World Data System Implementation Plan 2019–2020

Trusted Data Services for Global Science

The World Data System (WDS) of the International Science Council (ISC) decided to adopt three Strategic Targets (STs) defined in the Strategic Plan 2019–2023 to fulfil its remit and build worldwide multidisciplinary 'communities of excellence' for scientific data services. The overarching objective is to promote data stewardship and support the provision of trustworthy data services for global science. The WDS Scientific Committee (WDS-SC) is advancing these STs during the period 2019–2020 by guiding the implementation of the WDS programme according to the plan laid out below. For each ST, the Implementation Plan develops objectives and presents the deliverables and milestones with expected dates for delivery.

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Strategic Target 1: Improve the sustainability, trust in, and quality of open scientific data services

Objectives for ST1

a) Define and provide trustworthiness certification frameworks for WDS Regular and Network Members.
b) Actively promote Open Data Sharing Principles at national and international levels.
c) Foster interoperable practices to facilitate data sharing, access, and reuse, including through data publication; in particular, for multidisciplinary research.
d) Work with policymakers, funders, and other stakeholders to promote sustainable long-term funding for trustworthy scientific data services.
e) Improve access, use, reproducibility, reuse, and translation of data into products and services for improving society.

Background for ST1

The World Data System should be the international voice to advocate for a sustainable global research data infrastructure (GRDI) and propose mechanisms to better link components across domains.

Scientific data services—with certified technical and scientific capacities—are essential components of the research environment. They play an essential role in ensuring the integrity and availability of datasets, and hence promote trust in science. WDS is committed to increasing the quality of, and trust in, the services provided by its Members, and will concentrate on the above objectives. The following progress has been made by WDS thus far to advance objectives a) to e):

- In collaboration with the Data Seal of Approval (DSA), WDS has developed not only a set of Requirements to certify the trustworthiness of data repositories at the core level, but also a new certification authority—the CoreTrustSeal—to oversee their implementation. The CoreTrustSeal Data Repositories Requirements form the basis for sustainability of data repositories and data holdings. They are endorsed outputs of the Research Data Alliance (RDA) and, in addition, have been positively assessed by the European Multi Stakeholder Platform and nominated for inclusion in the European Commission's official ICT Technical Specifications.

- The scientific data services community has quickly realized the value of the new certification standard, with over 60 seals awarded by July 2019, and many more organizations within the process. A series of WDS regional workshops around trust and certification have supported this process: data holders and data producers from Africa, from Asia–Oceania, and from Latin America and the Caribbean (LAC) were brought together in three events held in 2017–2018.
- WDS has demonstrated its effectiveness at liaising with important stakeholders in the data landscape; in particular, funders and policymakers through its respective activities with the Belmont Forum and with the Organization for Economic Cooperation and Development (OECD). WDS took a leading role in the Belmont Forum's collaborative research action on e-Infrastructure and Data Management. It helped generate good practices for Data Management Plans (DMPs) to be adopted across national funding agencies. It also worked with the Global Science Forum (GSF) of OECD through two joint Expert Groups, which produced policy recommendations in the areas of coordination and support of international research data networks, and business models for sustainable research data repositories.
- To improve the quality of open scientific data services, WDS has established a set of Open Data Sharing Principles that express ethical commitments operationalized in the accreditation of WDS Members. Furthermore, a Training Resources Guide was published on the WDS website to point scientific data services towards training materials offered by WDS Members and beyond.

Deliverables/Milestones for ST1

ST#1a Influencing funders to fund research data infrastructure and activities

ST#1a.1) Follow-up on the OECD-GSF reports: outreach on the outcomes to the community, including WDS Members, as well as more generally (**Ongoing**)

ST#1b Co-designing activities with funders

ST#1b.1) Identify potential co-design activities (**Ongoing**)

ST#1b.2) Inform WDS Members about funding opportunities (e.g., through calls by the Belmont Forum) (**Ongoing**)

ST#1c Expanding WDS key contacts and networks

ST#1c.1) Establish contact with ISC members (**Ongoing**)

ST#1c.2) Exploit the WDS regional meetings to establish new contacts (**Ongoing**)

ST#1d Promoting and expanding CoreTrustSeal up-take

ST#1d.1) Use conferences, meeting, webinars, and so on as opportunities for outreach (**Ongoing**)

ST#1d.2) Assist CoreTrustSeal to develop a sustainable business model (**Ongoing**)

ST#1e Organize regional and domain workshops around trust and certification

ST#1e.1) Work with data services interested to become WDS Members, but not ready for certification, and establish a new membership category and mentoring programme with WDS Members (**Ongoing**)

ST#1e.2) Connect with the African Open Science Platform (**Ongoing**)

Strategic Target 2: Nurture active disciplinary and multidisciplinary scientific data services communities

Objectives for ST2

a) Provide models of best practice for data management and data sharing to communities as a tangible knowledge base for capacity building, including the documentation and dissemination of approaches and practices employed by successful communities/WDS Members to:
   i. Promote adherence to standards and conventions.
   ii. Accelerate the process of identifying commonalities.
b) Promote better interaction:
   i. Within disciplinary communities to promote best practices.
   ii. Across disciplinary communities to encourage cross-fertilization.
c) Build bridges between data communities through workshops and fora, including the SciDataCon Conference co-organized with the Committee on Data (CODATA) of the ISC.
d) Promote engagement of all sources of digital scientific outputs and assist the maturation of their content to become a part of trustworthy data services.

Background for ST2

The science required to address the problems facing humankind—for example, the challenge of meeting the Sustainable Development Goals (SDGs)—is transdisciplinary by nature. This transdisciplinary science must be supported by internationally coordinated and integrated multidisciplinary scientific data services, which cannot exist and succeed without effective underlying disciplinary scientific data services. WDS membership includes disciplinary and multidisciplinary communities of varying levels of maturity: some communities have achieved sustainable mechanisms for international coordination, while others have not. By providing a forum for these communities to increase their level of engagement, their interactions, and sharing of good practices WDS can accelerate both maturation and the emergence of a global community supporting scientific data services.

Communication channels with the different data communities include, but are not limited to, the WDS Members' Forum (also known as Data Repositories Day), SciDataCon, special international workshops and conferences arranged by WDS, webinars, WDS representation in other international conferences and meetings, as well as journal publications. WDS also promotes and

supports new data initiatives through regional workshops and targeted activities. Examples of such workshops include the Africa Data Initiatives Workshop (April 2017), the Asia–Oceania Conferences (September 2017, May 2019)—which has resulted in the formation of the WDS Asia–Oceania Network—and the LAC Scientific Data Management Workshop (April 2018).

Alignment of the DSA and WDS certifications (see ST1) provides a benchmark for the performance of WDS Members. Periodic recertification and ongoing assessments against the WDS Maturity Model assures continued improvement towards best practice. These procedures not only enable existing WDS Members to evaluate themselves in respect of performance and potential strategies for improvement, but also informs prospective Members and data communities at large about best practices and the emerging data landscape.

Deliverables/Milestones for ST2

ST#2a Providing and disseminate models of best practice

- ST#2a.1) Explore existing Maturity Models for different communities to provide a benchmarking tool to Members (**Dec 2019**)
- ST#2a.3) Work with WDS Members to assess the extent to which relevant standards have been adopted (**Ongoing**)

ST#2b Promoting better interactions within and across data communities

- ST#2b.1) Utilize opportunities to collaborate with other data organizations; for example, CODATA, RDA, OECD, Digital Research Infrastructure for the Arts and Humanities, and the Trans-Atlantic Platform (**Ongoing**)
- ST#2b.2) Cross-fertilize and promote best practices in data management, including practical aspects; for example, via the WDS Data Repositories Day (**Ongoing**)
- ST#2b.3) Outreach to expand WDS membership, focussing on broadening disciplinary and geographical scope (**Ongoing**)
- ST#2b.4) Foster dialogue on the harmonization of data provision from all disciplines to facilitate the transdisciplinary research required to address societal problems **(Ongoing)**
- ST#2b.5) Foster and sustain the next generation of data scientists by promoting the continued development of the WDS Early Career Researcher (ECR) Network (**Ongoing**)

ST#2c Building bridges between data communities

- ST#2c.1) Networking activity with an extra focus on the actors in developing countries **(Ongoing)**

ST#2d Promoting engagement of all sources of digital scientific information

ST#2d.1) Report from WDS Working Group about certification of digital repositories that hold scientific outputs other than data (**Dec 2019**)

ST#2d.2) Assist primary data sources onto a pathway that will lead to trustworthy data services (**Ongoing**)

Strategic Target 3: Make trustworthy data services an integral part of international collaborative scientific research

Objectives for ST3

a) Create awareness among all stakeholders of the needs and benefits of trustworthy data services in scientific research.
b) Make trustworthy data services easy to discover and to use.
c) Involve WDS Members more closely in international, collaborative, multidisciplinary scientific research.

Background for ST3

Data stewardship starts with funding allocation, and needs endorsement of DMPs, requirements for deposit in trustworthy data services and for open access, as well as appropriate licenses. Inclusion of these aspects in global funding programmes and initiatives—in particular, promotion of scientific openness and preservation of free exchange of data—form an important part of the WDS objectives.

Availability of trustworthy data services for deposit and for long-term sustainable curation of digital objects is a growing need, and promoting these data services as partners in international programmes is a priority for WDS. The success of the CoreTrustSeal and its supporting business infrastructure will assist in extending the geographic and disciplinary scope of WDS, and will be supplemented by targeted actions to engage specific organizations and networks with a view to certification and WDS membership.

A collaboration with OpenAIRE is developing a metadata aggregation for WDS, and will now also look to provide value-added WDS services in respect of brokering and Knowledge Network information. Future multidisciplinary applications of data and digital objects depend heavily on them meeting minimum requirements in respect of metadata completeness and interoperability specifications, and while these aspects are addressed in ST1, they form an integral part of advocacy, training curricula, and outreach.

WDS has successfully developed a curriculum outline for training of ECRs in research data management, and with this in place, training opportunities are being sought. This WDS contribution to the early stages of a researcher's career will be supplemented with continued interactions with global research programmes and initiatives. In this regard, existing

engagements with OECD, Belmont Forum, RDA, Future Earth, the Group on Earth Observations, and the European Union need to be strengthened, and new linkages forged with the United Nations system and the SDGs, the World Health Organization and health-related initiatives, and national and international data services.

Deliverables/Milestones for ST3

ST#3a Creating awareness of the needs and benefits of trustworthy data services

ST#3a.1) Host a WDS training workshop aimed at ECRs (**Nov 2019**)

ST#3b Making trustworthy data services easy to discover and to use

ST#3b.1) Release a first implementation of the OpenAIRE aggregator embedded into the WDS website (**Sep 2019**)

ST#3b.2) Initiate a WDS brokering registry (**Nov 2019**)