Food | Consumer | Health

Designing a world-class infrastructure to facilitate research

Presenter: Monique Raats

Date: 17/11/2017

Occasion: Digitising agriculture and food value chains. Research and innovation delivering on EU policy objectives, Brussels

Research Infrastructure on Consumer Health and Food Intake using E-science with Linked Data Sharing

Monique Raats, University of Surrey
m.raats@surrey.ac.uk

www.richfields.eu

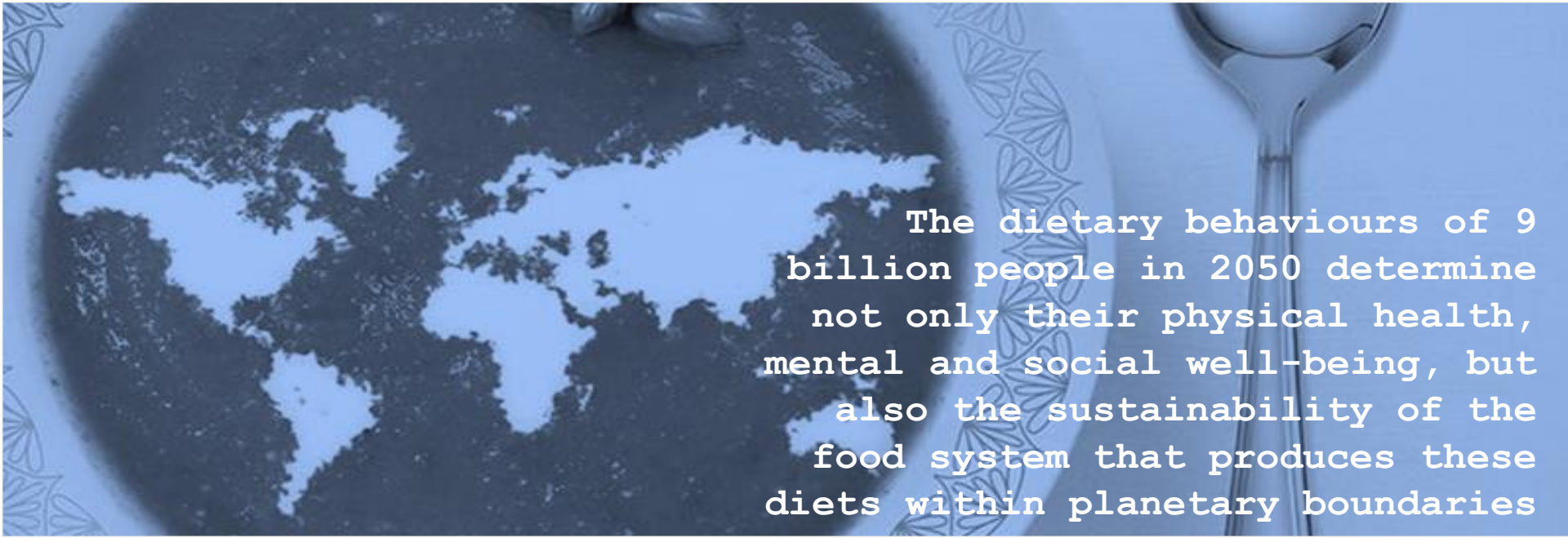
#RICHFIELDS

Coordinated by:
Wageningen Economic Research

WAGENINGEN UNIVERSITY & RESEARCH

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

The challenge



The future of our planet is on our plates

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

Societal trends

Digitalisation

- Data platforms, linked open data, standards
- Apps, sensors, wearables

Personalisation

- Individual feedback structures
- Quantified self

Globalisation

- Global markets and global SDGs
- Internet

Integration

- Fragmentation in sectoral policies and practices to be overcome

Citizen science

- Citizens become engaged in research

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

Connecting food, nutrition and health

The consumer as link between the Agrifood and Health sectors

EuroDISH

Societal challenges
Food security
Food safety
Sustainability
Climate change

Food Policy Environment
Social Environment

Societal challenges
Nutrition and health
Demographic change
Wellbeing

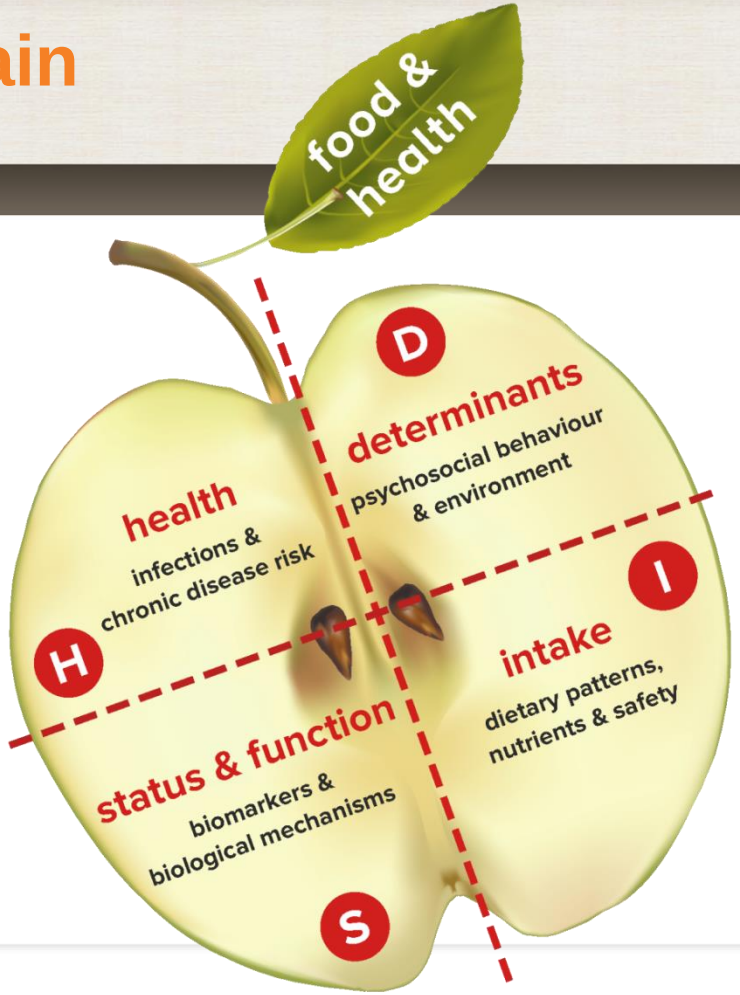
public
Agrofood sector
private

Consumer
why & **what** do we eat?
how does it affect health?

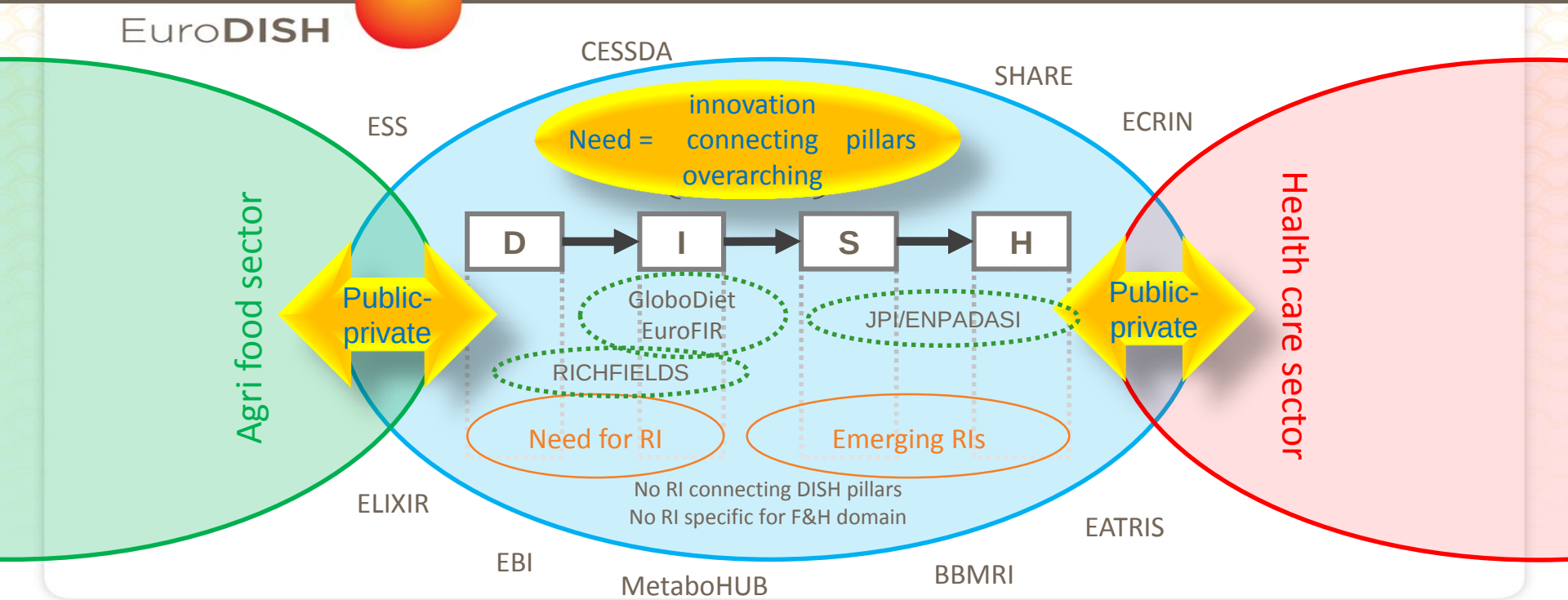
Health sector
public
private

DISH domain

'DISH' model:
4 key building blocks of food, nutrition and health research



Key needs for Food, Nutrition & Health RI



Problem → Potential

- Existing datasets not sufficient for understanding consumer behaviour, product development, public health policies
- Every day, consumers & businesses generate “big data”
- Potential to link & analyse data & respond to societal challenges

RICHFIELDS is exploring integration of data generated by:

- **Consumers**, e.g. apps, sensors
- **Businesses**, including retail, e-commerce, insurance; e.g. sales
- **Research**, including EU and International; e.g. surveillance data, personalised nutrition

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

Phase 3

Design of the research infrastructure

ICT, Business model, Governance, Ethics

needs

output

Richfields

needs

output

Phase 1

Data generated by consumers

Purchase, Preparation, Consumption

Phase 2

Connecting business and research generated data

Business, Existing research infrastructures

RICHFIELDS Inventory Management System (RIMS)

Characterising apps - Quality Criteria

Descriptive Criteria
What is it?

- Data Types
- Home page
- Contact Information
- Supported platforms
- Paid Services
- Medical Device
- Preparation Categories
- Price of IOS app
- Languages
- Itunes user rating
- Itune Genre
- Current IOS apps
- Minimum Android version

Scientific Criteria
Is it useful?

- Lifestyle Data
- Situational Characteristics
- Types of Situational Characteristics
- Product Characteristics
- External Device
- Data integration with partner tools
- What was purchased/ prepared/consumed?
- What was purchased/ prepared/consumed?
- What was prepared?
- Act or Intention?
- Units of purchase/ preparation/ consumption?

Technical Criteria
Can we access it?

- Is data accessible?
- Types of Access
- Data Formats
- Authentication
- Price
- Amount

Legal/Ethical Criteria
Can we use it?

- Terms of use
- Privacy Policy
- Data ownership
- Data usage vendor
- Personal information
- Types of personal information
- Public profile
- Privacy settings
- Device data
- Types of device data
- Cookies
- Web beacons
- Data storage

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

	Pre-food purchase	Point-of-sale	Post-purchase	Pre-food preparation	Point-of-preparation	Consumption
Knowledge & understanding	• Searching for experiences • Searching for offers • Comparing products & prices • Store/ restaurant search/ locator			• Sharing knowledge & experience • Searching for information		
Planning & organisation	• Creating shopping lists • Booking services • Budgeting			• Documenting/ recording food • Meal/menu planning • Recipe management		
Food purchase		• Placing an order	• Transactions			
Meal preparation / cooking					• Using apps as cooking aids • Interacting with sensors	
Food intake						Documenting/ recording food for: • Behaviour change • Medical support • Food logging

Food purchase

Descriptive Criteria *What is it?*	Scientific Criteria *Is it useful?*	Technical Criteria *Can we access it?*	Legal/Ethical Criteria *Can we use it?*
Categories are: • Knowledge & understanding • Planning and organisation • Making a purchase • Financial understanding	Types of determinants: • Individual (i.e. demographic, psychological, situational) • Interpersonal (i.e. social) • Environmental (i.e. product, meso/macro)	No apps explicitly stating “no” data accessibility, but most apps did not provide any information on this Majority of apps that allowed data access did not provide information on the issue	Majority of apps had a “terms of use” and/or a privacy policy document available Where a “terms of use” document existed, the majority of apps had no information on data ownership

Conclusions for food purchase apps

- Promising possibilities to utilize purchase app data for mHealth purposes
- Lack of information exists in many cases, thus justifying a clarification from app vendors regarding data accessibility, data ownership and associated public privacy issues.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

Food preparation

Descriptive Criteria *What is it?*	Scientific Criteria *Is it useful?*	Technical Criteria *Can we access it?*	Legal/Ethical Criteria *Can we use it?*
Categories are: • Planning and organisation • Knowledge & understanding • Meal preparation/ cooking	Types of determinants: • Individual (i.e. demographic, psychological) • Interpersonal (i.e. social, cultural) • Environmental (i.e. product, micro, meso/macro)	Majority of apps that allowed data access did not provide information on the issue	Not all apps had “terms of use” documentation Most provided a privacy policy document Where a “terms of use” document existed thirdy of apps had no information on data ownership

Conclusions for food preparation apps

- Potential to answer questions relating to Individual Psychological determinants, such as food beliefs, habits and self-regulation in relation to food. However, the limited availability of contextual data means that much of this data is detached from the user.
- The interconnectedness of the apps presents new opportunities to further enrich the collected data from external sources. There is the potential to create ‘links’ between multiple app usages from a single user, particularly social media

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

Food consumption

Descriptive Criteria *What is it?*	Scientific Criteria *Is it useful?*	Technical Criteria *Can we access it?*	Legal/Ethical Criteria *Can we use it?*
Food diaries are the most common form of data collection, often allowing for multiple inputs including generic food items, packaged products, or images	Food consumption data is interlinked with various types of relevant contextual data related to behavioural motivation, physical activity, health and fitness.	The majority of apps lack technical documentation necessary for data export and integration.	Similar lack of documentation related to the implemented terms of use and privacy policies. While users are usually the owners of their data, vendors are granted an irrevocable and royalty free exploitation license.

Conclusions for food consumption apps

- Due to its magnitude, diversity and interconnectedness, user-documented food consumption data offers a promising opportunity for a better understanding of habitual food consumption behaviour and its determinants.
- Unstandardized or undocumented food intake assessment procedures, data exchange protocols and formats, terms of use and privacy regulations, however, limit possibilities to integrate, process and share user-documented food consumption

Legal/ethical criteria - Can we use it? - *Data sharing study*

- Range of data types being shared
- Data sharing context
  - Scientists in universities and publically funded research institutes need data to study the relationship between food and health.
  - Governments need data to develop and monitor nutrition policies in place to improve food and health.
  - Companies that produce or sell foods and drinks (e.g. manufacturers, retail chains, restaurants, food delivery services) need data to do research to develop and improve their products.
- Predictors of willingness to share data
  - Trust and confidence in organization handling data
  - Privacy concerns
  - Reasons for sharing
  - Values (how you see the world)
  - Attitudes to science
  - Attitudes to food and health
  - Cooking practices
  - Perceived health

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

Landing page FNH-RI

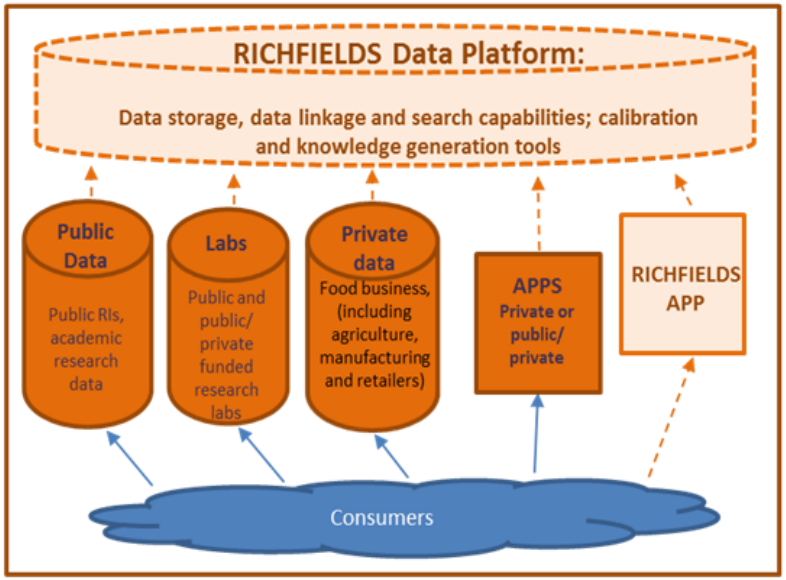
FNH-RI

RICHFIELDS RI/PORTAL

Authoritative Materials and Standards

- **Data catalogues and data management protocols**
  identifying and describing data (Commercial, Public and Research/Academic data) and its provenance; Lists of relevant laboratories; best practice documents and data management protocols
- **Research protocols**
  development, capture and sharing of best practice protocols for the use of connected and 'big data' in food-related consumer behavior research.
- **Standardised vocabulary/thesauri**
  standardisation of vocabulary and development of thesauri to support research activities utilizing connected data.
- **Ontologies/Semantic Data models**
  development of ontologies and semantic data models to support research activities utilizing connected data.
- **Training/Consultancy services**
  to assist both the RICHFIELDS data users and data providers to improve the quality of their data usage/capture of determinants of food behavior.

Data Platform/Technology



Governance

- **Management/Steering Committee** - *transparent governance/ethical framework; informing future research agendas*
- **User & Stakeholder Network / Forums** - *community of researchers/stakeholders*
- **Conferences/wider dissemination** - *'go to' for food behaviour tools, expertise and data*

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

Food, Nutrition & Health RI timeline

Growth of Member States
and stakeholders involved

FNH-RI
Foundation

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

<--Preparatory phase--><----Design phase----><----------Implementation phase---------->

EuroDISH

DISH-RI

Richfields
www.richfields.eu
#RICHFIELDS

Fully operational
Food, Nutrition & Health RI

FNH-RI

Research projects: Member State and EU level (H2020, JPI, etc.)

RI building, Member State level and EU level funding

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

Food, Nutrition & Health RI Roadmap: phased governance maturity

Preparatory Phase

- "Simple" foundation structure of the 4 core partners to facilitate collaboration through MoUs and projects
- Develop FNH Industry Forum

Initial Phase

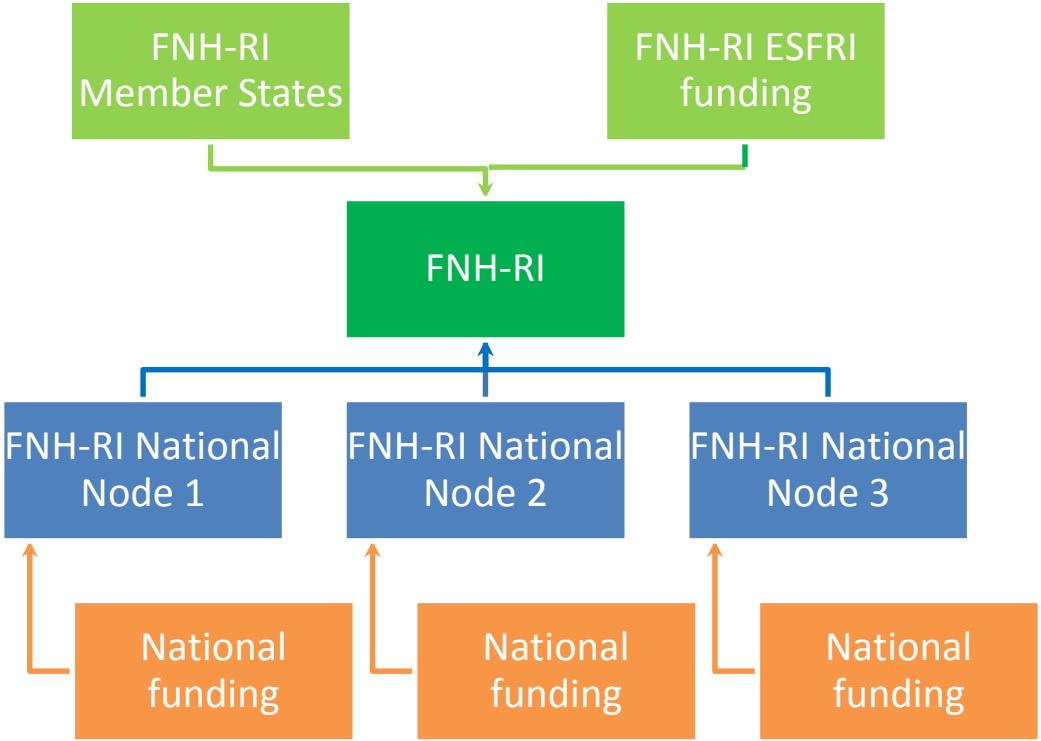
- "Simple" foundation linked to consortium agreement
- Includes new partners and new national nodes, Scientific and Industry Forums,
- Dependent on project duration

Implementation Phase

- Mature governance structure based on sustainable structures (legal organisation)
- Building the business model

FNH-RI

Food, Nutrition & Health RI Governance principle
Hub and spoke model



The Netherlands: National Institute for Public Health and Environment | Wageningen University and Research Centre | University of Maastricht | University Medical Centre Maastricht | University of Groningen | University Medical Centre Groningen | TNO

Italy: Consiglio Nazionale delle Ricerche (CNR) | Food and Nutrition Research Center of the Italian Agricultural Research Council (CRA NUT) | Parco Tecnologico Padono | Mediterranean Fondation Terina | Fondazione Edmund Mach| University of Bologna

United Kingdom: Quadram | University of Surrey | University of East Anglia | Norfolk – Norwich University Hospital | FoodForce – Network of leading European research provider organisations

Denmark: Technical University of Denmark | University of Copenhagen | Aarhus University | Aalborg University | University of Southern Denmark

France: Institut National de la Recherche Agronomique | University of Claude Bernard Lyon | Centre Europeen pour la Nutrition et la Sante | University Paris | International Agency for Research on Cancer

Slovakia: Nitra University (SUA) | National Agriculture and Food Center (NPCC) |AgroBioTech

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.

Richfields

www.richfields.eu

#RICHFIELDS

Coordinated by:
Wageningen Economic Research

Partners:

AALBORG UNIVERSITY DENMARK

eufic

Aalto University

cens

EuroFIR

DIL

GS1 Denmark

Quadram Institute

JAVIER DE LA CUEVA & ASOCIADOS

Istituto di Tecnologie Industriali e Automazione

RISE

IJS

ETH zürich

UNIVERSITY OF SURREY

WAGENINGEN UNIVERSITY & RESEARCH

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 654280.