



FNS - Cloud

Food Nutrition Security

Food Nutrition Security Cloud Final Project Meeting & FNS Launch Event

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COMET Louise Pl. Stéphanie, Brussels, BE

Tuesday 12th & Wednesday 13th September 2023

Outline

- Briefly introduce FNS in RI/EOSC landscape
- Highlight some key tasks and outputs around FAIR Data principles
 - Show range of use cases/Field Labs including different data and tools organised around FNS Harmony ontology
 - Show Demonstrators with focus on Diet & Microbiome Infrastructure – further discussed during the two days
 - FNS Cloud Education, Training & Support – key outputs from Demos
- Introduce the 2-day agenda

FNS-Cloud: Project Information

Funding: Horizon 2020 – Innovation Action (SFS-26-2019, Food Cloud Demonstrators)

Duration: 48 Months (starting 1st October 2019)

Budget: €10.9m

Beneficiaries: 35



Coordinator (CO): RTDS (AT) – Stephen Webb

Scientific Coordinator (SCO): QIB (UK) – Paul Finglas

Executive Board (EB): WP Leaders (RTDS, PMT, JSI, UCD, QIB, EuroFIR, UWTSD, JdIC)

External Experts Advisory Board (EEAB): variety of relevant experts and stakeholders from different countries and domains

General Assembly (GA): decision-making body consisting of a representative from each partner

FNS-Cloud: Aims & Objectives

VISION

FNS-Cloud will help overcome European research infrastructure fragmentation by integrating and federating existing food nutrition security (FNS) data, tools and services, to provide added value, open access and FAIR data that can reduce knowledge gaps, enable better research and exploitation, inform policy and help deliver sustainable diets to European citizens.



1

Implement and test 'cloud' via Use Cases (WP4) and Demonstrators (WP5) to test existing and new proof-of-principle data and tools across FNS domain

2

Develop, integrate and test innovative FNS Cloud Services

3

Enable harmonisation and standardisation of FNS data (sources and format) and external services for integration and interoperability

4

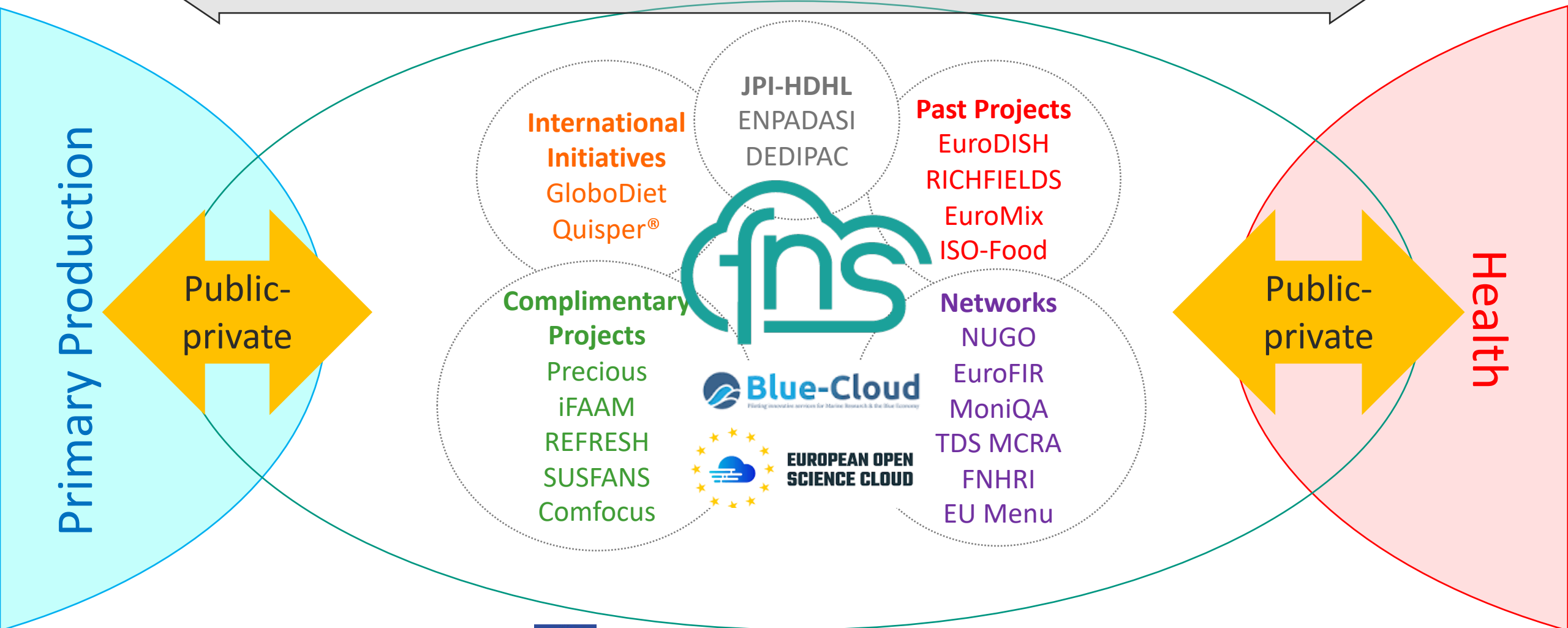
Engage FNS User Communities (especially researchers) to improve co-operation and reduce barriers to innovation and exploitation

5

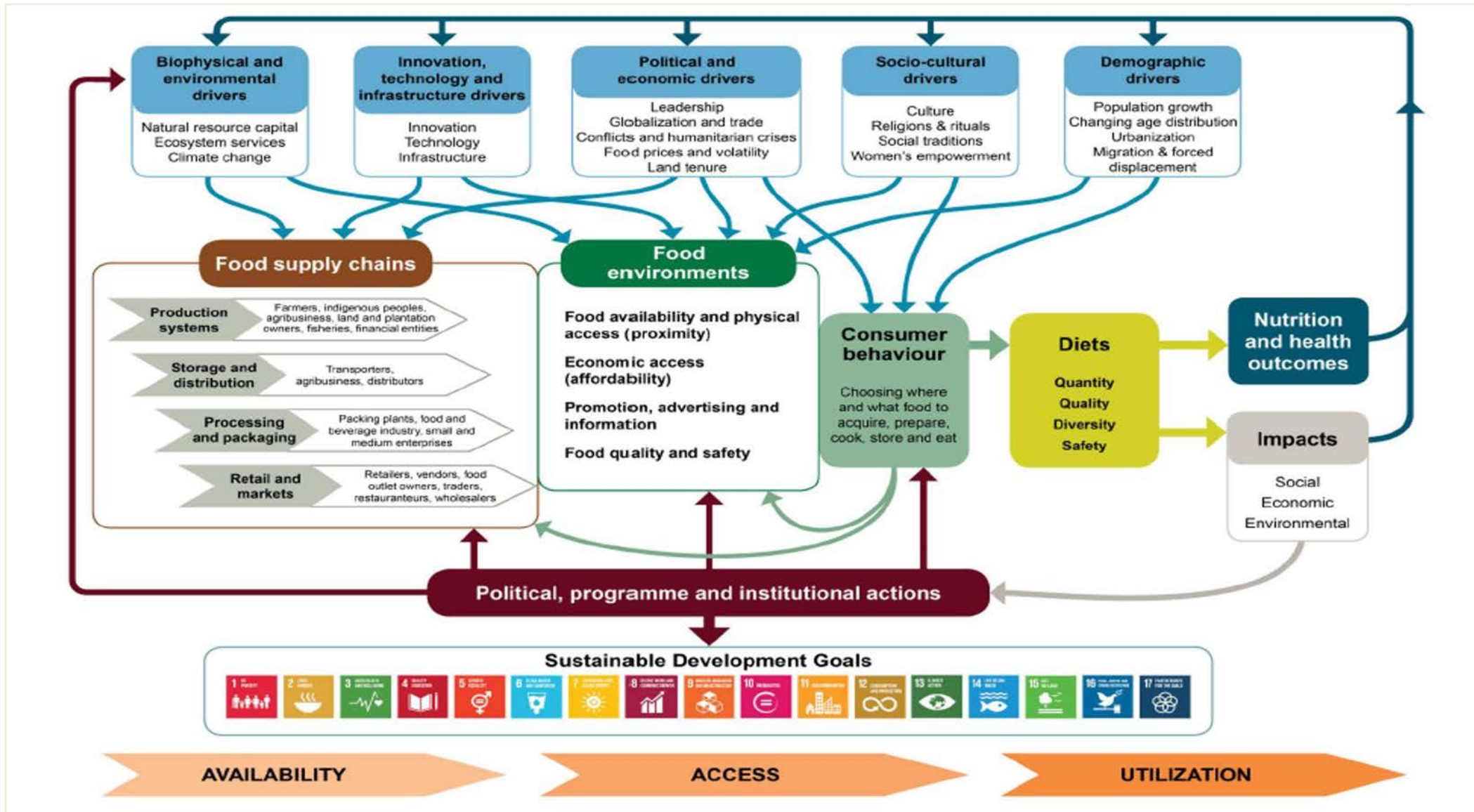
Develop sustainable FNS Cloud governance and business models, as part of the wider EOSC

FNS-Cloud in the Research Landscape

ESFRI: METROFOOD, CESSDA, EATRIS, SHARE, ECRIN, BBMRI, ELIXIR



FNS across the Food Systems.....



FAIR data principles

- A set of guiding principles to make data Findable, Accessible, Interoperable, and Reusable
- First published in 2016 by Wilkinson et al. in Nature's Scientific Data Journal
- Four key areas are further described by 15 principles (below), quantified by 14 different metrics

FINDABLE:

- F1. (meta)data are assigned a globally unique and eternally persistent identifier.
- F2. data are described with rich metadata.
- F3. (meta)data are registered or indexed in a searchable resource.
- F4. metadata specify the data identifier.

ACCESSIBLE:

- A1 (meta)data are retrievable by their 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 are accessible, even when the data are no longer available.

FAIR

INTEROPERABLE:

- I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
- I2. (meta)data use vocabularies that follow FAIR principles.
- I3. (meta)data include qualified references to other (meta)data.

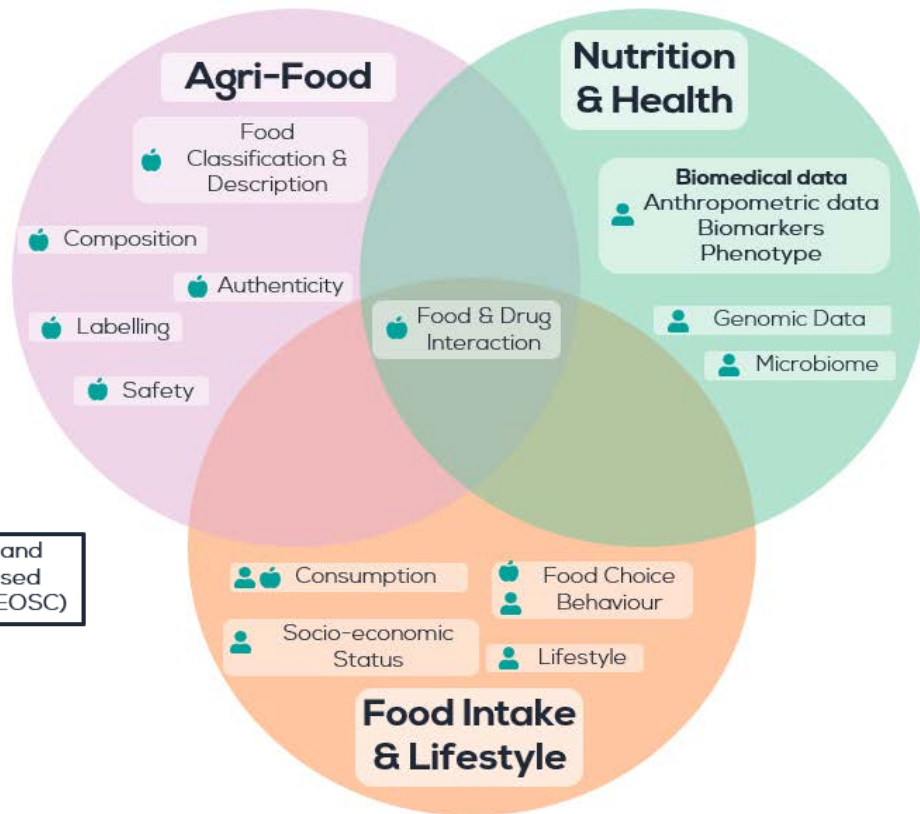
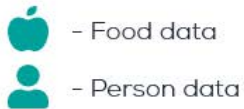
RE-USABLE:

- R1. meta(data) have a plurality of accurate and relevant attributes.
 - R1.1. (meta)data are released with a clear and accessible data usage license.
 - R1.2. (meta)data are associated with their provenance.
 - R1.3. (meta)data meet domain-relevant community standards.

FNS-Cloud Data Map & Catalogue (F&A)

FNS data & tools identified and mapped

- Extensive catalogue of existing datasets
- Repository for new data meeting FNS standards
- Searchable catalogue of data and services
- Integration with other existing RIs and repositories



Data interoperability and quality, will be assessed against FAIR metrics (EOSC)

Integrated tools and services

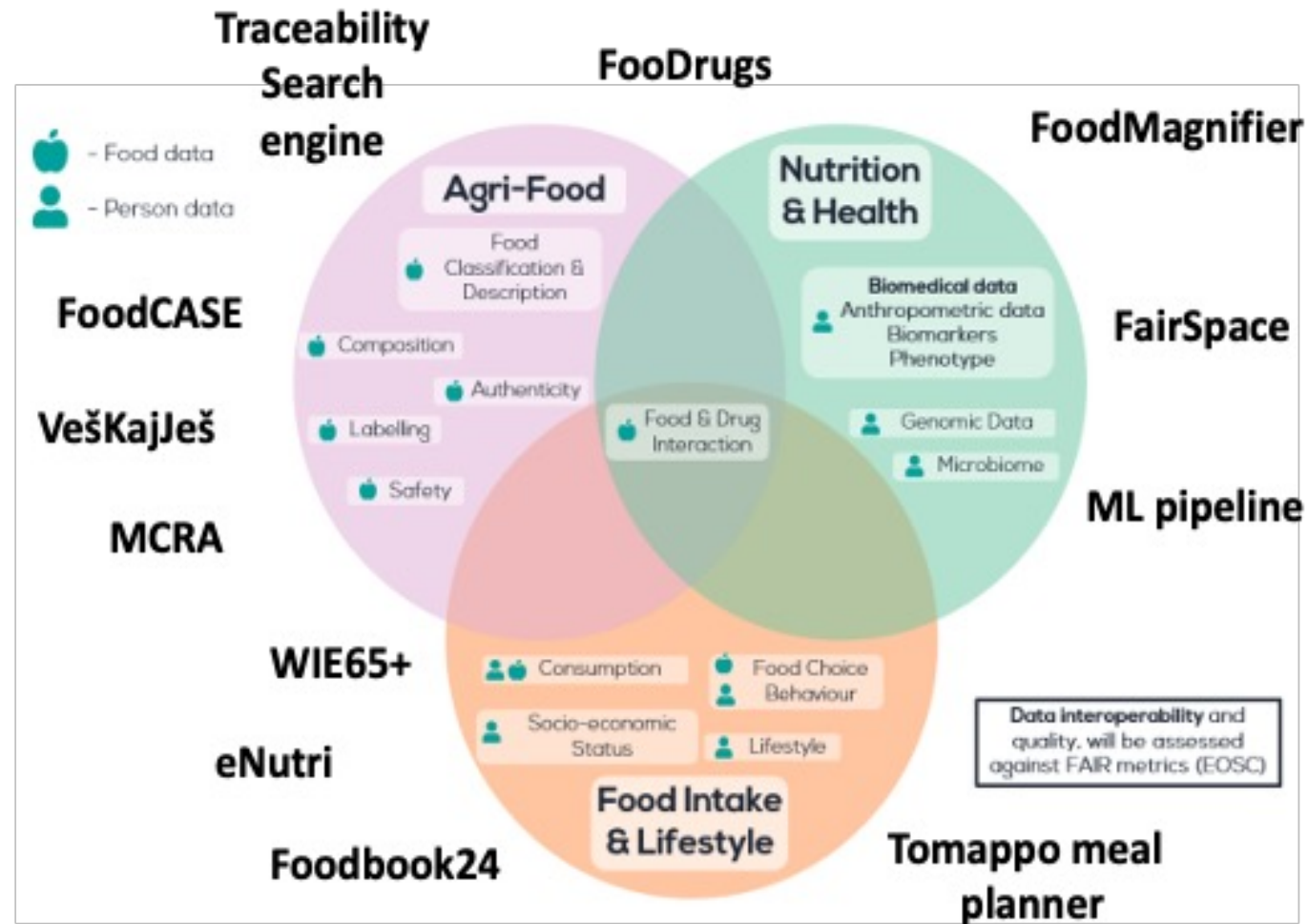
- Guidelines & recommendations for data/services
- APIs for data exchange
- Authentication and authorisation mechanisms

The screenshot displays the FNS-Cloud website interface. The header includes the FNS logo, navigation links (About, Tools & Services, Datasets, News, Community, Contact), and a LOGIN button. The main section is titled 'BROWSE TOOLS & SERVICES' and features a search bar, filters for 'Tools' and 'Services', and a 'SEARCH' button. Below the search results, two tools are listed:

- FoodCASE** (Premotec GmbH): A data management system for food composition, consumption, TDS, and branded food data. It includes a 'Tool Integration in Progress' badge and a 'TRL 9 API' label.
- Libro** (Nutrics): A smartphone app for tracking nutrition, exercise, and sleep. It also has a 'Tool Integration in Progress' badge and a 'TRL 8 API' label.

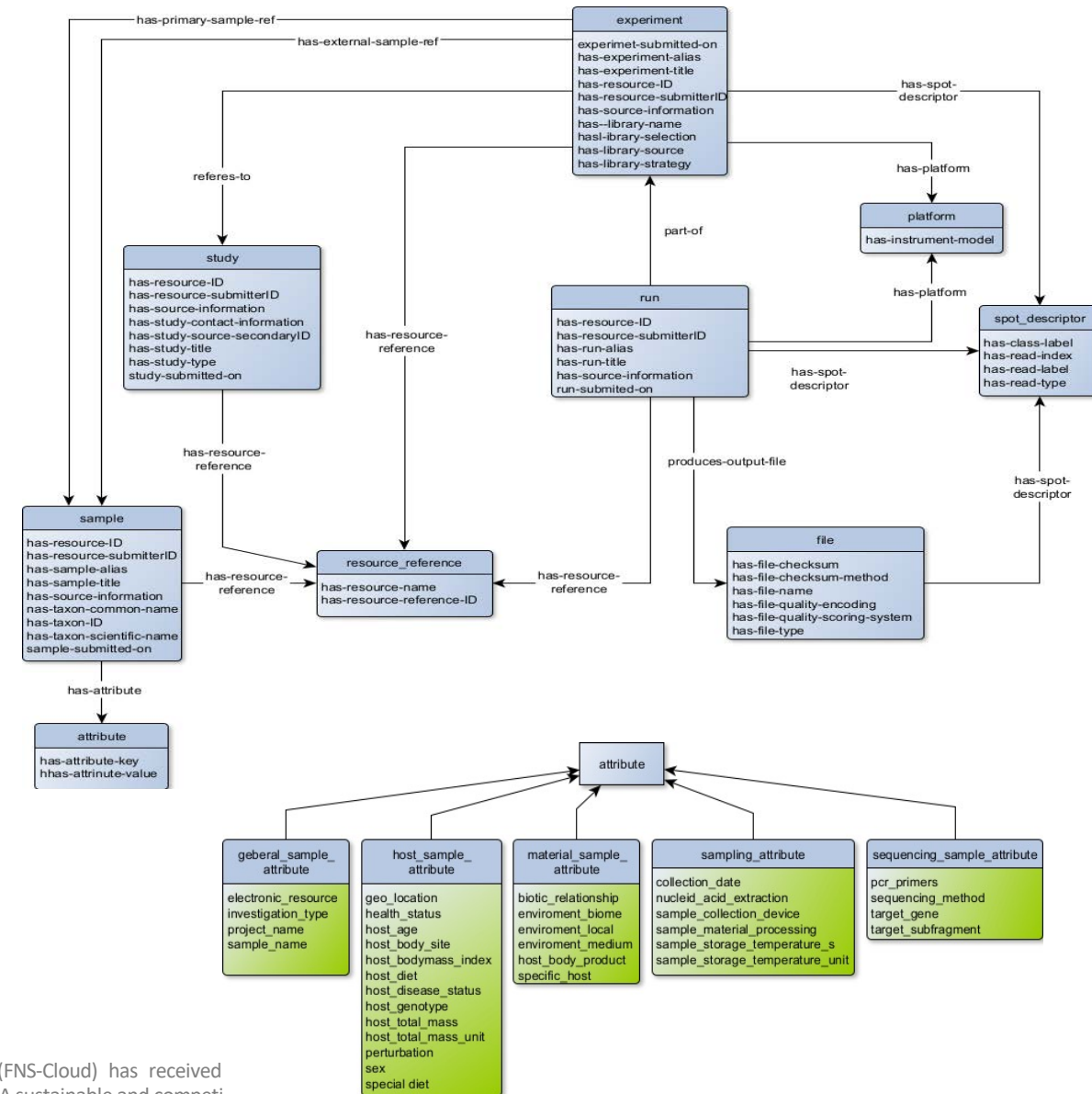
A third tool entry is partially visible at the bottom: 'Tool for Type 2 Diabetes (T2D) and Hypertension (HTN) risk assessment and personalised dietary and lifestyle feedback'.

Independent FNS Cloud solutions with Data Map



FNS Harmony ontology (FNS-H)

- Developed to provide harmonization of data within the project and to support applications and demonstrators
- Reuses and links to other reference ontologies
- Modular ontology – six modules that can be used together or independently depending on use cases
 - Microbiome data, Food components, Bioactives, Dietary interventions module, Branded food and product identifiers
- Availability:
 - Ontology permanent identifier: <https://purl.org/fns-h>
 - GitHub repository: <https://github.com/panovp/FNS-Harmony>
- Most prominent use case: microbiome study metadata enrichment



Use Cases/Field Labs Across Food Nutrition Spectrum (WP4)

Five USE CASES and four FIELDS LABS will focus on:

- Making existing and emerging FNS data FAIR
- Generating proof-of-principle new data where existing data are not available
- Developing and testing FNS-Cloud infrastructure, services and tools

Food traceability & metrology search engine

Use Case 1:

- Data collated across whole food chain
- Search engine development
- Model foods: olive oil, milk, fish



Food labelling data & reformulation tools



Use Case 2:

- New branded data (SI)
- New combined branded datasets (SI, CH, NL, DE)
- Product photographs collected via consumer app

Total diet studies risk assessment

Use Case 3:

- Mapping tool for food matching
- Further development of MCRA web application
- Apps for high-end user & consumers



Food intake consumer behaviour and lifestyle

FIELD LABS 1-3



Existing data:

- Dietary data mapping tool
 - Dealing with multiple coding systems
- Data merging strategy
 - Combining data from different assessment methods
- Data quality & useability assessment

NCDs & Microbiome

FIELD LAB 4

Use Case 4:

- T2D & hypertension risk assessment tool
- Using existing study data
- Diet & lifestyle recommendations

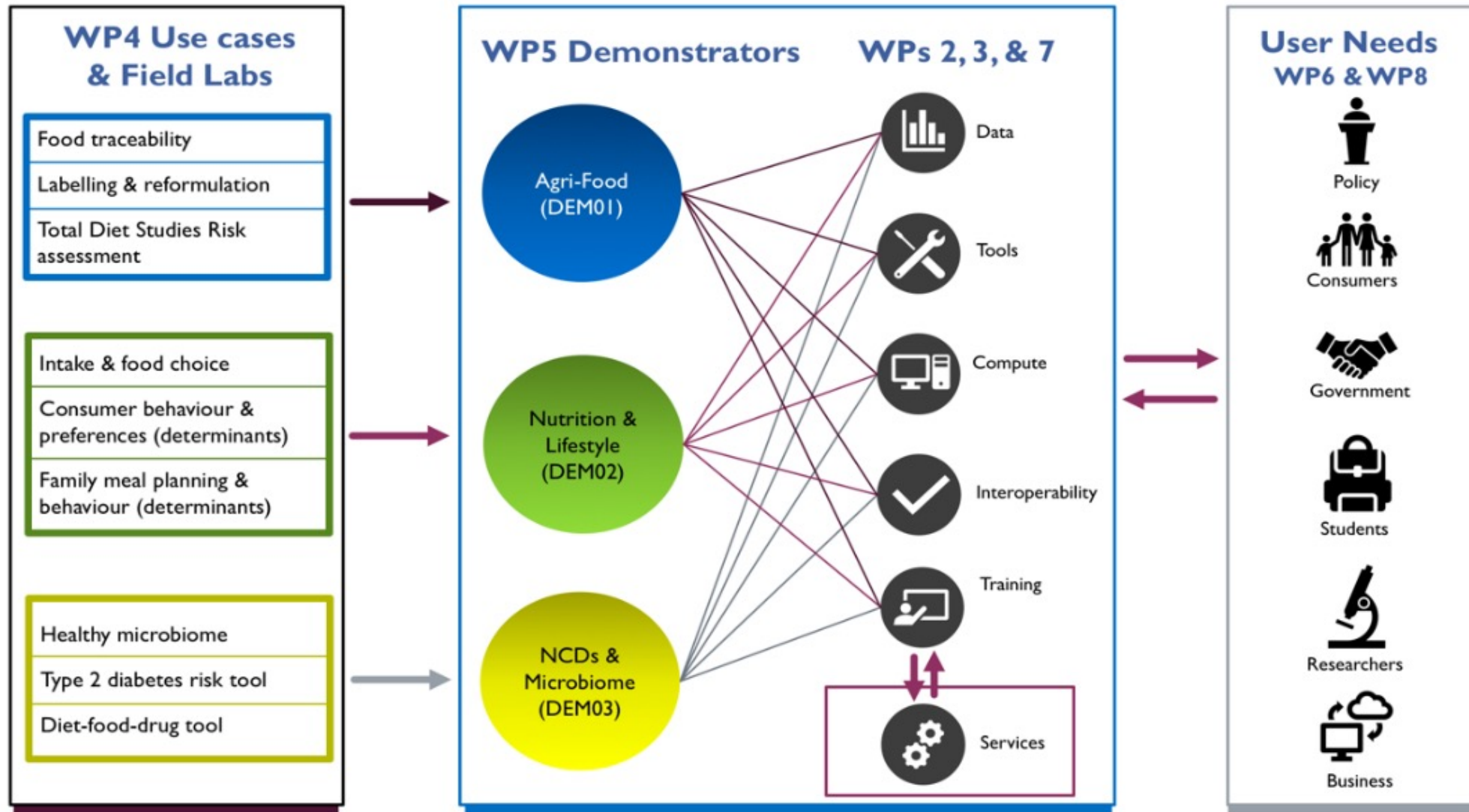


Use Case 5:

- Classification & alert system for food-drug-diet interactions
- Data identification
- Database development with user interface

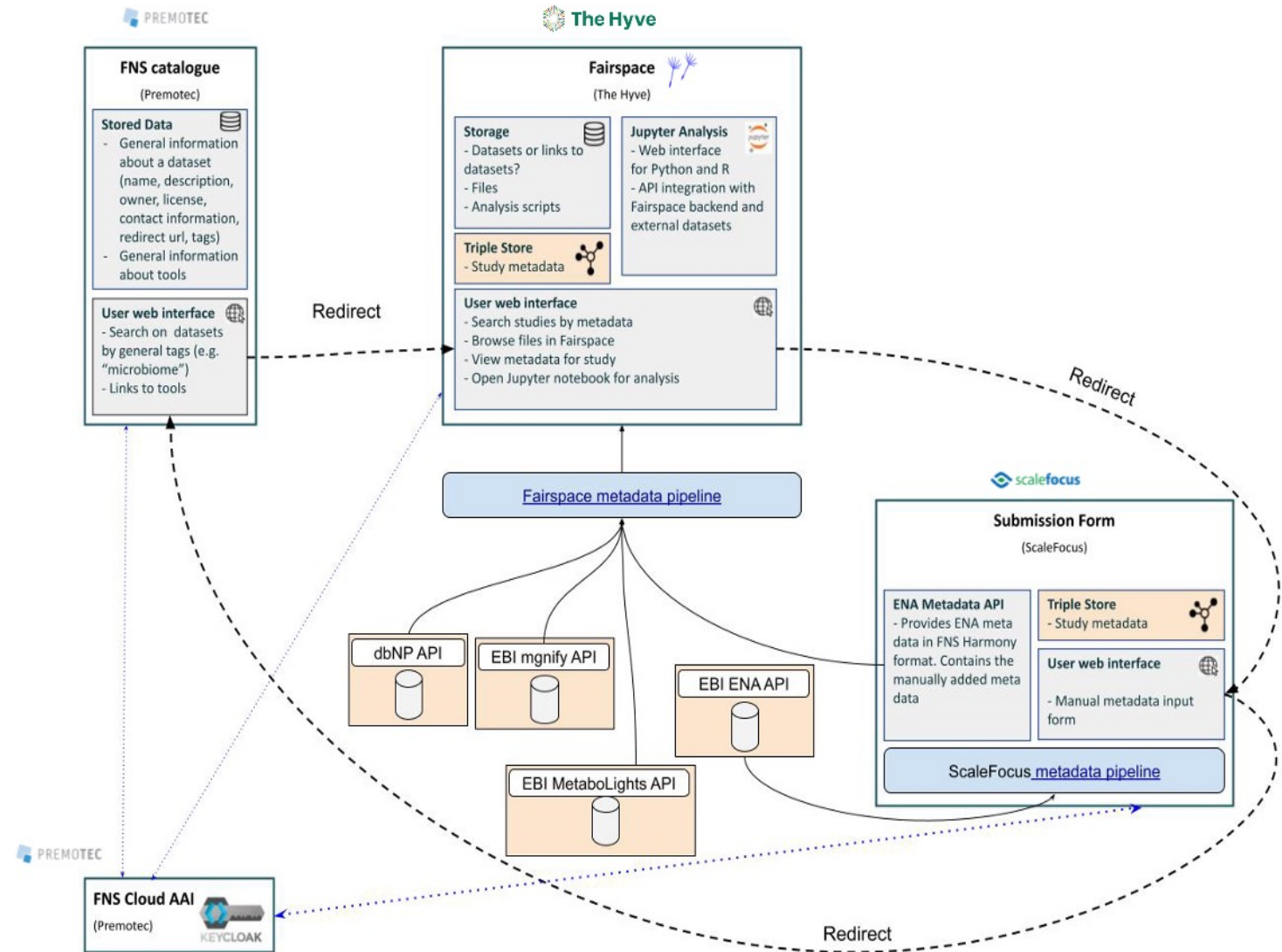


Demonstrators (WP5)

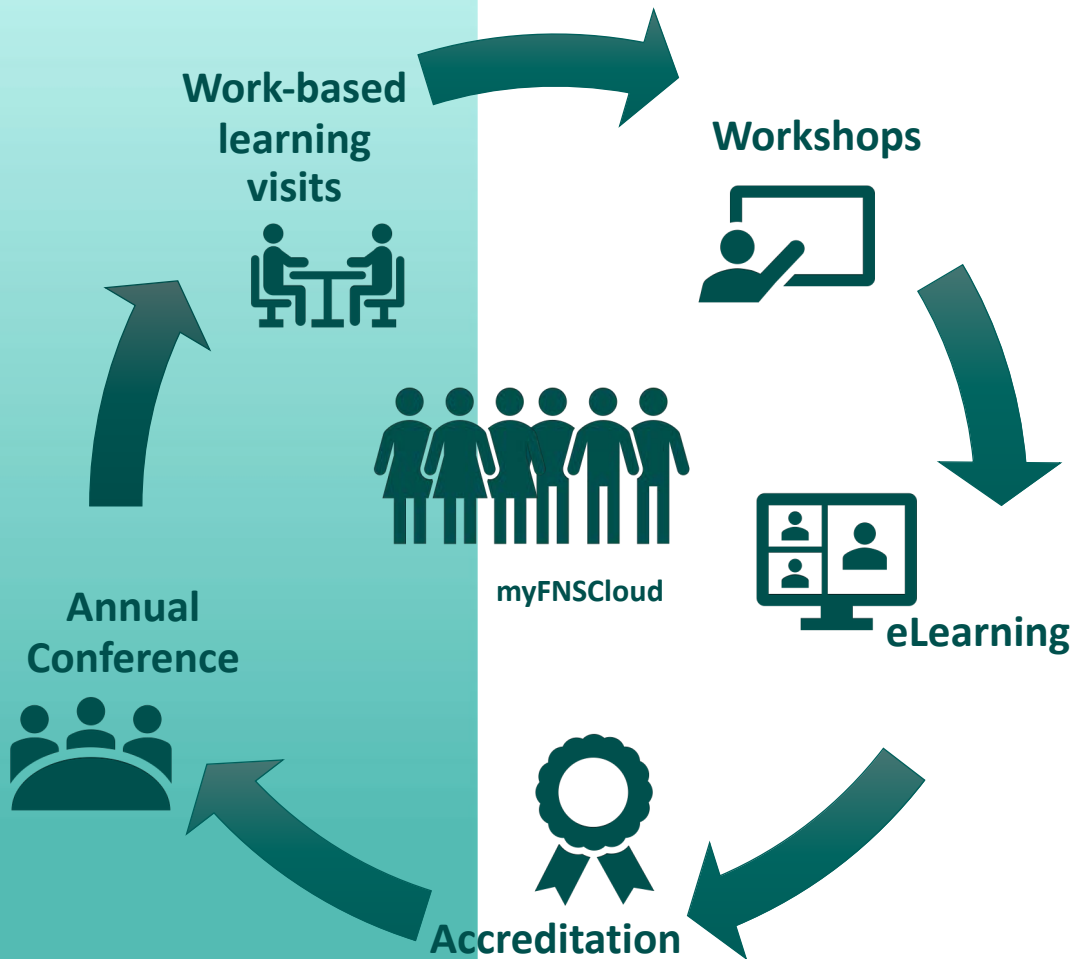


Integrated FNS Cloud solutions – Fairspace & Microbiome Data & tools

- **Distributed system** that ensures seamless integration of any solution
- Some tools and services developed within FNS Cloud, e.g.
 - **Fairspace** designed to provide and link **microbiome metadata with raw data and public data**
- **FNS Cloud AAI:**
 - Centralised authentication component that houses all the FNS-Cloud member accounts
 - Compatible to other research clouds, such as eduGAIN and EOSC, through federation



FNS Cloud Education, Training & Support: Community of Practice



Delivering education, training, and support to enhance skills and build confidence amongst user communities

- **Train-the-trainer programme** at hubs across EU (IFA-ISEKI - AT, ILSI-Europe - BE, EFFoST - NL, and EuroFIR - BE)
- **Community of Practice** (myFNSCloud), bespoke platform hosting resources and networking (EuroFIR - BE, UWTSD - UK)
- **Work-based learning** to enhance professional practice (UWTSD – UK)
- **Annual conference and social media** (EuroFIR - BE, UWTSD - UK, ILSI-Europe - BE, EFFoST - NL)

Key Project Outcomes



List of generated and further improved tools, datasets and other resources



FNS Cloud Catalogues, myFNSSCloud (CoP), FNS Cloud website (MVP)



High degree collaboration within and across beneficiaries (OA scientific publications, tools, data)



Interoperability across data & tools as shown by the Demonstrators



D&C materials for end users: videos, training materials, user manuals, guidelines (MVP)



FNS Harmony Ontology and proposed domain experts (MVP)

Thank you for your attention!

Acknowledgements



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FNS-Cloud Partners



Find out more....

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<https://bit.ly/2PNJRhz>

Follow us on social media

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Contact us directly

Meeting Outline – Day 1

- **Tues am:**
 - Short talks & panels on Blue Cloud, FNS FAIR data/OA research
 - Two plenaries – food chain traceability/total diet studies & risk assessment
- **Tues pm:**
 - DEMOS: Food traceability search engine/FoodMagnifier app
 - DEMOS: Total Diet Studies/MCRA Food labelling data and reformulation
- **Evening:** Networking buffet

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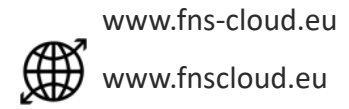
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Meeting Outline – Day 2

- **Wed am:**
 - Short talks & panels on policy and Open Science
 - Plenaries on Nutrition & lifestyle challenges for intake, and Elixir Food and Nutrition Community
- **Wed pm:**
 - **DEMOS: Nutrition & Lifestyle, and Diet & Microbiome**
 - **DEMOS: T2D tool for consumers, and Food-Drug interactions**
 - **FNS Cloud Future Vision and Sustainability Plans**

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