



Sustainable Food Initiative

Agrifood Top 2018, Zwolle

Dr. Ronald Visschers




PROGRAM

Ronald Visschers: General intro and RD&I portfolio SFI


Peter Haring: SFI, an industry lead platform towards more sustainable food systems

Ivo Ploegsma: SFI Field Labs, Joining Forces


Ronald Visschers: SFI Living Labs: World Food Center Research Program




SFI Targets 2025




- ❖ We will develop a new generation of food processing technology in 2025, that enables a **decrease in footprint (water, greenhouse gases) of 50%** whilst preserving the inherent goodness of the agricultural raw materials.
- ❖ We will have created routes in 2025, to **reduce waste production by 50 %**, **enable more than 95% high-value use of agricultural raw materials**, and to ensure **full circularity of packaging materials**.
- ❖ Using modern approaches from the field of data sciences, we will be able in 2025 to handle at least **90% of the available raw materials** and raw materials qualities (specs plus 30 % variation).



Overall Strategy



- ❖ "Using the full potential of all agricultural produce to create a new generation of sustainable, safe, nutritious and delicious products while reducing the total footprint to zero in 2050"
- ❖ Impact via a new way of cooperative working to do Top Science and Fast Innovation
- ❖ Working towards our moonshot by cooperating in industry led challenges



Organisational framework




Partners in SFI community:


- ❖ Acknowledge SFI moonshot, vision, strategy and SFI principles
- ❖ Sign Letter of Participation

Knowledge links between:

- ❖ Three executive environments
 - ❖ Consumers
 - ❖ Research & development
 - ❖ Valourisation
- ❖ Challenges



R&D Project: Consumer Insights



AIM: Consumer Science Toolbox to identify consumer needs and acceptance of technologies based on 2025 scenario's that are essential to implement sustainability goals

Deliverables:


- ❖ Scenario's for Consumer behaviour/ Technology and Supply Chain 2025
- ❖ Design Academy for product and packaging concepts for 2025
- ❖ Toolbox for consumer trust and clean label strategies
- ❖ Toolbox for Consumer loyalty and reward
- ❖ Toolbox for Sustainable Packaging behaviour
- ❖ Living Lab Implementation
- ❖ Application of data-mining and virtual concepts

Industry Lead:
Dick van Olderen (Kraft Heinz)
 Total Project Volume: 2.25 ME (450k€ cash)



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R&D Project: Digital Protein Compass




AIM: Linking intrinsic techno-functional and nutritional properties of proteins and their interaction with the matrix to molecular properties which can be steered

Deliverables:

- ❖ Toolbox for functional characterisation
 - First focus on antinutritional factors
- ❖ Development of novel production routes
 - Single cell fermentation
 - Use of whole plant / mild processing
 - Use of by-products
- ❖ Identification of digital solutions for predicting functionality

Industry Lead:
Dr. Margot Schooneveld (DSM)
Total Project Volume: 1.6M€ (400K€ cash)



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R&D Project: Internet of Food



AIM: DEVELOP OPEN SOURCE PLATFORM FOR FOOD MODELLING, DATA ACQUISITION AND EXCHANGE

Deliverables:


- ❖ Open Source, plug&play food modelling
- ❖ Standards for Data exchange and storage
- ❖ Standards for consumer data metrics
- ❖ Block Chain technology for food
- ❖ Universal sensor technology

Industry Lead:
Dr. Michiel Gribnau (Unilever)
Total Project Volume: 2 M€ (500K€ cash)



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R&D Project: Total Use of Resources




AIM: PILOTE SCALE PROCESSING OF CROPS WITH 100% USE OF RAW MATERIALS

Deliverables:


- ❖ Crop centered approach
- ❖ Inventory of state-of-the-art processing
- ❖ Options for biomass sourcing
- ❖ Breakthrough feasibility studies on
 - ❖ Enzymatic conversion
 - ❖ Fermentation
 - ❖ Mild processing
 - ❖ electrification

Industry Lead:
Dr. Marco Giuseppin (AVEBE)
Total Project Volume: 1.3M€ (325K€ cash)



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R&D Project: Efficiency improvement




AIM: Novel processes for mildly processed functional fractions from plant and dairy materials with a true sustainability impact.

Deliverables:

- ❖ Demonstration of how highly processed ingredients can be replaced by functional mild fractions with 50% less energy consumption
- ❖ Proven methodology to design optimal processing routes with respect to ingredient functionality, energy costs and C/H2O footprint
- ❖ New/improved design of separation technologies

Industry Lead:
Dr. Michiel Meuse (Unilever)
Total Project Volume: 5M€ (1155K€ cash)



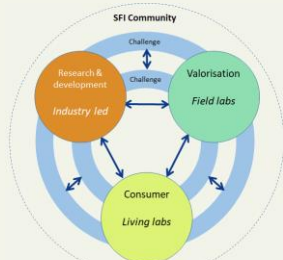

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Ivo Ploegsma **Field Labs, Joining Forces**

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Organisational framework



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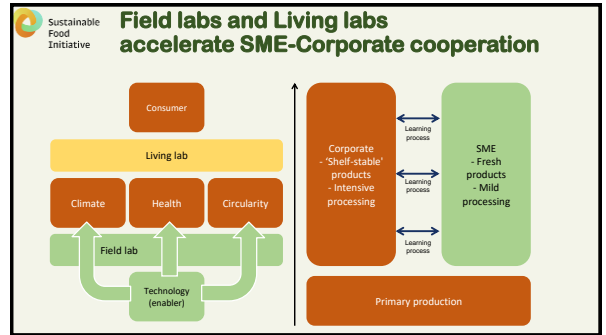
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Sustainable Food Initiative **Validation Field Labs**

Definition:
 Field labs are practical environments where companies and knowledge institutes cooperate in order to **develop, test and implement new technologies** as well as an environment where professionals **learn to apply** new technologies.
 Field labs contribute to strengthening crosslinks between research, education and policies at a **specific field of interest**.



Sustainable Food Initiative **Validation Field Labs**

Criteria:

- Addressing one or more societal challenges
- Fully in line with SFI moonshot, vision, strategy and principles
- High TRL valorisation and investment phase
- Threshold of minimal 10 SMEs involved
- (Inter)national ambitions
- Self-supporting for 75% (long term)
- Complementary to other Field labs
- Collaboration with research institutes, WO and HBO
- Aligned with EU programmes

Smart Industry field labs (FME) applicable in case of crossovers
 Connections start-up programmes (HFV, RockStart and Startup Bootcamp)

TRL 1	Basic principles observed and reported
TRL 2	Technology concept and/or application formulated
TRL 3	Critical function proof of concept established
TRL 4	Laboratory testing of prototype component or process
TRL 5	Laboratory testing of integrated system
TRL 6	Prototype system verified
TRL 7	Integrated pilot system demonstrated
TRL 8	System incorporated in commercial design
TRL 9	System ready for full scale deployment

Sustainable Food Initiative **Validation Field Labs**

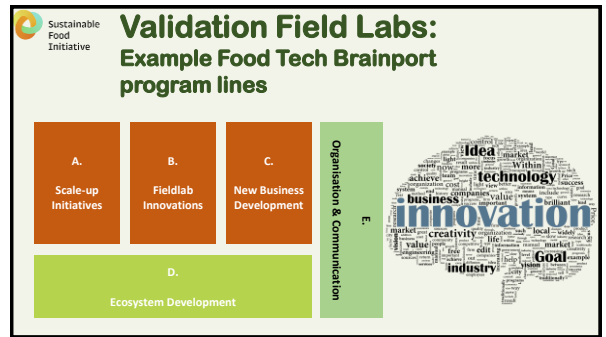
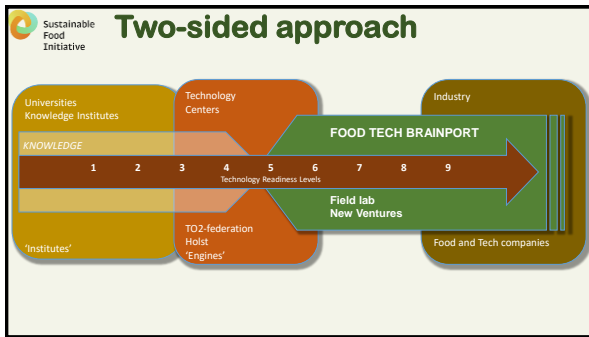
SFI intends to develop 5-10 SFI Field labs that accelerate innovation at (regional) SMEs and have substantive scale (see criteria)

Contact with 6 provinces to develop Field labs
 Gelderland
 Overijssel
 Zuid-Holland
 Noord-Brabant → Example Food Tech Brainport
 Limburg
 Utrecht

Sustainable Food Initiative **Validation Field Labs: Example Food Tech Brainport**

Sustainable Food Initiative **Validation Field Labs: Example Food Tech Brainport**

- Location : Helmond
- Identity: Cross-over Hightech-AgroFood
- Social Relevance:
 - Climate Neutral (footprint reduction)
 - Circular Food Economy (waste reduction)
 - Health & Safety (sustainable, healthy, safe and affordable food)
- Focus:
 - Enabling technologies (mild preservation, mild separation, smart processing, datafication)
 - TRL 7-9 ("proven" technology to market)
 - SME's
- Working model:
 - Entrepreneur driven (for entrepreneurs, by entrepreneurs)
 - Commercial labs, pilotfacilities, demofacilities and tolling facilities coordinated/facilitated by Food Tech Brainport
- Collaboration with Brainport Development, BOM, Province Noord-Brabant, city of Helmond, WUR/FBR, HAS, TU/e
- International Innovation connections to Germany, Canada, New Zealand (and running several EU programs)



Validation Field Labs

Take-away/success criteria

- Our challenges are big (enough) already, collaboration is a must
- Efficiency and effectiveness in using public financial instruments
- Complementarity and focus is important
- Size matters.....better to have a small number of strong & collaborative Field Labs than to have many small overlapping or competing initiatives

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Industry led platform for accelerating innovation towards More sustainable food systems

MOONSHOT

Using the full potential of all agricultural produce to create a new generation of sustainable, safe, nutritious and delicious products while reducing the total footprint to zero in 2050

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Update executive environments

Overall Strategy

- Mission**
 - ◆ "Using the full potential of all agricultural produce to create a new generation of sustainable, safe, nutritious and delicious products while reducing the total footprint to zero in 2050"
- Vision**
 - ◆ Impact via a new way of cooperative working to do Top Science and Fast Innovation
- Strategy**
 - ◆ Working towards our moonshot by cooperating in industry led challenges

Labels in the pyramid: Moonshot (Mission), SFI Ways of working (Vision), Challenges (Strategy)

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Vision

The Innovation Paradox: 'Filling the Gap'

Labels in the diagram: Universities, CROs; Large industry: leading; Academia and CROs: Inspiring; Startups: Innovating; SFI; Fundamental / Ideas; TRL level →; Implementation

Open Science, Open Innovation

- Deep science with fast innovation
- Large industries, start-ups & academia
- Inspiring instead of assigning

34

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35

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Why SFI in NL?

- Scientific
 - Wageningen is globally 1st in food sciences and technology (Shanghai Ranking 2017)
 - NL is strong in process engineering (TUs), data sciences (TUs), colloid & material sciences (TUs, GUs), biosciences (GUs, TUs)
- NL food industry leads the world
 - Quantitatively, qualitatively, innovation
- Match with priorities
 - Topsector, European, National

Combine to find radical solutions, consolidating R&I as the innovative top, requiring collaboration of the complete knowledge chain and production chain

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Creation of a research & innovation oriented community

- Larger industries
- Small, innovative start-up enterprises
- Academia: both experts and students (BSc/MSc/PhD)
- Technology Institutes (TNO, WR, others)
- Polytechnics: experts and students
- TKI's
- Min EZ
- NWO

- Work together in a truly open innovation setting
- Researchers, experts, innovators, young talents meet, think, work together, communicate, innovate

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Creation of a research & innovation oriented community

- ◆ **Research aimed to create breakthroughs**
 - ◆ Resource efficiency, footprint reduction, nutritional quality and functionality
 - ◆ Fundamental understanding, connected to application and fast demonstration and implementation
- ◆ **Circle in the sand**
 - ◆ Where researchers, entrepreneurs and students can work together in a truly open innovation setting.
 - ◆ Unilever is sharing its equipment and pilot plant
 - * Adding our equipment to Shared Research Facilities
 - * The first floor will be totally open with extensive kitchen facilities
 - ◆ Researchers and innovators from all over the world work together, meet, communicate and innovate

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Multi-disciplinary, cross-functional

Process engineering Product engineering	Universities and technology institutes
Material science Colloid / Nanosciences	Consumers and influencers
Biochemistry Biophysics Biology	Ingredient producers
Data sciences	Consumer product manufacturers

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Not just a research programme

- An open platform for inspiration
 - Physical location (on Wageningen Campus) with resident scientists, start-up entrepreneurs, students, industrials
- Research programme is the **basis** of open interaction
 - Discuss questions and problems with people *outside* project team (students, experts, consumers, etc.) to find new solutions and approaches
 - Involve partners from practice (industry, society) from the start

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More to come

Meanwhile in the Netherlands... and Europe..

- NL government is driving clear actions
 - LNV: Taskforces, transition agenda, priorities: protein transition, food waste
 - EZK: Energy transition, NWA related priorities
 - OCW: New NWO strategy, kick off NWA related call expected in May
 - NL-Region agreements
- EU government is preparing FP9
 - Declaration letter ask: 6-8 B€ to be allocated for Sustainable Food production
 - Key to demonstrate industry commitment, via FoodNexus/EIT-Food.

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The Netherlands: internationally leading in agrifood

- National ecosystem with Wageningen-Ede as epicentre ("kennishart")
- Strengthening and inter-connecting all Dutch agrifood regions and complementary (knowledge) clusters
- Strategic guiding and decision-making on a national level essential: coordination of agenda's on a strategic level essential in realising ambitions
- SFI gives substance and coordination to innovative ecosystems to accelerate the realisation of sustainability ambitions of food systems
- Food Valley 2030 has an integral approach (accessibility, housing, infrastructure, etc.), in combination with long term perspective, and therefore has a broader scope than SFI
- Both processes are complementary and mutually reinforcing

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Schematic representation of coherence

Core
SFI: Deep Research and Fast Innovation

2nd Circle
Food Valley: Broad Scope (agrifood business climate)

3rd Circle
Other regions and initiatives relevant for SFI and Food Valley

FoodValley 2030

"This little country feeds the world"

System denken, Specialisme, Aantrakkingskracht, Trots, Innovatie, Open innovatie, Nieuwe banen, 1-1-4, ROI, Congress optimalisatie, Marketing, Economisch en sociaal, Samenwerken



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Complementarity and open cooperation

- ❖ Similar ambitions and aimed at strengthening Dutch agrifood ecosystem
- ❖ Involving and exploiting strengths of all Dutch agrifood regions and related knowledge clusters: Ede-Wageningen (knowledge) epicentre and regions are mutually reinforcing
- ❖ Complementarity
 - ❖ SFI gives substance to Food Valley 2030, hence giving an industry led impulse
 - ❖ FV 2030 can strengthen the organisational power of SFI, resulting in a strong position of SFI in the national agrifood ecosystem



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Added value for other regions

- ❖ Strong brand "Dutch agrifood Ltd."
- ❖ Development of new, inspiring R&D programmes in cooperation with businesses (corporates, SMEs and start-ups) and knowledge institutes in other regions
- ❖ Strengthening valorisation in regions via Field labs in cooperation with businesses and knowledge institutes from other regions
- ❖ Inspirational meetings in (knowledge) epicentre Ede-Wageningen and regions, to develop challenges with regional partners
- ❖ Shared research facilities (in multiple regions)
- ❖ Sharing data infrastructure and access to databanks
- ❖ Consumer insight (through consumer panels and WFC)