Making Data Work for Cross-Domain Grand Challenges

- **CODATA, established by the ISC, has a specific mission and role.** CODATA and ISC members include International Scientific Unions, and other global science organization. Strong links with the UN System.

- **ISC Action Plan entrusts CODATA with an initiative 'Making Data Work for Cross-Domain Grand Challenges': establish a global (decadal) programme to address these issues.**

- The major, pressing global scientific and human issues of the 21st century can **ONLY** be addressed through **research that works across disciplines to understand complex systems**, and which uses **interdisciplinary and transdisciplinary** approaches to turn data into knowledge and then into action.

- **Preparatory Phase from 2017:** exploring technical issues and case studies through Dagstuhl workshops, TGs and WGs, funded projects etc, to understand the challenges and prepare the programme. Developed some of the WorldFAIR methodology and approach.

  - **Cross-Domain Interoperability Framework:** units, vocabularies, data structure, data description, provenance…

  - **Case Studies:** in a range of domain and cross-domain research areas: included infectious diseases/epidemiology; urban health; DRR; Task Groups in Agriculture, Nanomaterials, etc.

- **WorldFAIR Project:** takes this approach forward in the context of an EU-funded project.

WorldFAIR: Global cooperation on FAIR data policy and practice

▪ Two-year project to advance implementation of the FAIR principles in a range of disciplines, or cross-disciplinary research areas.

▪ **Funded by the European Union, HORIZON-WIDERA-2021-ERA-0 — Project: 101058393**

▪ Institutions in France, Belgium, Cyprus, Denmark, Germany, Ireland, Norway; Australia, Brazil, Kenya, New Zealand, USA; UK.

▪ Includes **authoritative international entities** (e.g. IUPAC, OneGeochemistry, GBIF, ODIS); connections with important projects or standards organisations (e.g. NanoCommons, DDI Alliance, OHDSI, TDWG, SalUrbAL).

▪ **Important partnership between CODATA and Research Data Alliance.**

▪ WorldFAIR website: https://worldfair-project.eu/

▪ WorldFAIR outputs: https://zenodo.org/communities/worldfair-project/

▪ WorldFAIR webinar series: https://bit.ly/WorldFAIR-Webinar-Series
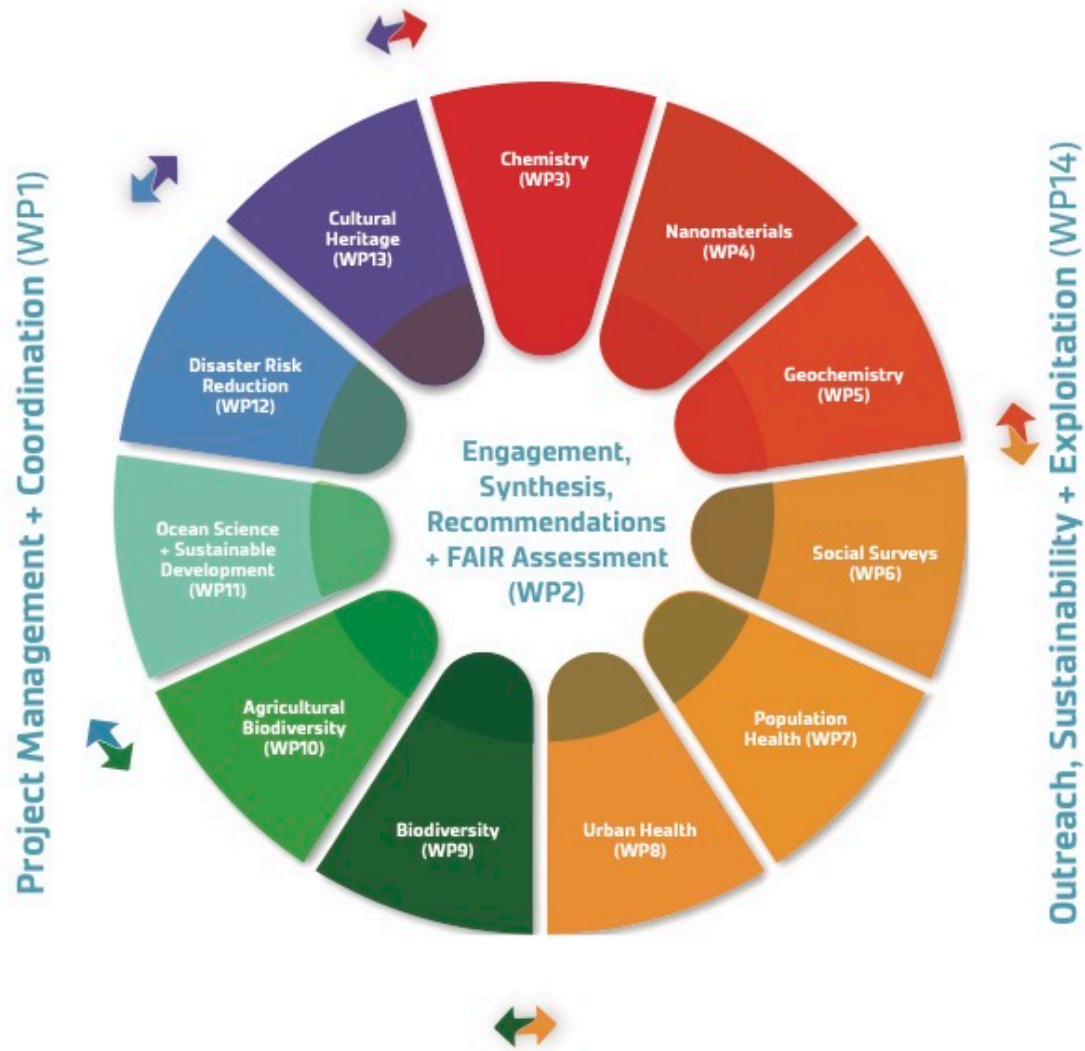
WorldFAIR Partners

Interoperability Frameworks

- Among the most important, but most challenging, recommendations of the **Turning FAIR into Reality** report, is R.4:

- 'Develop **interoperability frameworks** for FAIR sharing within disciplines and for interdisciplinary research: Research communities need to be supported to develop interoperability frameworks that define their practices for data sharing, data formats, metadata standards, tools and infrastructure. **To support interdisciplinary research, these interoperability frameworks should be articulated in common ways and adopt global standards where relevant.**'

- Very strong focus on the I and the R of FAIR.

- Core driver of CODATA-ISC Decadal Programme and WorldFAIR project

European Commission

Final Report and Action Plan from the European Commission Expert Group on FAIR Data

TURNING FAIR INTO REALITY
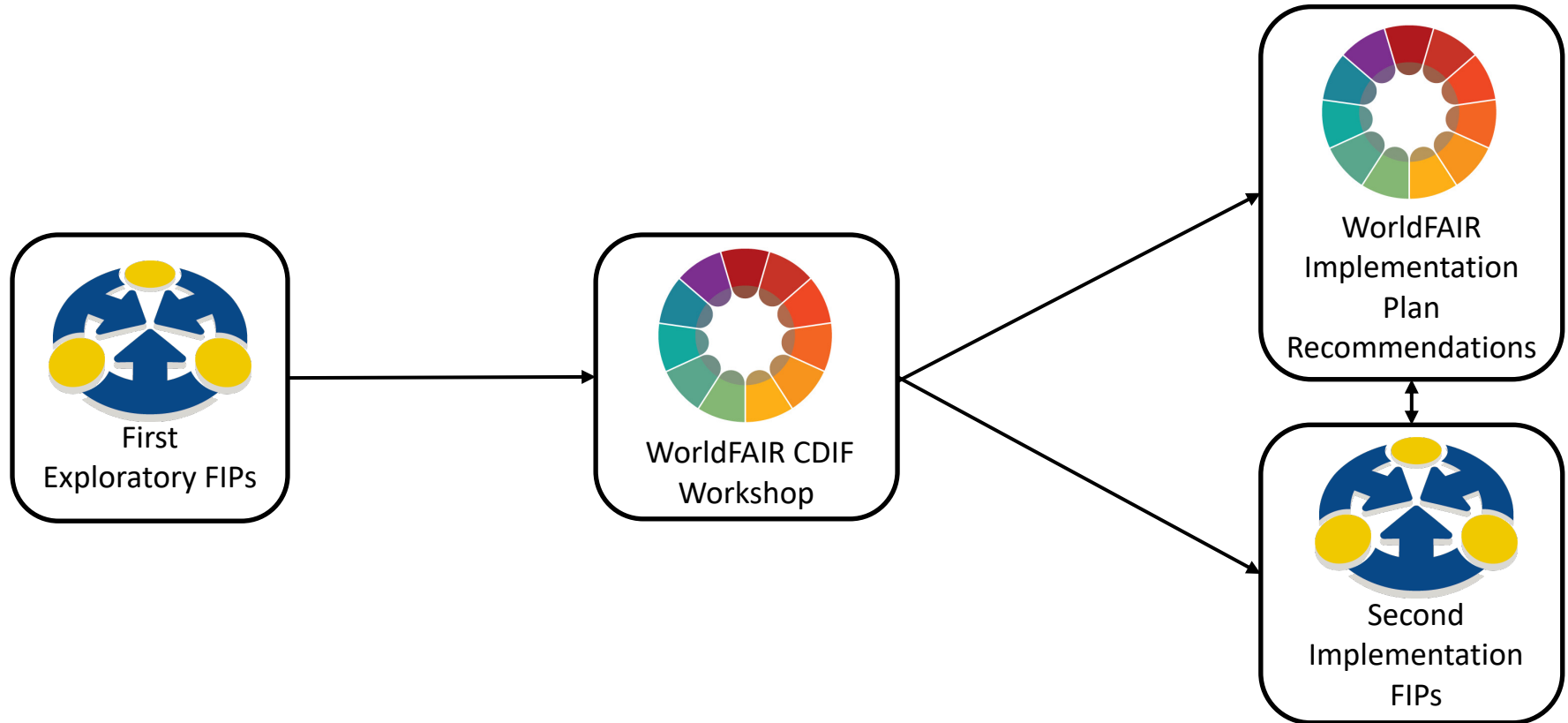
Research and Innovation

2018

WorldFAIR Case Studies

- **Chemistry** – making IUPAC assets FAIR

- **Nanomaterials** – applying NanoInchi and FAIR recommendations in Nanosafety.

- **Geochemistry** – recommendations for FAIR in geochemistry, particularly vocabularies.

- **Social Surveys Data** – data harmonisation between ESS and AussiESS.

- **Population Health –** INSPIRE - Integration of population surveys with clinical and genomics data for COVID-19 research in eastern and southern Africa.

- **Urban Health** – terminologies and making urban health data FAIR

- **Biodiversity** – improving GBIF data model in collaboration with TDWG - GBIF (Global Biodiversity Information Facility)

- **Agricultural Biodiversity** – pollinator data (KALRO, Embrapa, Meise, HiveTracks)

- **Ocean Science** – Implementing FAIR in the ODIS (Ocean Data and Information System) for the UNESCO Oceans' decade.

- **Disaster Risk Reduction** – recommendations on making DRR data and terminologies FAIR, case studies in Africa and Pacific Islands

- **Cultural Heritage** – recommendations on making cultural heritage data FAIR (particularly digital representation of heritage artefacts)

WorldFAIR Methodology

WorldFAIR WP02 Coordination and Synthesis

- **CODATA leading coordination and synthesis WP.**

- **D2.1: FAIR Implementation Profiles** for each case study (a methodology for understanding FAIR practices).

  - **Report 'FAIR Implementation Profiles (FIPs) in WorldFAIR: What Have We Learnt?':
    https://doi.org/10.5281/zenodo.7378109**

- **D2.2:** Second round of FIPs and report to be published end March 2024. Chart progress future plans.

- **D2.3:** Recommendations and documentation for a **Cross-Domain Interoperability Framework (CDIF)**. Working Group and Advisory Group have started contribution.

  - **WorldFAIR Policy Brief: https://doi.org/10.5281/zenodo.7853170**

  - **Webinar on FIPs and CDIF: recording https://youtu.be/2UBgZBVqh4Y; slides:
    https://zenodo.org/record/8099435**

  - CDIF workshops with each Case Study

  - Dagstuhl workshop in October: https://bit.ly/Dagstuhl-CDIF-2023

  - Design principles, discoverability, semantics and data integration to be available for public review soon...

  - CDIF Version 1.0 to be published by 31 May 2024

- **D2.4:** Findings will lead into recommendations for **domain sensitive FAIR assessment**. Due 31 May 2024.

WorldFAIR

WorldFAIR+ Activities and Next Steps

WorldFAIR(+) Methodology

1. Identify and scope new Case Studies (or Petals): i.e. a research group, institution, project with which an OSC is working.

2. FAIR Implementation Profile (FIP) Workshop(s)

3. Depending on the Case Study, this could involve one or many FIPs.

   1. Guided and collaboration creation of the FAIR Implementation Profile; can cover the 'here and now' and indicate aspirations.

4. Interoperability Framework Workshop

   1. Takes the FIP(s) as a starting point.

   2. Detailed, structured discussion of data model, metadata, semantics, representation, etc.

   3. Iterative discussion in relation to domain practice and the emerging CDIF.

   4. Recommendations for an Interoperability Framework from the Case Study.

5. Co-design an implementation plan and an aspirational FIP.

WorldFAIR+

- Aim to create a federation of additional Case Studies.

- Need additional resources and contribution of expertise and effort for the coordinating function.

- ISC supported Case Studies in emergencies data (earthquake and flooding/cholera).

- Discussions with various partners and CODATA members (Germany, Korea, Australia, Malaysia, AOSP, US…)

- **Keen to discuss with any additional Case Studies or partners for coordination.**

WorldFAIR

Thank you for your attention

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