is a transparent mechanism to trace back the origin of DSI. Metadata as TK is equally attached and is important to inform future users about the origin of DSI. Expectations of the providing community are easily accessible. - The track and trace mechanism is under a multilateral roof with PIC/MAT - The admin burden is bearable.
Change required	**Delivers fair and equitable benefits from DSI (associated with GR)** - It was intensively discussed how provenance can be traced back and, in particular, how subsequent users of DSI stored in databanks can find out if the sequence is from IPLCs. Some participants strongly suggested recognizing that TK can be embodied in GR through the selection process by IPLCs. IPLCs have developed indigenous GR for a long time and some are widely spread now as maize. There was strong consent that tags linked from DSI on public databases could serve for more transparency and support the recognition of providers of genetic resources and traditional knowledge. Metadata should be attached to DSI data, so that potentially embodied TK is visible for every user. Furthermore, some participants commented that a tracking and tracing system could add scientific value. However, some participants mentioned that it is difficult to identify embodied TK. How to face this problem in the future should be decided together with IPLCs.
	Facilitates access to DSI and does not disrupt research and development - Databanks that already have transparency and tracking option for users could share their experience to support the international discussion on benefit sharing and tracking and tracing. Suggestions were made, as information can be provided on permit numbers in public databases or the use of blockchain technology. However, it was also debated how feasible such a system would be and if it would be rather complicated and costly than ease benefit sharing for providers. - Questions were raised about the responsibility for developing and implementing tracking systems. Should it be databanks, governments, or other institutions?

<table>
<tr><th colspan="2">Capacity development and financial support to close the skill and technology gap between countries</th></tr>
<tr><td rowspan="2">Desired State</td><td>Delivers fair and equitable benefits from DSI (associated with genetic resources)

- Capacity development is part of the benefit-sharing package, as a non-monetary benefit. Large-scale initiatives are supposed to support capacity development, not based on single sequences but the use of the complete system. Thus, DSI access and use are enhanced for those who are at the moment only providers. That leads to a wide ability of DSI supplying countries to participate in research and in particular, to create and use DSI themselves. Effective research participation and research collaborations in countries of origin are increasing and industry is developing.
- Infrastructure exists to use DSI
- Smallholder farmers have been trained and capacitated on how to deal with DSI
- Digital North-South Gaps are decreased</td></tr>
<tr><td>Facilitates access to DSI and does not disrupt research and development

- Developed countries are willing to collaborate in more DSI projects. For example, a wider South-North student exchange should be obtained</td></tr>
<tr><td rowspan="2">Change required</td><td>Delivers fair and equitable benefits from DSI (associated with GR)

- The need for targeted capacity-building initiatives was broadly highlighted as well as the importance of aligning with CBD Articles 16-19 when discussing purposeful and targeted initiatives.</td></tr>
<tr><td>Facilitates access to DSI and does not disrupt research and development

- The aim should be to close the technology gap between North and South. This would be beneficial for all, as it increases and diversifies scientific research projects and is the base for fruitful collaborations in international DSI projects in the future. As the capacity of accessing DSI rises, DSI supplying countries would increase. In the end, more collaborations would be possible.</td></tr>
</table>

The use of DSI results in non-monetary and monetary benefits	
Desired State	**Delivers fair and equitable benefits from DSI (associated with genetic resources)** - Non-monetary benefit-sharing from the pre-commercial stages of research is limited. However, technology transfer and other non-monetary benefits such as capacity building are happening. Furthermore, stakeholders have more clarity and acknowledgment of the non-monetary benefits and their contribution - Benefits are channeled for conservation through a multilateral system/conservation fund (agreed upon at the international level -so terms and conditions are known to all)
Change required	**Delivers fair and equitable benefits from DSI (associated with GR)** - The participants agreed that access to large DSI datasets is essential for modern biological research and product development, because much of the value of databanks lies in the comparison of multiple sequences. If at the end the function of a sequence is known, it often needs multiple sequences to develop a single product. This caused some exchanges between participants about the value of a single sequence.
	Facilitates access to DSI and does not disrupt research and development - Many participants declared themselves in favor of more clarity and legal certainty on the meaning of non-monetary and societal benefits. In the opinion of many participants, more resources should be mobilized to support conservation and sustainable use. The use of biodiversity information should be linked to conservation through benefit-sharing based on profits. - Furthermore, it was considered that it is important to raise the role of DSI in communication and awareness-raising campaigns, on how it contributes to conservation and sustainable use. Some considered if a conservation fund would not be the most appropriate mean.

Analysis of convergences and divergences

The objective of the 2nd Global Dialogue on DSI was "to identify areas of convergence of views, as well as remaining divergences, regarding the alternatives of a potential international system that ensures or promotes benefit-sharing when using DSI for research and development and in commercial applications."

To assess the level of convergence and divergence in key fields discussed at the dialogues the contributions of participants were clustered in thematic areas and analysed by the organizing team. It became obvious that in several thematic areas a large majority of participants agreed on key high-level aspects of the points discussed. In specific areas, a few participants underlined that they cannot agree to these emerging convergences (captured in *italics* in the lists below). The organizing team also observed that in many areas, participants suggested options on how to implement or to operationalise these key aspects. In some cases, participants strongly rejected certain options, which the team qualified as divergences at the *level of implementation.* There were also cases, in which participants disagreed on key high-level aspects of the points discussed. These disagreements were qualified as divergences at the *policy level.*

During the final global plenary session of the dialogue, the team presented the main fields of noted convergences and divergences, and a group of participants with different backgrounds was invited to deliver statements on these outcomes of the dialogue and on key aspects of the DSI discussion (Box 1). Other participants were contributing to the discussion via online chats.

Box 1: Key reflections from the group at the final global plenary session

- The use of DSI is categorically different: "… DSI in the way it's being used, collected and accessed, is so fundamentally different from the way GR were envisioned by those who negotiated NP or CBD"
- Delimitation between commercial and non-commercial uses not possible: "There's also no clear delimitation between academic and commercial users, […] This would ignore the continuum of basic-applied-commercial R&D."
- Modalities must be determined: "I think the only way that we'll be able to go forward is to see detailed, costed, evaluated options that the world now has to choose between"
- Balance between efficacy and bindingness: "The issue of making something watertight but having it be very simple and cost effective and not standing in the way of open access and the scientific process is a difficult one"
- Reasons for regulating DSI: "Our need to raise money needs to guide is in what we do with DSI [….] all BD should be paid for from those who make money from it, […] a small fraction individually, but it would come near the amount we could need to save biodiversity"
- Fit for purpose: "[…] has not agreed to a multilateral benefit-sharing system for the use of DSI. They advocate a revisiting of the overall approach to ABS, leading perhaps to a global mechanism for sharing of all benefits relating to biodiversity"

Based on this additional input, the team compiled a condensed overview on convergences and divergences at policy and implementation level in the three main topics:

- Features of a benefit sharing system for DSI
- Access to and use of DSI
- Cooperation, capacity development and financial support

The table below summarizes the outcome of the 2nd Global Dialogue on DSI. The supporters and organisers of the Dialogue hope that this overview will be used to inform and support the coming DSI negotiations under the CBD Open-Ended Working Group on the Global Biodiversity Framework.

Features of a benefit sharing system for DSI	**Policy level**	
	Convergences	**Divergences**
	The use of DSI results in both non-monetary and monetary benefits, both of which are important, and these should be shared more fairly and equitably	The meaning of non-monetary and societal benefits, how they are distributed, and their relative contribution to overall benefits
	Significant, but not unanimous support was expressed for a multilateral benefit sharing system for DSI	Some participants did not agree to multilateral solutions
	Benefits should support both the conservation of biodiversity, and the sustainable use of its components.	
	There is a need to improve communication and awareness-raising on how the use of DSI and associated benefit-sharing contribute to conservation and sustainable use	
	Benefits should reach biodiversity custodians, who are the ones conserving biodiversity in situ, including indigenous peoples and local communities.	
	Implementation level	
	Options	**Divergences**
	a) Benefits reach the population through trickle-down effects b) Benefits reach the population through a rule-based system	
	Rule-based systems could have following features: - A benefit sharing system for DSI would require certain terms and conditions. - Benefit-sharing obligations should apply when products based on DSI are commercialised - There could be a link to intellectual property rights. - Benefits could reach custodians uncoupled from provenance of GR or TK, especially if provenance cannot be determined. - They could also reach custodians through a tracking system with provenance tags and metadata on associated TK.	Different views exist on whether, or which, terms and conditions should apply when DSI is accessed. Several participants rejected bilateral benefit sharing options, and specifically tracking systems for benefit sharing

<table>
<tr><td rowspan="6">Access to and use of DSI</td><td colspan="2">Policy level</td></tr>
<tr><td>Convergences</td><td>Divergences</td></tr>
<tr><td>The existing open access model of DSI databases should be maintained</td><td rowspan="2"></td></tr>
<tr><td>Access to large DSI datasets is essential for modern biological research and product development.</td></tr>
<tr><td>The aggregated use of DSI for purposes of detection and characterisation of new DSI creates value</td><td>Participants disagreed on the relative value of single sequences, especially in commercial products, some participants saw no value created by the use of single sequences</td></tr>
<tr><td>Those who supported a rule-based benefit sharing system noted that open access does not necessarily mean free and unfettered access for commercial use</td><td></td></tr>
<tr><td colspan="2">Implementation level</td></tr>
<tr><td>Options</td><td>Divergences</td></tr>
<tr><td>Tags indicating provenance, and whether associated traditional knowledge exists, both add scientific value and support recognition of providers, including indigenous peoples and local communities, and independent of their potential use in a tracking system for benefit sharing</td><td>Participants disagreed on the extent to which tags should be mandatory or voluntary, and their impact on the rights of IPLCs regarding free prior informed consent (FPIC) for the use of their TK</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="6">Cooperation, capacity development and financial support</td><td colspan="2">Policy level</td></tr>
<tr><td>Convergences</td><td>Divergences</td></tr>
<tr><td>There is a need for capacity development and financial support to close the skill and technology gap between countries, and this should be enhanced</td><td>Participants disagreed on the extent to which capacity development and financial support should also focus on supporting sustainable development and conservation outside the DSI community of practice</td></tr>
<tr><td>Those who supported a rule-based benefit sharing system noted that capacity develop should not be the only form of benefit-sharing.</td><td>Participants disagreed on which actors and modalities should deliver capacity development (e.g. countries or users?)</td></tr>
<tr><td colspan="2">Implementation level</td></tr>
<tr><td>Options</td><td>Divergences</td></tr>
<tr><td>As the main providers of DSI, databanks should cooperate more to increase transparency and the scientific value of DSI</td><td></td></tr>
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