6.8 FAIR Enabling Resources (FERs)

Choosing an approach to structure the inventory of your data assets

Why should I do this?

To help you investigate a whole range of proven technology options and make informed decisions while implementing FAIR data practices. It will also give you more detailed information, including how to use tools such as comparison tables to aid evaluation.

Here is an introduction to each of the key concepts as you navigate the many resources that are already available, and the many that are yet to come.

What is a FER?

A FAIR Enabling Resource (or FER) is described as 'any digital object that provides a function needed to achieve some aspect of "FAIRness" and is explicitly linked to one or more FAIR Principles'.

What is a FIP?

A FAIR implementation profile consists of making choices selecting FERs.

FAIR Principles

Findable
To use data, it must first be found. Metadata and data should be easy to find for both humans and machines. Machine-readable metadata is essential for automatic discovery of datasets and services.

F1 – Data is assigned a globally unique and persistent identifier.

F2 – Data is described with rich metadata.

F3 – Metadata clearly and explicitly include the identifier of the data they describe.

F4 – Data is registered or indexed in a searchable resource.

Accessible
Once the user finds the required data, they need to know how it can be accessed.

A1 – Data is retrievable by its identifier using a standardized communications protocol.

A1.1 – The protocol is open, free, and universally implementable.

A1.2 – The protocol allows for an authentication and authorization procedure, where necessary.

A2 – Metadata is accessible, even when the data is no longer available.

Interoperable

Data is more valuable when combined with other data. In addition, the data needs to interoperate with applications or workflows for analysis, storage and processing.

I1 – Data uses a formal, accessible, shared, and broadly applicable language for knowledge representation.

I2 – Data uses vocabularies that follow FAIR principles.

I3 – Data includes qualified references to other data.

Reusable

The ultimate goal of FAIR is to optimise the reuse of data. To achieve this, data and metadata should be well described, so that they can be replicated and/or combined in different settings.

R1 – Data is richly described, with a plurality of accurate and relevant attributes.

R1.1 – Data is released with a clear and accessible data usage license.

R1.2 – Data is associated with detailed provenance.

R1.3 – Data meets domain-relevant community standards.

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1) If you are a Program Officer (PO), you may want to share this page directly with your grantee, so they can act on it.

2) If your are a grantee, ensure you have technical team members involved in this process. While the content is accessible to both technical and non-technical members, technical expertise will be required to make decisions for the investment in this step.

Things to consider for your investment:

Refer to the summary of tools

Find a summary of tools—including those generated by Ag-related projects, and discovered via a detailed search of commonly used tools—mapped against the FAIR Principles **here.**

Many of these options were also highlighted in the theme factsheets and workbook content.

Things to consider when selecting FERs

a) Relevance to AgDev

Domain-specific applicability: Ensure the resources align with the unique needs and challenges of agricultural development.

Data types and formats: Verify compatibility with common data types and formats used in AgDev (e.g., geospatial data, sensor readings, agricultural records).

b) User-friendliness

Accessibility: The resources should be easily accessible to individuals with varying technical backgrounds.

Intuitive interfaces: User interfaces should be intuitive and minimize the learning curve.

Clear documentation: Comprehensive documentation and tutorials should be available to guide users.

c) Interoperability

Standards compliance: Adherence to relevant FAIR principles and standards (e.g., FAIR Guiding Principles, W3C Recommendations).

Integration with existing tools: Compatibility with commonly used AgDev tools and platforms.

Data exchange formats: Support for standard data exchange formats (e.g., RDF, JSON-LD).

d) Scalability and Flexibility

Adaptability: The resources should be adaptable to diverse AgDev scenarios and evolving data requirements.

Scalability: The ability to handle increasing data volumes and complexity.

Customization: Flexibility to tailor the resources to specific needs and preferences.

e) Sustainability

Long-term support: Ensure that the resources have a sustainable development and maintenance plan.

Community engagement: Involvement in relevant communities and forums to foster collaboration and knowledge sharing.

Cost-effectiveness: Consider the long-term costs associated with using and maintaining the resources.

If you would like to have a more in-depth review of FERs, refer to the various choices of FERs made by Ag-related projects and evaluate each option for your project with pros and cons using the evaluation spreadsheet.

If you would like to create a FIP for your own project, use the **GO FAIR FIP Questionnaire.**

Ensure any work notes or decisions taken are being documented, as this would be useful to refer to at later stages, or for someone new joining the team.

Those who own the data do not necessarily store it [creating] an awareness among national partners of what data exists and how to store it… helps

them to understand how they will benefit from data sharing.

Berit Nordskog, Researcher at NIBIO, Grantee in Bill & Melinda Gates Foundation investment (2024)

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