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Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services Eighth session Online, 14–24 June 2021 Item 5 of the provisional agenda*

Report of the Executive Secretary on progress in the implementation of the rolling work programme up to 2030

Data management policy of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

Note by the secretariat

1. The Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), in section II of its decision IPBES-2/5, established a task force on knowledge and data for the period of its first work programme 2014–2018. In section II of decision IPBES-3/1, the Plenary approved the data and information management plan set out in annex II to the same decision.

2. At its seventh session, in decision IPBES-7/1, the Plenary adopted the rolling work programme of the Platform for the period up to 2030 set out in annex I to the decision, which included, among its six objectives, objective 3 (a), on advanced work on knowledge and data. In section IV of its decision IPBES-7/1, the Plenary recalled the establishment of the task force on knowledge and data and extended its mandate for the implementation of objective 3 (a) of the rolling work programme of the Platform up to 2030, in accordance with the revised terms of reference set out in annex II to the same decision, and requested the Bureau and Multidisciplinary Expert Panel, through the IPBES secretariat, to constitute the task force in accordance with the terms of reference.

3. According to its terms of reference, the task force on knowledge and data oversees and takes part in the implementation of objective 3 (a) of the rolling work programme up to 2030 and acts in accordance with relevant decisions of the Plenary and its subsidiary bodies. Its mandate includes, among other things, to guide the secretariat, including the dedicated technical support unit, in the management of the data, information and knowledge used in IPBES products, including the development of the web-based infrastructure, to ensure their long-term availability and data interoperability.

4. In line with that mandate, the task force on knowledge and data drafted and, upon approval by the Multidisciplinary Expert Panel and the Bureau at their fourteenth meetings, in January 2020, published the first version of the IPBES data management policy (version 1.0). The task force revised the policy in September 2020 and published the revision (version 1.1), upon approval by the Multidisciplinary Expert Panel and the Bureau at their fifteenth meetings, in November 2020.

5. The most recent version of the IPBES data management policy is available at https://doi.org/10.5281/zenodo.3551078. Version 1.1 of the policy is set out in the annex to the present note, without formal editing.

^{*} IPBES/8/1.

Annex

DATA MANAGEMENT POLICY

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Version 1.1 (December 2020)

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This revision has been reviewed by IPBES task force on knowledge and data, IPBES secretariat, and has been approved by the IPBES Multidisciplinary Expert Panel, and IPBES Bureau

Version 1.0 (January 2020)

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The version has been approved by the IPBES Multidisciplinary Expert Panel, and IPBES Bureau. The version has been reviewed by IPBES task force on knowledge and data, IPBES task force on capacity-building, IPBES task force on indigenous and local knowledge, IPBES task force on policy tools and methodologies, IPBES task force on scenarios and models, and IPBES Secretariat.

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Summary of changes from version 1.0

- The term "archival" was replaced with "preservation" throughout the document
- The definition of a "workflow" was added
- The definition of a "data deposit package" was added
- Data management "plan" was replaced with data management "report" throughout the document.
- Embargo periods are added in the policy, stating the following: "Embargo periods are possiblebut need to be approved by the task force on knowledge and data. Restricted access to the data is only allowed for specific circumstances and need to be approved by the task force on knowledge and data

DEFINITIONS

- (a) **Data**: *Data* in a general sense are individual units of information obtained from observations or measurements that form the basis of monitoring, *research*, assessments, and analysis. Data may be categorized according to the following aspects:
 - Thematic (socioeconomic, ecological, landscape, sociological, etc.);
 - Geographical (global, regional, sub-regional, local);
 - Systematic (taxonomy), descriptive or trait-based;
 - Material from indigenous people and local communities (IPLC);

Data can be of any nature, including among others, spatial or non-spatial, qualitative or quantitative, descriptive, and from all scientific disciplines. This includes material from indigenous people and local communities (IPLC);

- (b) External data: External data are original data as defined above, information, or knowledge which have been generated outside of IPBES and IPBES products, and are available and published in peer-reviewed journals, grey literature or other sources or available as IPLC. Original data should be citable via a stable digital object identifier (DOI) or other identifiers (e.g. ISBN). These products of external entities are typically the input for research within IPBES. IPBES is not responsible for any preservation of these products;
- (c) Knowledge: *Knowledge* is the understanding gained through experience, reasoning, interpretation, perception, intuition, and learning that is developed as a result of information use and processing. In the context of this policy, *knowledge* is the description of the process used to analyse, integrate, collect or process *external data* in any way.
- (d) IPBES products: Factual records (numerical scores, text, images, and sounds) produced or used as primary sources for scientific research and which are required to validate its results. They vary according to the area of *knowledge* and may be contained in textual documents, spreadsheets, databases, maps, statistics, laboratory notebooks, field notebooks, diaries, questionnaires, transcriptions, audio files, video, photographs, images, protein sequences or genetics, artefacts, samples, models, algorithms, scripts, log files, simulation software, methodologies and *workflows*, operating procedures, standards and protocols and any new products developed in the future. *Knowledge* and the data generated by applying this *knowledge* to *external data* are referred to as *IPBES products*.
- (e) Links and references: Links, for example, those in the form of DOI, and bibliographical references provide access to the data and metadata supporting IPBES deliverables. In order to guarantee long- term access to that data, IPBES will need to keep an accurate, up-to-date and accessible list of *links and references* to products of external entities, *external data, knowledge* and *IPBES products*.
- (f) Research: Research refers to all activities within IPBES which collect, measure, aggregate, process, integrate, or analyse in any way existing data from original research, published in peer- reviewed literature or grey literature, or new generated data, within an assessment, a *technical support unit* or *task force*. This also includes the development of indicators and archetype scenarios to be used in multiple assessments. No original research is conducted through IPBES processes. Theterm "*research*" is only used for the purposes of this policy to refer to the process of preparation of *IPBES products* in line with the procedures for the preparation of Platform deliverables as set out in annex I to decision IPBES-3/3 and other relevant decisions by the IPBES Plenary.
- (g) **Expert**: Any person conducting *research* in the context of IPBES, in particular, its assessments and *task forces*. This includes assessment *experts* and *task force* members as well as all other persons in the IPBES context conducting *research*;
- (h) **Research project**:
 - A chapter in an assessment, which is coordinated by coordinating lead author(s) and conducted by lead authors and/or fellows;
 - A task associated with a single or multiple *IPBES product(s)*.
- (i) Generated data management: The management and handling of *IPBES products* in an organized manner to fulfil the requirements of this Data Management policy;
- (j) **Data management report**: A *data management report* is a formal document containing information concerning the handling of data during and after the finalizing of the *research project*. It should be drafted at the beginning of the project and be maintained and updated during the wholeduration of the assessment to be kept up to date. It describes:

- The data that will be created;
- The process of how the data has been created, including references to the original data sources, scripts, and software used (see "Workflow" below);
- All additional information to make the process of the data generation as transparent and reproducible as possible;
- Access to the data;
- The duration which the data will be preserved (and/or made accessible);
- Where the data will be preserved.
- (k) Workflow: The repeatable sequence of individual steps involved in achieving a certain goal. Individual steps could be 'data gathering', 'data filtering', 'data preparation', 'data analysis', and 'data visualisation'. An analytical workflow, for example, represents the transformations made to data along the scientific process, including data sources, scripts and software used.
- FAIR data principles: A set of guiding principles to make data Findable, Accessible, Interoperable, and Reusable (FAIR). See the FAIR data principals for specifications <u>https://www.force11.org/group/fairgroup/fairprinciples</u>);
- (m) Milestone: A significant step towards the completion of the overall goal of a *research project* which warrants its long term storage. In the case of assessments, this would include the completion of zero, first and second-order drafts of the chapters of the assessment as well as their final versions. Other defined *milestones* can be added if deemed necessary. For other *research projects*, *milestones* should be defined in the planning phase of the *research project*.
- (n) Plenary: The decision-making body of IPBES comprising representatives of members of IPBES.
- (o) Secretariat: The *secretariat* of the Platform;
- (p) Multidisciplinary Expert Panel (MEP): a subsidiary body established by the IPBES *Plenary* which oversees the scientific and technical functions of the Platform, a key role is to select *experts* to carry out assessments.
- (q) **Bureau**: a subsidiary body established by the *Plenary* which carries out the governance functions of the Platform. It is made up of representatives nominated from each of the United Nations regions and is chaired by the Chair of IPBES
- (r) **Task Force**: working group of domain experts established by the Plenary to implement the Platform's work programme
- (s) **Technical Support Unit**: The *technical support unit* works under the oversight of the secretariat to coordinate and administer the activities of *expert* groups in support of the development of deliverables.
- (t) **Data Deposit Package**: the content deposited in a long term repository. One Data Deposit Package has a DOI. A Data Deposit Package consists of at least the data itself and the data management report describing the data including its origin and processing steps, unless the data is a final product like an assessment.

INTRODUCTION

This policy builds on the Data and Information Management Plan approved by the IPBES *Plenary* set outin annex II to decision IPBES-3/1. In particular, it builds on its activity 1: reviewing and developing data and metadata guidelines and is grounded in its principles for managing knowledge, information, and data in the Platform, in particular accessibility and open science (paragraphs (c) and (e) of section III of the data and information management plan):

- Accessibility. Free and open access to its deliverables and to the material on which they are based is core value of the Platform. Consequently, the plan will, first, aim for open, permanent access to data and information sources for its deliverables (e.g., in the scientific literature) with minimal restrictions; second, enforce the use of common and accessible file formats in the Platform's deliverables; third, emphasize the need to communicate the availability of data and information; and, fourth, facilitate multilingual discovery and sharing of data and information. The Platform acknowledges that making data and information available online may not always mean it is accessible to member States due to political, technical, and economical or any other reasons. Therefore, making data and information available in other formats will be crucial for ensuring true accessibility of the data and information produced by the Platform;
- **Open science**. The open science approach promotes the generation of *knowledge* through collaboration based on free and open access to *knowledge*, information, and *data*. Open science, therefore, ensures that the work of all the experts and stakeholders involved is fully recognized and properly attributed. Adoption of these principles and of this approach means a significant cultural change in the ways in which science is done and scientific results and underlying data are shared publicly by authors, journals and research organizations and thus made relevant to society. This cultural change is already happening in various scientific disciplines such as astronomy, neurobiology, molecular genetics, and oceanography, among others. In the context of the Platform, the open science approach could engender very significant advances in data integration, analysis and interpretation and could lead to a better understanding of nature and its contribution to a good quality of life.

Objectives

To fulfil its function to generate transparent assessments, IPBES is committed to implementing data management procedures that are discipline-appropriate, proportionate, practical, cost-effective and sustainable, and supportive of its objectives.

The data management policy is intended to be the primary reference document for IPBES data management. It serves to ensure that data is managed correctly and consistently, and is maintained to the highest possible standard.

The data management policy has the following objectives:

- (a) To ensure that *data* produced during IPBES *research* activities, within assessments as well as assessment overarching follows the *FAIR data principles*;
- (b) To provide a framework for all IPBES entities, including *technical support units* and *experts* to fulfil their responsibilities with respect to management, handling, preservation, and distribution of *knowledge* and *generated data* within the platform;
- (c) To guide the *experts* to fulfil their responsibilities to develop one or more *data management reports* which fulfil the requirements of this policy and other partners;
- (d) To provide a suggested *workflow* for long term storage and preservation of *IPBES products* to the *experts*;
- (e) To promote the usage of open-source software to enable users to recreate and use *IPBES products* without limitations.

General Principles

IPBES products should be managed following the *FAIR data principles* throughout the research cycle as part of IPBES's commitment to accessibility and open science (see above).

IPBES products which follow the *FAIR* principle are essential for fulfilling the functions of IPBES, to perform regular and timely assessments of knowledge on nature, its contribution to good quality of life, and their interlinkages, in a transparent and reproducible manner.

In the management, handling, and delivery of IPBES products, national law should be respected, which includes rights of privacy, intellectual property rights, and duties of confidentiality as well as other legal obligations to which IPBES has agreed as binding upon IPBES and that fall outside the scope of this policy.

IPBES products should be anonymized, if necessary, before long term storage.

IPBES is committed to providing guidance to all *experts* associated with IPBES to ensure that all *data* resulting from *research* associated with IPBES follows the *FAIR data principles*.

Application

IPBES will apply this policy to all new and ongoing *IPBES products* and related *research*. The policy should be reviewed at least every 2 years by the *task force* on knowledge and data to align with new developments concerning data management and *FAIR* data standards. Exceptions and deviations to this policy have to be agreed upon in the *Data Management Report* in writing and shared with *secretariat* and *technical support unit* on knowledge and data.

Scope

This policy applies to all *IPBES products*. IPBES *experts* are required to abide by the terms and conditions agreed with third parties. IPBES also recognizes that such third parties' policies are evolving and that the latter may require higher levels of data accessibility and dissemination in the future.

COMPLIANCE AND ENFORCEMENT

Compliance with the data management policy is mandatory for IPBES *experts*. The assessment *technical support units* should ensure that *experts* follow the policy. Compliance will be monitored by the *technicalsupport unit* on knowledge and data. Products will not be accepted as *IPBES products* unless they comply with this policy.

ROLES AND RESPONSIBILITIES

(a) Bureau and Multidisciplinary Expert Panel

• Will review any changes to the policy as proposed by the *task force* on knowledge and data and consider these for approval;

(b) Secretariat

- Will execute, under the guidance of the *task force* on knowledge and data and in cooperation with the *technical support unit* on knowledge and data, the development and maintenance of the guidelines, tutorials, *workflows* and examples to enable *experts* to implement these policies;
- Will keep an accurate, up-to-date and accessible list of references (including rich metadata), and links to *external data, knowledge* and generated data as used for and in the *IPBES products* (for metadata requirements of *IPBES products* see Appendix IV);
- Will add specific and consistent keywords to *data deposit packages* (e.g. chapter, assessment, figure) to make the data findable and identifiable;

(c) Task force on knowledge and data

- Will provide guidelines and templates for data management, and guide the development and maintenance of that, as well as *data management reports* and advise the *technical support unit* on knowledge and data in questions regarding *data management* and *data management reports* as outlined in the section on provisions on data management reporting;
- Review the policy at least every 2 years;
- Will review the guidelines, tutorials, workflows, and examples related to this policy on a yearly basis to identify gaps and implement new developments;

(d) Technical support unit on knowledge and data

- Will provide support, advice, and participate in efforts from the *task force* on knowledge and data to develop guidelines and examples for *data management* and *data management reports*;
- Will review the *data management reports* from the corresponding assessment *technical support units* so that they follow the data management policy and are updated regularly;
- Will make sure that the assessment *technical support units* fulfil their responsibilities as outlined in this policy and the *data management reports* and will collect the metadata of the*IPBES products* from the technical support units, so that it can be accessible and searchable via the IPBES website;
- Will provide assistance in making sure that the *data management reports* adhere to this policy;
- Will execute, under the guidance of the *task force* on knowledge and data, and in cooperation with the *secretariat*, the development and maintenance of the guidelines, tutorials, *workflows*, and examples (*data management report*) to enable IPBES to implement this policy;

(e) Technical support units

- Will collect the *data management reports* from their *experts*;
- Will provide assistance in making sure that the *data management reports* adhere to this policy;
- Will provide a DOI for each *data deposit package*;
- Will make sure that the *experts* fulfil their responsibilities as outlined in this policy and in the *data management reports* and will collect the metadata of the *IPBES products* from the experts so that it can be handed over to the *task force* on knowledge and data;
- Will develop and maintain, under the guidance of *technical support unit* on knowledge and data, and in cooperation with the *secretariat*, guidelines, tutorials, *workflows*, and examples (*data management reports*) to enable IPBES to implement this policy;

(f) Experts

- Will prepare and keep up to date *data management reports* for their IPBES related research. These *data management reports* should be available at the latest at the first *milestone*, and be updated for each following *milestone*. The *data management reports* should follow the examples in Appendix I;
- Are responsible for fulfilling the requirements as outlined in the *data management reports*;
- Are responsible for reporting issues on the implementation of the *data management reports* to the associated *technical support unit*.

PROVISIONS ON DATA MANAGEMENT PLANNING

- (a) A *data management report* is expected for each IPBES *research project*. This can be achieved by a single *data management report* for a *research project* or by an individual *data management report* for each research aspect within a *research project*;
- (b) The *data management report* should comply with this data management policy. If this is not possible, the exceptions need to be specified in the *data management report* itself and be acknowledged by the *technical support unit* on knowledge and data. It is the responsibility of the *expert* to ensure that the *data management report* is created, maintained and updated throughout the *research project* life cycle and submitted to the associated *technical support unit*;
- (c) The *technical support unit* on knowledge and data provides support, and where appropriate guidelines and examples (*data management report*), to the *experts* to make sure that *FAIR data principles* are followed for *data management* and documented in the *data management report*. This includes the use of open formats suitable for *data* long term storage and retrieval (see Appendix II);
- (d) The IPBES *secretariat* provides information about recommended long-term, and to the extent possible certified, open data repositories which provide DOIs (see Appendix III).

PROVISIONS ON ACCESS TO IPBES PRODUCTS

- (a) IPBES products should be preserved including a DOI for each milestone of an IPBES research project;
- (b) IPBES products in or associated with an assessment or other IPBES products, including *data management reports*, should be made openly accessible in a form that follows this policy at the latest one calendar month after the approval of the assessment, or other product by the *Plenary*. *Data* related to *milestones* should also be made accessible, as far as confidentiality rules allow for this. Embargo periods are possible but need to be approved by the *task force* on knowledge and data. Restricted access to the data is only allowed for specific circumstances and need to be approved by the *task force* on knowledge and data;
- (c) Applicable ethical, privacy and confidentiality requirements need to be followed and *generated data* should be, if deemed necessary, anonymized before preservation;
- (d) The management, handling, and delivery of the materials from IPLC have to adhere to the application of free, prior and informed consent (see Appendix V), as well as to other binding conditions outside this policy in accordance with national law;
- (e) IPBES products and their metadata are released with a clear and accessible data use license
- (f) Allowed licenses for the IPBES products are Creative Commons Copyright Waiver (CC0) and Creative Commons By Attribution (CC-BY) or licenses equivalent to these. Divergent licenses need to be approved by the *technical support unit* on knowledge and data.

APPENDICES

- I. Data management report example
- II. File format guidelines
- III. Recommended repositories
- IV. Metadata requirements
- V. Management, Handling, and Delivery of Materials from IPLC

APPENDIX I: Data Management Report - Examples

Here are a few examples of data management reports:

- IPBES Values Assessment Chapter 2.1 Systematic review on the conceptualizations of values, https://doi.org/10.5281/zenodo.4071756
- IPBES 2020 Stakeholder Quantitative Dataset, https://doi.org/10.5281/zenodo.4095066

Further examples will be added on an ongoing basis when gaps and special cases are identified. Contact the technical support unit on knowledge and data (tsu.data@ipbes.net) for more information.

APPENDIX II: File Format Guidelines

File formats play an important role in *FAIR data principles* (www.go-fair.org/fair-principles/). Data can be findable and accessible, but still not reusable and interoperable if the data formats do not follow open data standards. Data formats should be open and non-proprietary so that they do not depend on specific non-open software to be read and, if possible, be human-readable (i.e. text files in contrast to binary files). Text files should be in UTF-8 encoding.

Compiling an exhaustive list of formats for all file types is a task which exceeds the scope of this policy. Therefore, we supply a list of guidelines that are in line with the aims of this policy. We encourage the use of the formats recommended in the links below:

- National Archives (<u>https://www.archives.gov/preservation/formats</u>) the guidelines of the National Archives. Very detailed
- ETH Library (<u>https://documentation.library.ethz.ch/display/DD/File+formats+for+archiving</u>) for a nice and concise summary of file formats
- Best File Formats for Archiving (<u>https://suchanek.name/texts/archiving</u>/) for a comprehensive article.

APPENDIX III: Recommended Repositories

The repository for long term storage of all IPBES products, including milestones, is Zenodo (https://zenodo.org/).

The IPBES secretariat has created and is maintaining one single community on Zenodo for IPBES: https://zenodo.org/communities/ipbes/

For all active research data and code documentation, IPBES recommends GitHub.

IPBES on GitHub: https://github.com/ipbes

APPENDIX IV: Metadata Requirements

Metadata should be prepared in English and follow a developed metadata scheme. This scheme will include

- bibliographic metadata (similar to datacite <u>https://schema.datacite.org/meta/kernel-4.3/</u>) including:
 - ORCID (<u>https://orcid.org</u>) of the expert
 - ROR (<u>https://ror.org/about/</u>) of the Institution of the expert
- DOI of the *data* it refers to
- DOI or equivalent persistent identifier of the external data
- *IPBES Product* related metadata (For example, assessment-related data, chapter related data, figure, map, and table metadata and additional keywords as specified by the *technical support units* in coordination with the knowledge and data *technical support unit*.)

Additional metadata which is deemed necessary by the data and knowledge *technical support unit* / task force, the assessment *technical support unit*, or the *expert* can be added.

Metadata should be as descriptive as possible and in compliance with the FAIR principles (<u>https://www.go-fair.org/fair-principles/</u>).

- Title
- DOI
- Description/Abstract
- Keywords
- Data Authors/Data Source
- Metadata author
- Creation date, version
- Geographical coverage
- Temporal coverage
- Taxonomic coverage
- Quality Assurance/Quality Control (QA/QC) procedures
- Data files/format
- Metadata author
- Contact person
- IPBES product information

APPENDIX V: Management, Handling, and Delivery of Materials from IPLC

This is a working document and will be further developed.

To get the latest version of this appendix visit http://dx.doi.org/10.5281/zenodo.3551079

Within the framework of IPBES, principles of Free Prior Informed Consent (FPIC) applies to research or knowledgerelated interactions and activities involving indigenous peoples and local communities (IPLC). Given that the dialogue process includes discussion of indigenous knowledge of biodiversity and ecosystems, there may be information which the knowledge holders or their organizations or respective communities consider sensitive, private, or holding value for themselves which they do not want to share publicly through publications or via any other media formats without formal consent.

To ensure that information and materials is shared in an appropriate way during an activity, and that information and materials produced after, are used in ways that respects FPIC, the following applies:

- 1. Guardianship participants who represent organizations and communities
 - Participants who represent organizations or communities should act as the guardians of the use of the knowledge and materials from their respective organizations or communities that is shared during or after an activity. Any use of their organizations' or communities' knowledge should be discussed and approved by the guardians, as legitimate representatives of their organizations or communities.
 - Guardians are expected to contact their respective organizations and communities when they need advice. Guardians are also expected to seek consent from their organizations or communities when they consider that this is required.
- 2. During an activity
 - The FPIC rights of the indigenous people in an activity should be discussed at the beginning of an activity, e.g. a workshop or call for contributions, until participants feel comfortable and well informed about their rights and the process, including the eventual planned use and distribution of information. This discussion may be revisited during the activity, and should be revisited at the end of the activity once participants have engaged in the dialogue process.
 - Participants do not have to answer any questions that they do not want to answer, and do not need to participate in any part of the activity in which they do not wish to participate;
 - At any point, any participant can decide that they do not want particular information to be documented or shared outside of the activity. Participants should inform organizers and other participants of this. Organizers and participants should ensure that the information is not recorded.
 - Permission for photographs must be agreed prior to photos being taken and participants have the right not to be photographed. Organizers will take note of this.
- 3. After an activity
 - Participants maintain intellectual property rights over all information collected from them about themselves or their communities, including photographs.
 - Permission should be obtained before any photograph of a participant is used or distributed in any form.
 - Copies of all information collected should be provided to the participants for approval.
 - Any materials developed for IPBES products using the information provided by participants should be shared with the participants for prior approval and consent.
 - The information collected during an activity should not be used for any purposes other than those stated above unless permission is sought and given by participants.
 - Participants can decline to consent or withdraw their knowledge or information from the process at any time, and records of that information should be deleted if requested by the participant.