



FNS - Cloud

Food Nutrition Security





Making Food Intake data FAIR – The FNS-Cloud Nutrition & Lifestyle Demonstrator

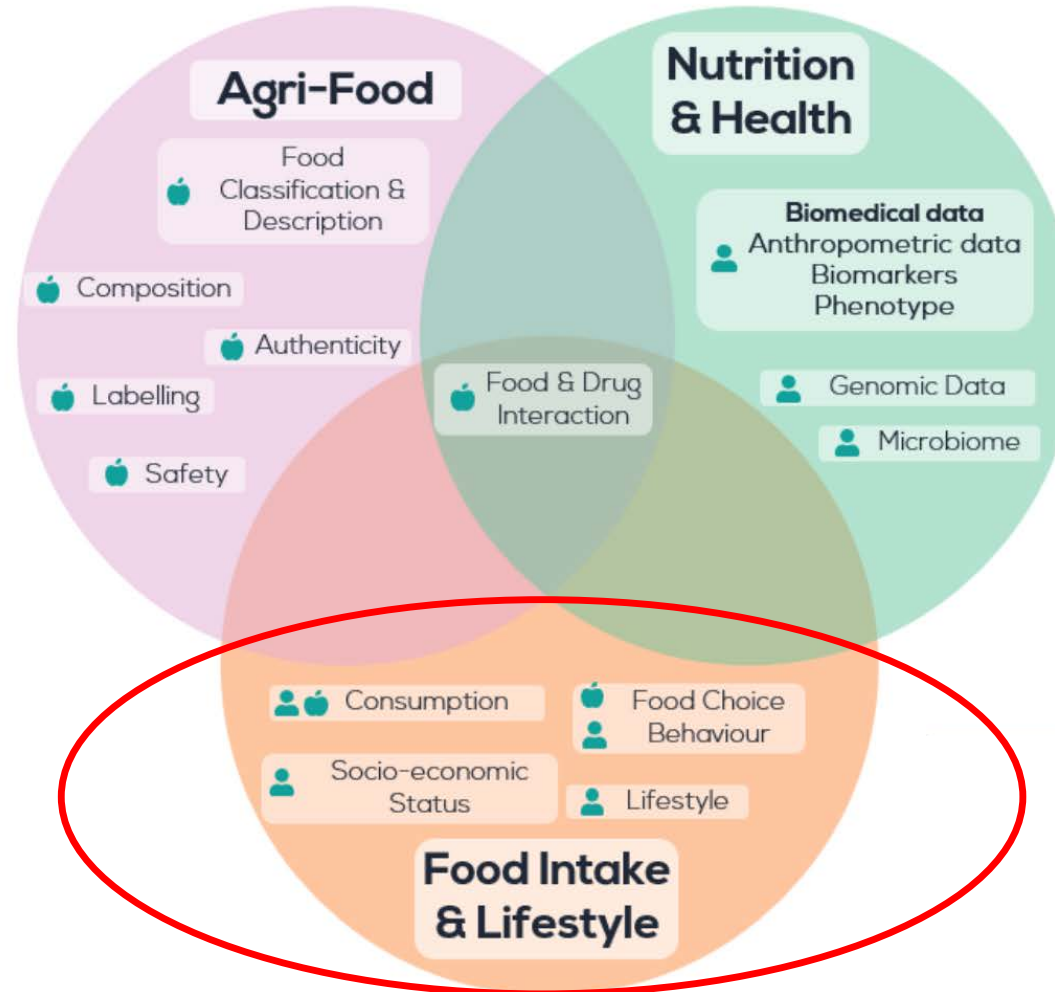
Prof. Eileen Gibney

UCD Institute of Food and Health, UCD Ireland

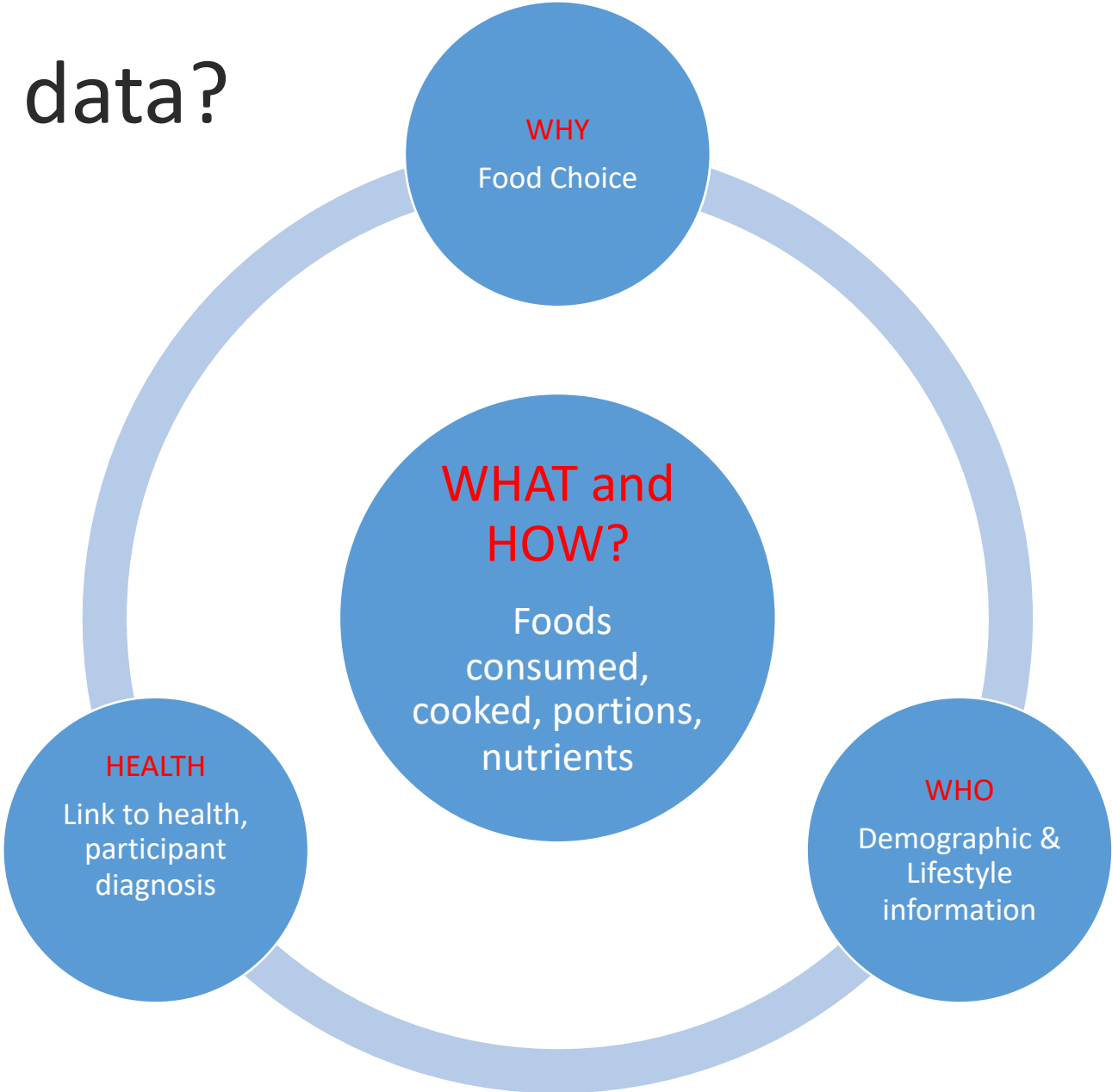
What is Food & Health data?

FNS-Cloud Topics

-  - Food data
-  - Person data



Food intake and lifestyle data?



Why assess dietary intake?

Estimate intake of foods & food groups
(e.g. g/d of fruit)

Estimate daily intake of nutrients
(e.g. protein, vitamin C, calcium)

Identify adherence to population-based dietary recommendations
(e.g. DRVs, 5-a-day for fruit & vegetables)

Identify dietary behaviour
(e.g. skipping breakfast)

Quantify diet quality (“healthiness”)
(e.g. Mediterranean Diet Score)

Provide personalised dietary advice

Methodology

Diet Diaries/ Food record

Prospective

Weighed,
estimated, image

Participant led
(training, checks)

Often 3-7 days

*What was eaten in a
week*

24 h Diet Recalls

Retrospective

Previous 24 hours

Multiple recalls per
person

Interview-based or
participant led

*What was eaten
yesterday*

Food Frequency Questionnaires (FFQ)

Retrospective

Previous month to
year

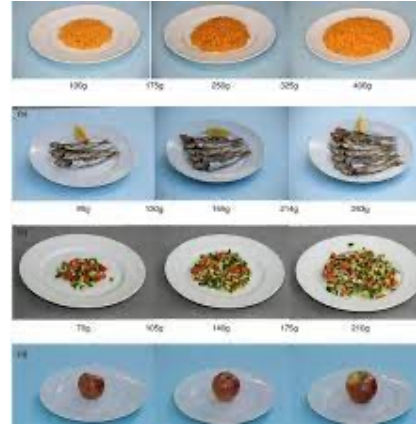
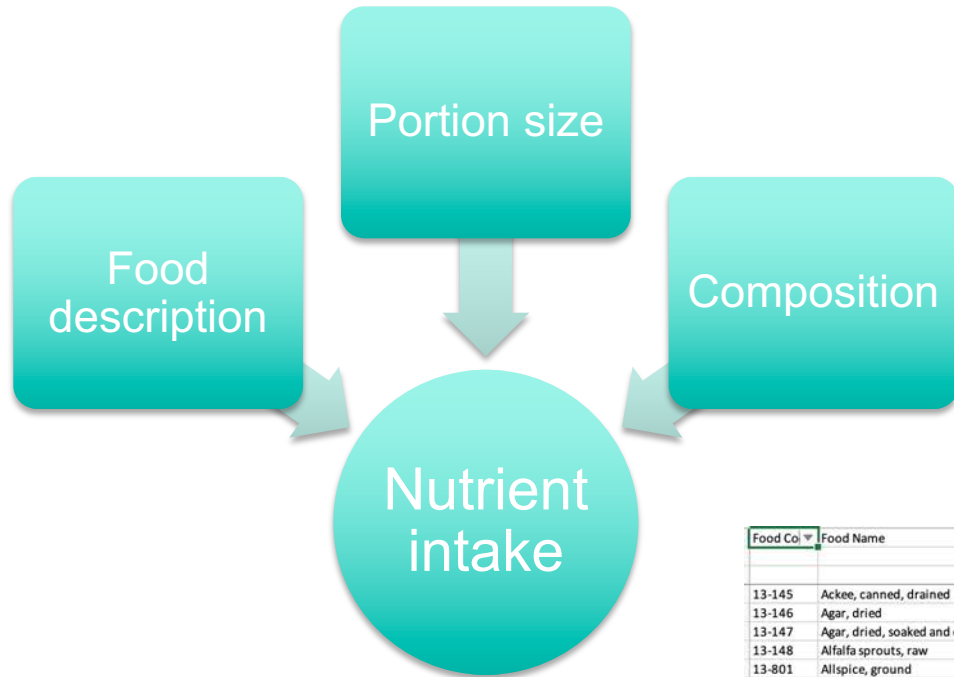
20-200 food & drink
items

Frequency only or
semi-quantitative

*What was eaten last
month / year*

For further information: <https://dapa-toolkit.mrc.ac.uk/>

Foods to nutrients



Food composition data

Published date: 3 March 2021

The food composition database gives information on the amount of vitamins and minerals contained in different foods.

Data are provided for seven countries – Finland, France, Germany, Italy, Netherlands, Sweden, and United Kingdom. **Vitamins and minerals** included are calcium; copper; cobalamin; magnesium; niacin; phosphorus; potassium; riboflavin; thiamin; iron; selenium; vitamin B6; vitamin E; vitamin K; zinc.

These data are used by EFSA experts to establish dietary reference values – the complete set of nutrient recommendations and reference values, such as population reference intakes, the average requirement, adequate intake level and the lower threshold intake.

Food composition data

| Food Col | Food Name | Description | Group | Previous | Main data referenc | Footnot | Water (g) | Total nit | Protein | Fat (g) | Carbohy | Energy (k | Energy (k | Starch (g) | Oligosac | Total su | Gluc |
|----------|---|-----------------------------------|-------|------------|--------------------|-------------------------------------|-----------|--------------|---------|---------|-----------|-----------|-----------|------------|------------|--------------|------|
| | | | | | | | WATER | TOTNIT | PROT | FAT | CHO | KCALS | KJ | STAR | OLIGO | TOTSUG | GLUC |
| | | | | | | | Water | Total nitrog | Protein | Fat | Carbohydr | kcal | kJ | Starch | Oligosacch | Total sugars | Gluc |
| 13-145 | Ackee, canned, drained | 8 cans | DG | | 554 | MW4, 1978; and Vegetables, Her | 76.7 | 0.46 | 2.9 | 15.2 | 0.8 | 151 | 625 | Tr | | 0.8 | 0. |
| 13-146 | Agar, dried | Literature sources | DG | | | Wu Leung et al. (1972) Food com | 9.7 | 0.26 | 1.3 | 1.2 | Tr | 16 | 67 | 0.0 | | Tr | 0. |
| 13-147 | Agar, dried, soaked and drained | Literature sources | DG | | | Wu Leung et al. (1972) Food com | 84.2 | 0.03 | 0.2 | 0.1 | Tr | 2 | 7 | 0.0 | | Tr | 0. |
| 13-148 | Alfalfa sprouts, raw | Analytical and literature sources | DG | | | Vegetables, Herbs and Spices Supp | 93.4 | 0.64 | 4.0 | 0.7 | 0.4 | 24 | 100 | Tr | | 0.3 | 0. |
| 13-801 | Allspice, ground | Literature sources | H | | | Marsh et al. (1977) Composition c | 8.5 | 0.98 | 6.1 | 8.7 | N | N | N | N | | N | N |
| 14-870 | Almonds, flaked and ground | 10 samples | GA | 14-801 14- | 4 | Reviewed 2013. LGC, Snacks and r | 4.2 | 4.07 | 21.1 | 55.8 | 6.9 | 612 | 2534 | 2.7 | | 4.2 | T |
| 14-897 | Almonds, toasted | Literature sources | GA | 14-803 | | USDA SR28, 2015 | 2.4 | 4.05 | 21.0 | 52.5 | 5.9 | 579 | 2394 | 0.8 | | 5.1 | T |
| 14-898 | Almonds, weighed with shells | Calculated from 14-896 | GA | 14-883 | | USDA SR28, 2015 | 1.6 | 1.51 | 7.8 | 18.5 | 1.9 | 205 | 847 | 0.3 | | 1.6 | 0. |
| 14-896 | Almonds, whole kernels | Literature sources, Prunus dulcis | GA | | | USDA SR28, 2015 | 4.4 | 4.09 | 21.2 | 49.9 | 5.3 | 554 | 2292 | 0.8 | | 4.5 | 0. |
| 13-150 | Amaranth leaves, boiled in unsalted water | Calculation from raw | DG | | | Wu Leung et al. (1972) Food com | 90.4 | 0.48 | 3.0 | 0.3 | 0.3 | 16 | 67 | 0.1 | | 0.2 | T |
| 13-149 | Amaranth leaves, raw | Literature sources | DG | | | Wu Leung et al. (1972) Food com | 88.9 | 0.56 | 3.5 | 0.3 | 0.3 | 18 | 75 | 0.1 | | 0.2 | T |
| 14-001 | Amla | Literature sources | FA | | | Gopalan et al. (1980) Nutritive val | 81.8 | 0.08 | 0.5 | 0.1 | 13.7 | 58 | 243 | N | | N | N |
| 16-448 | Anchovies, canned in oil, drained | 10 samples, 4 brands | JC | 16-323 | | Data from Fish and Fish Products | 46.4 | 4.03 | 25.2 | 10.0 | 0.0 | 191 | 798 | 0.0 | | 0.0 | 0. |
| 13-807 | Anise seeds | Literature sources | H | | | Marsh et al. (1977) Composition c | 9.5 | 7.87 | 17.6 | 15.9 | N | N | N | N | | N | N |

Composition of foods integrated dataset (CoFID)

Challenges

Methodology

- Level of detail, type of data
- Timeline
- Single, multiple timepoints

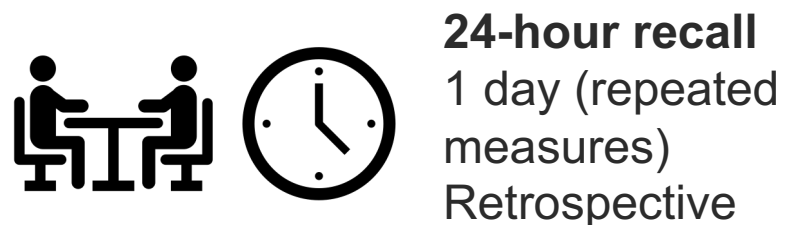
Data Handling

- Data full of errors (under-reporting)
- Mapping & Merging
- Anonymisation

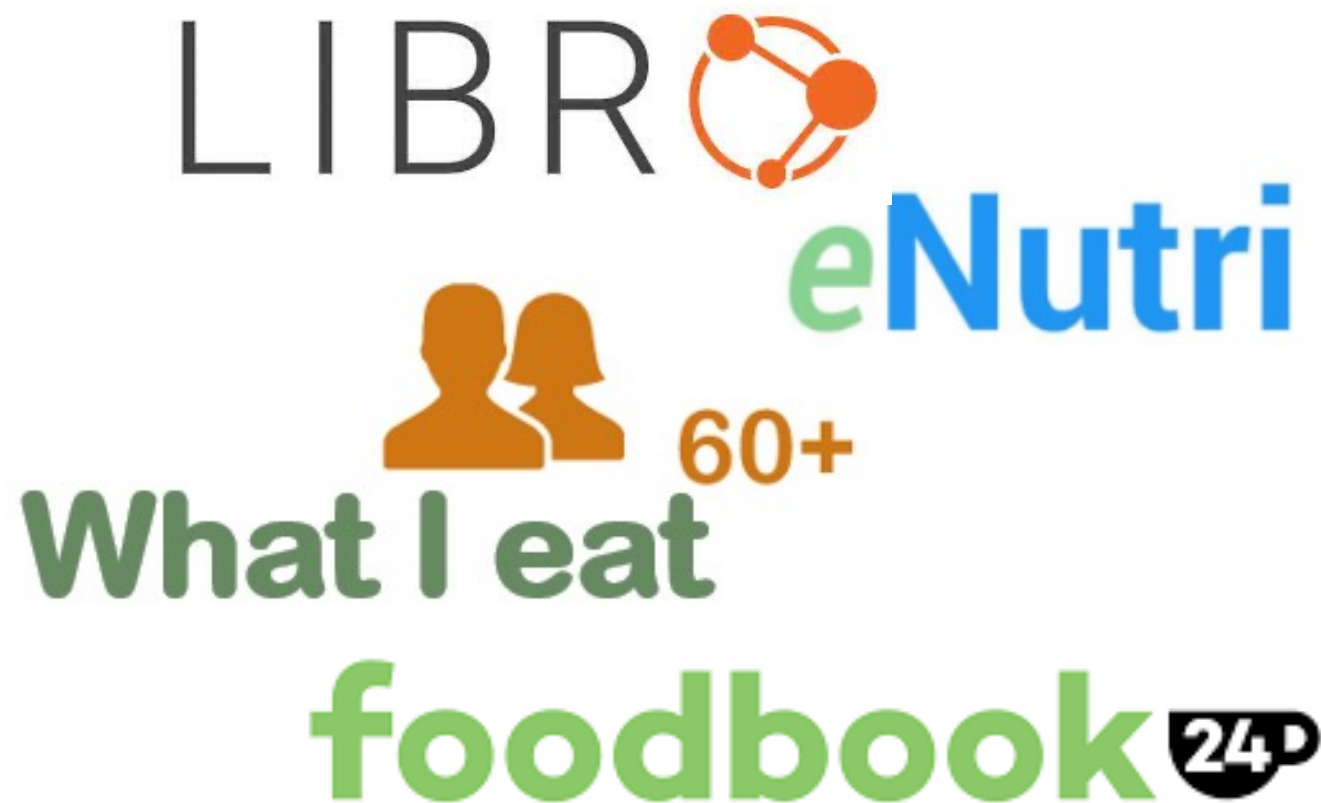
Output

- Anonymisation (consent)
- Aggregation
- Analysis

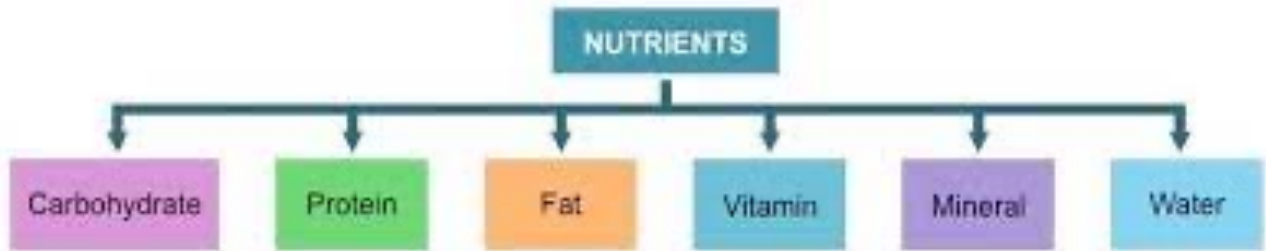
Traditional methods



Novel methods

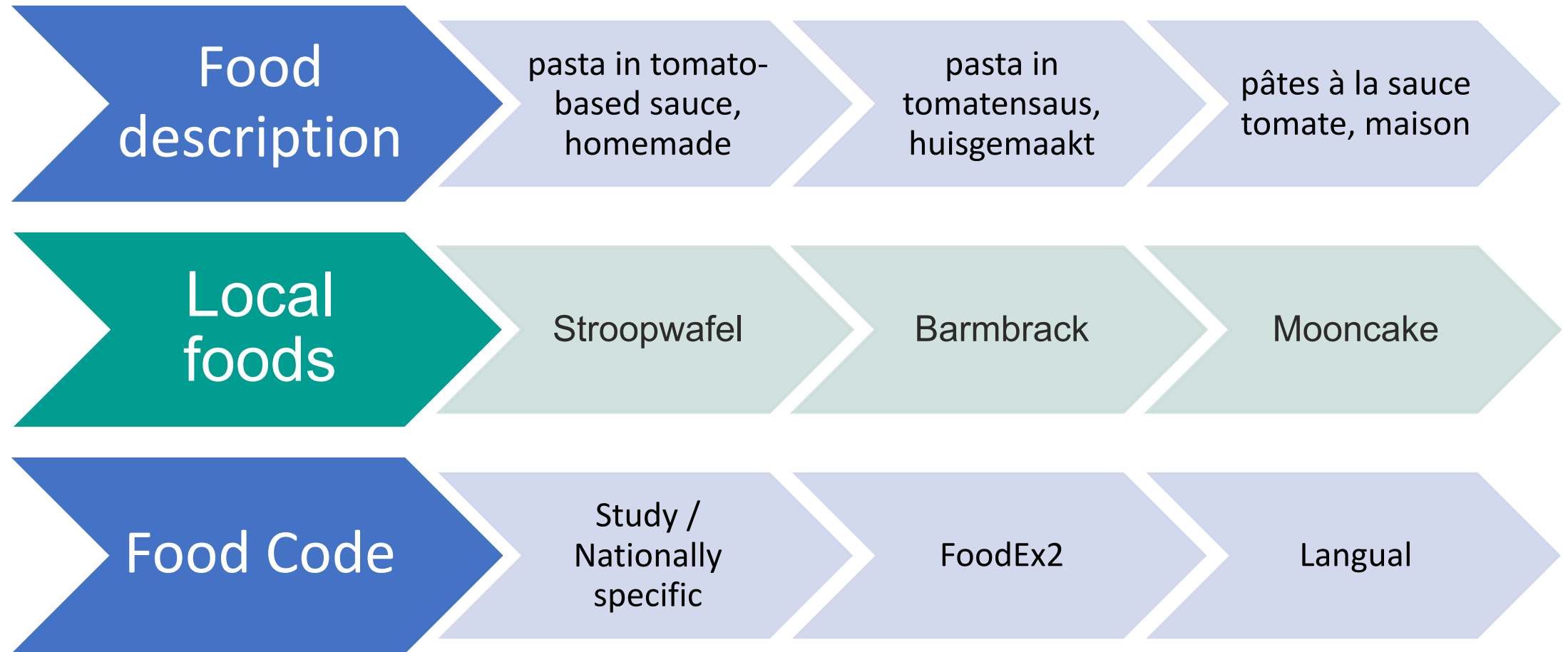


Dietary intake data – different sources but the same output



g / day

Challenges – descriptions & coding



Despite these challenges we still need intake data...

Estimate intake of foods & food groups
(e.g. g/d of fruit)

Estimate daily intake of nutrients
(e.g. protein, vitamin C, calcium)

Identify adherence to population-based dietary recommendations
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(e.g. skipping breakfast)

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(e.g. Mediterranean Diet Score)

Provide personalised dietary advice

Many datasets exist... need tools, support to use



Food consumption data



EPIC study

FAO/WHO GIFT | Global Individual Food consumption data Tool

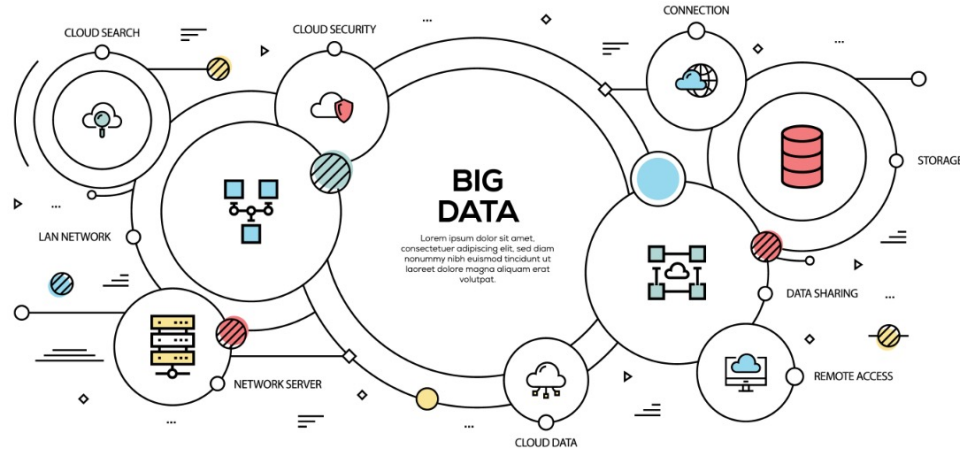


Predimed
Prevención con Dieta Mediterránea



Food Nutrition Security Cloud (FNS-Cloud) has re
EU.3.2.2.3. – A sustainable and competitive agri-food industry) under Grant Agreement No. 863059 – www.fns-cloud.eu

To support the use of data develop solutions



FNSCloud 'Nutrition Researcher' Journey



Assess factors which influence dietary patterns & adherence to sustainable healthy eating guidelines

0

Use existing data or find data to answer the research question

1

FIND DATASETS – Use FNS catalogue to find relevant datasets for the specific research question – Catalogue search

2

IDENTIFY potential datasets containing parameters of interest

3

Determine if selected datasets are suitable for use in the specific research question
- Quality Framework

4

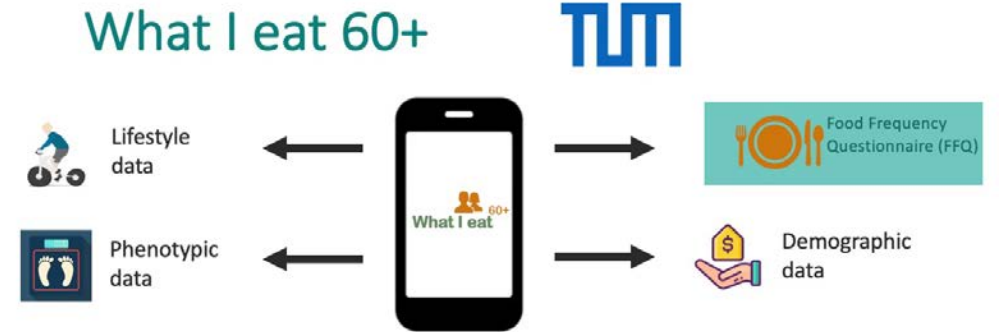
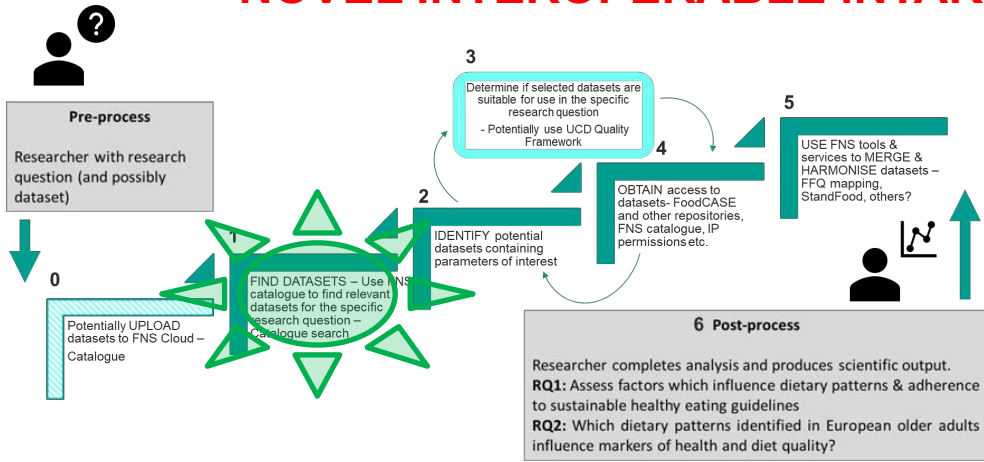
OBTAIN access to datasets- FoodCASE and other **data repositories**, FNS catalogue, IP permissions etc.

5

USE FNS tools & services to **MERGE & HARMONISE** datasets – FFQ mapping, StandFood, others?



NOVEL INTEROPERABLE INTAKE ASSESSMENT TOOLS & DATASETS



foodbook 24h

Super user

- Oversight of multiple studies
- Create surveys
- Assign researcher users
- Modify questionnaires
- Add/manage participants
- Download data from studies

Researcher user

- Create surveys
- Create and modify questionnaires
- Add and manage participants
- Download data from studies assigned to them

Participant user

- Sign up and take part in multiple surveys

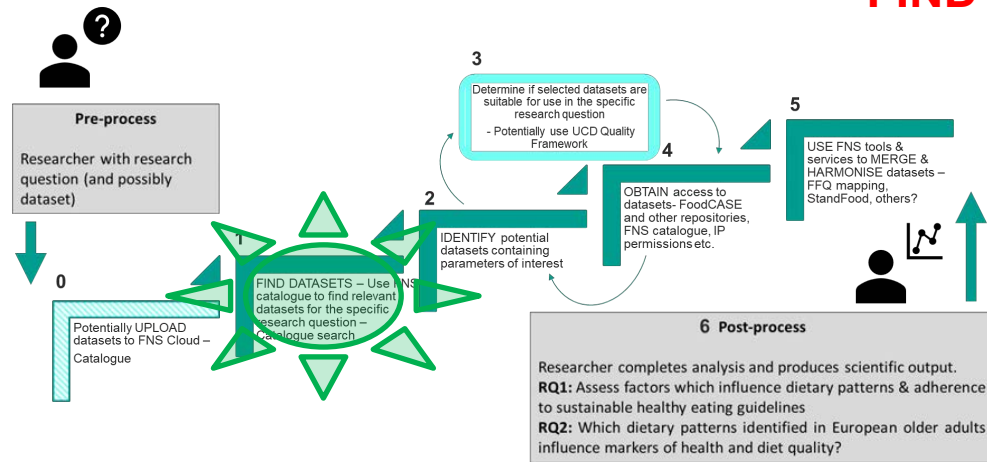
from the European Union's Horizon 2020 Research and Innovation

Video tutorial

eNutri

Mid-FFQ tutorial screens

FIND DATASETS



BROWSE TOOLS

This tool, which is an integral part of FNS-Cloud, allows to browse the collected Tools based on the searched phrase, or by selected available Food Areas (from among the Agri-Food, Biological Activity, Food & Drug interaction, Food Intake & Lifestyle or Nutrition and Health domain) or filter them by selecting the desirable target audience. Each set provides general information about the Tool, contact data, technical details, and other info.

Food Topic Areas

Target Audiences

SEARCH

CLEAR

BROWSE SERVICES

This tool, which is an integral part of FNS-Cloud, allows to browse the collected Services based on the searched phrase, or by selected available Food Areas (from among the Agri-Food, Biological Activity, Food & Drug interaction, Food Intake & Lifestyle or Nutrition and Health domain) or filter them by selecting the desirable target audience. Each set provides general information about the Service, contact data, technical details, and other info.

FNS-Cloud Topics

Target Audiences

SEARCH

CLEAR

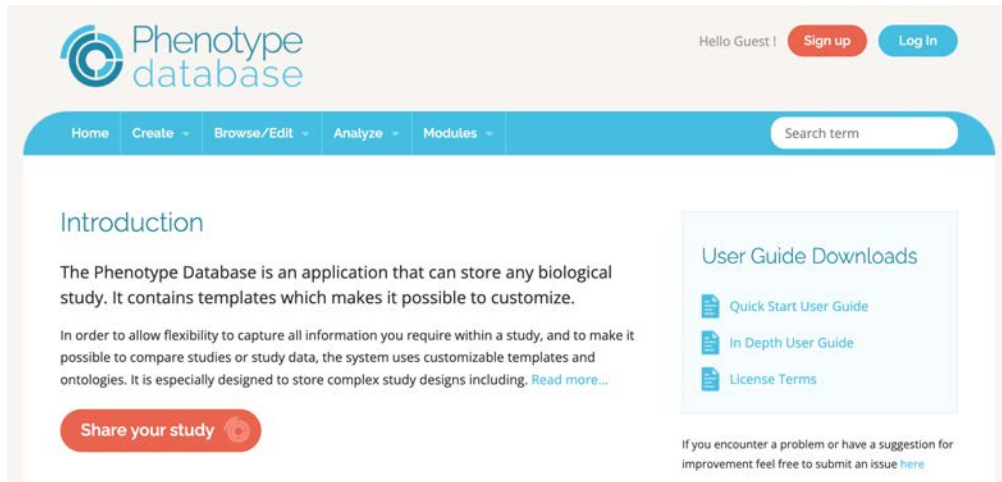
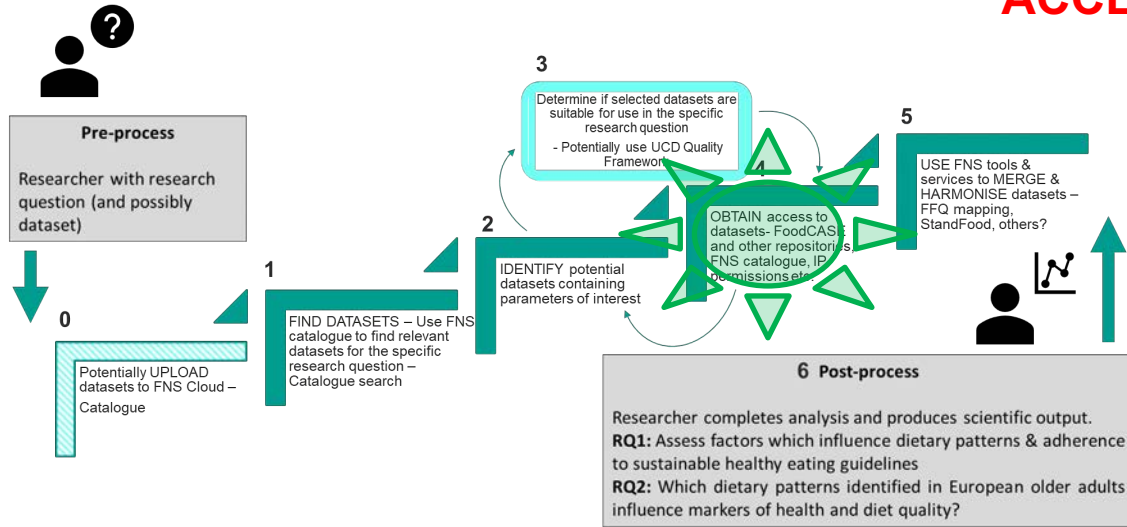
Standard Search
Table Search
Advanced Search

| | |
|---|--|
| <p>Title:</p> <input style="width: 95%; margin-bottom: 10px;" type="text" value="Title"/> <p>FNS-Cloud:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> FNS-Cloud Topics ▼ </div> <p>Country:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Country ▼ </div> <p>Start year:</p> <p><i>Data collection started this year or later</i></p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Start Year ▼ </div> <p>Access Mode:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Access Mode ▼ </div> <p>Format:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Formats ▼ </div> <p>Joint-profit:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Undefined ▼ </div> | <p>Description:</p> <input style="width: 95%; margin-bottom: 10px;" type="text" value="Description"/> <p>Region:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Region ▼ </div> <p>Language:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Language ▼ </div> <p>End Year:</p> <p><i>Data collection finished this year or earlier</i></p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> End Year ▼ </div> <p>Target Audience:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Target Audiences ▼ </div> <p>Non-profit:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Undefined ▼ </div> <p>Commercial:</p> <div style="border: 1px solid #ccc; padding: 2px; border-radius: 4px; display: flex; justify-content: space-between; align-items: center;"> Undefined ▼ </div> |
|---|--|

SEARCH

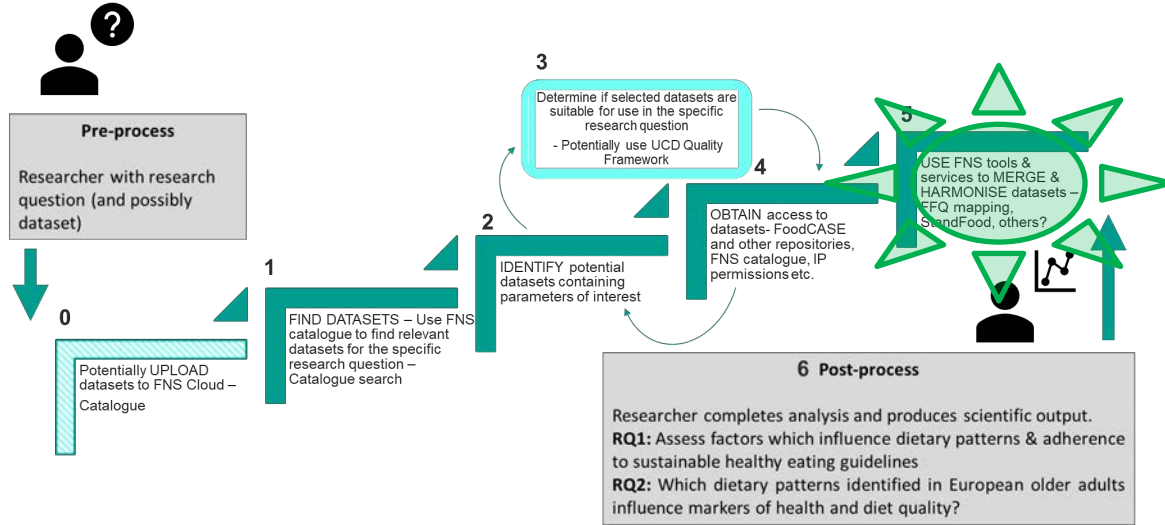
CLEAR

ACCESS DATASETS



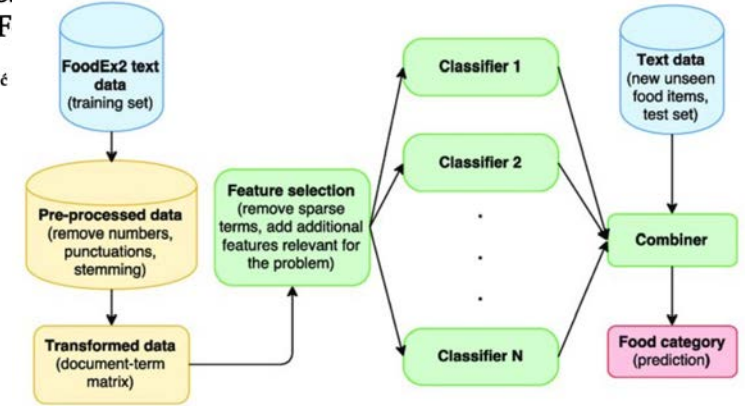
RESEARCH REPOSITORY UCD

MAP and MERGE DATASETS



StandFood: Standardization of Food Semi-Automatic System for Classifying Describing Foods According to Food Frequency Questionnaires

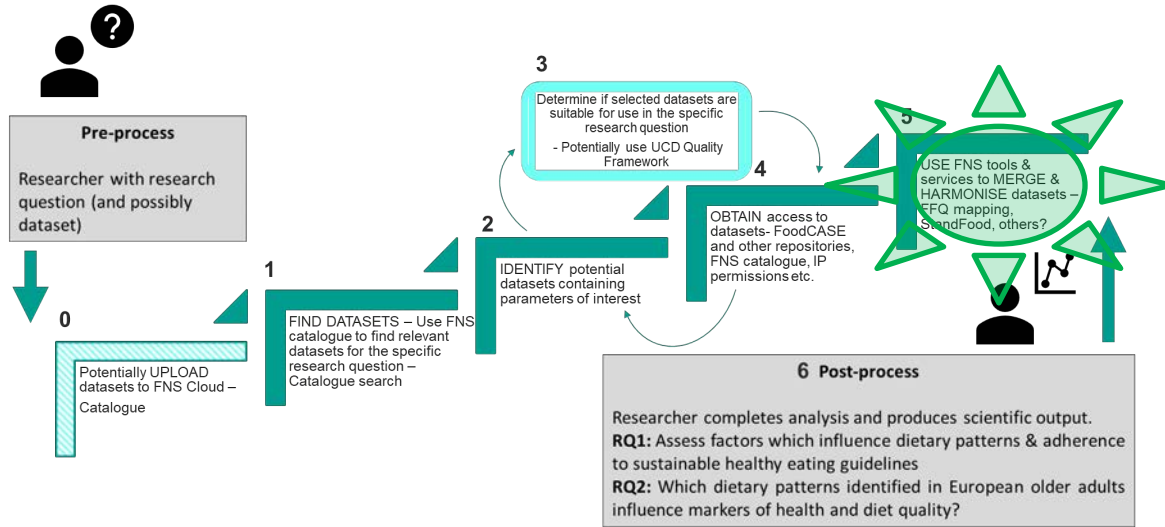
Tome Eftimov^{1,2,*}, Peter Korošec^{1,3} and Barbara Koroušič



| eNutri FFQ 65+ | What I eat 60+ | Food4me |
|---|-----------------------------|---|
| <i>Fruit</i> | <i>Fruit</i> | <i>Fruit</i> |
| Apples & pears | Apples, pears | Apples Pears |
| Citrus fruits | Citrus fruits | Oranges, satsumas, mandarins Grapefruit Bananas |
| Bananas | Bananas | Grapes |
| Grapes | Grapes | Mango, melon |
| Tropical fruits (melon, mango, kiwi, pineapple) | Tropical fruits | Kiwis |
| Stone fruit | Stone fruits | Peaches/plums/apricots/nectarines |
| Berries & cherries | Berries | Strawberries, raspberries, cherries |
| Fruits canned in syrup/stewed with sugar | Canned fruit & stewed fruit | Tinned, stewed fruit peaches |
| Fruits canned in juice/stewed without sugar | | |
| Dried fruit | Dried fruits | Dried fruit eg raisins, prunes |

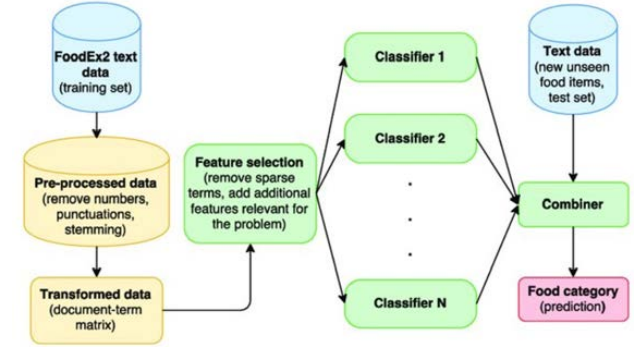


MAP and MERGE DATASETS



Article
StandFood: Standardization of Foods Using a Semi-Automatic System for Classifying and Describing Foods According to FoodEx2

Tome Eftimov ^{1,2,*}, Peter Korošec ^{1,3} and Barbara Korošić Seljak ¹



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FNSCloud 'Nutrition Researcher' Journey



Assess factors which influence dietary patterns & adherence to sustainable healthy eating guidelines

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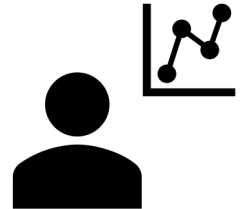
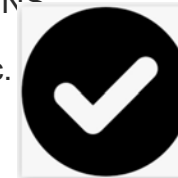
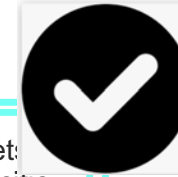
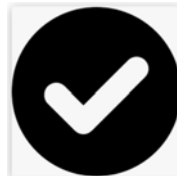
Determine if selected dataset suitable for use in the specific research question
- **Quality Framework**

4

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USE FNS tools & services to **MERGE & HARMONISE** datasets – FFQ mapping, StandFood, others?



search results

EuroFIR Food composition datasets (via FoodExplorer)
 EuroFIR AGISL
 37 harmonised national food composition datasets from across Europe, Africa plus CA, USA, NZ, Japan
 FoodExplorer tool
 Created: 14.09.2021

Bioactive data (eBASIS/ePlantLIBRA)
 OIL EuroFIR AGISL
 31 Quality evaluated data sourced from peer reviewed publications on the composition of food bioact
 benefits, and adverse effects (separators only) 2) Potential...
 Created: 14.09.2021

Food Waste Data on side streams (FoodWasteExplorer)
 OIL EuroFIR AGISL
 27,069 data points representing 587 nutrients, 638 bioactives, 49 toxicants and other data-related c
 ontents) linked to 1264 side streams (e.g. almond shells)...
 Created: 14.09.2021

SCARES - Seafood Study
 VSD

Existing datasets



FNS - Cloud
 Food Nutrition Security

Home > Catalogues

Catalogues

Browse FNS Cloud Catalogues, containing information about datasets related to the topics of food, nutrition and security, e-tools like apps and software to manage and analyse data and services, that are provided by FNS Cloud or our verified partners.



Datasets

Search for datasets with data related to FNS topics. Gain access to the open data or contact data owners for access.



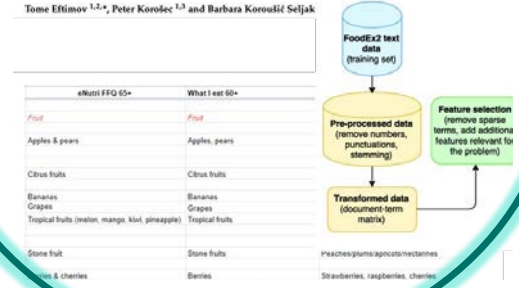
Tools

Explore available apps, software and algorithms to analyse, manage and visualise your data.



StandFood: Standardization of Foods Using a Semi-Automatic System for Classifying and Describing Foods According to Food

Tome Ettimov^{1,2*}, Peter Korövec^{1,2} and Barbara Koroušić Seljak



Data harmonization tools

LIBR

eNutri

What I eat 60+

foodbook 24P

Tools for collecting intake data

FoodMagnifier

FNS Tutorial

HEALTHY

Type 2 Diabetes Mellitus risk assessment personalized tools

About Contact

Feedback

Consumer apps



FNS - Cloud

Food Nutrition Security



CAPNUTRA

- Mirjana Gurinovic
- Jelena Milesevic
- Milica Zekovic
- Agi Kadvan
- Marija Glibetic

University of Reading

- Julie A Lovegrove
- Eve Kelly
- Michelle Weech

Technical University of Munich

- Kurt Gedrich
- Julia Blaurock

Thank you

Eileen Gibney

eileen.gibney@ucd.ie

University College Dublin

- Laura Bardon
- Grace Bennet
- Shuhua Yang
- Mark Lambe

All others from FNS-Cloud team



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