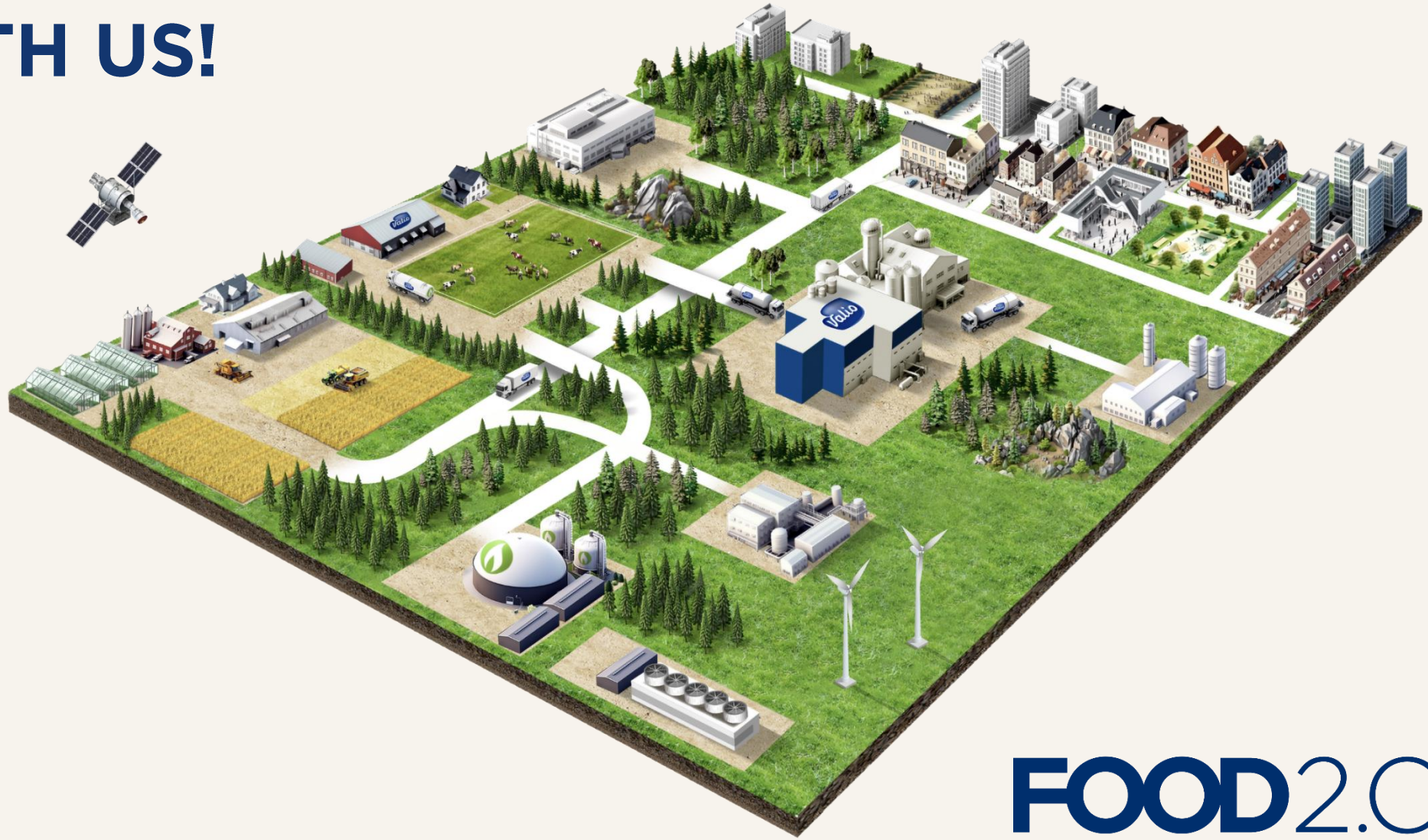
JOIN THE JOURNEY WITH US!



FOOD 2.0 | Valio

AGENDA

11.30 Light networking lunch

12.30 Welcome and opening - Veera Virtanen

Targets of the Food 2.0 program - Harri Kallioinen

Ecosystem status - Veera Virtanen and Riitta Partanen

13.00 **Roadmap theme presentations**

- Future products - Mikko Immonen
- Technology transformation - Niina Valkonen
- Regenerative production - Virpi Kling/Juha Nousiainen
- Circular economy & Resource efficiency - Robert Harmoinen

13.50 **Networking coffee**

14.20 **Collaboration as a driving force in industry**

Technology transformation cases

- Viking Malt - New malt ingredients - Xin Huang
- Enifer - Case PEKILO® - Simo Ellilä

Circular economy cases

- St1 - Biogas production from manure - Lea Rankinen
- Honkajoki - Upconverting food sidestreams in an industrial ecosystem - Mika Tuomola

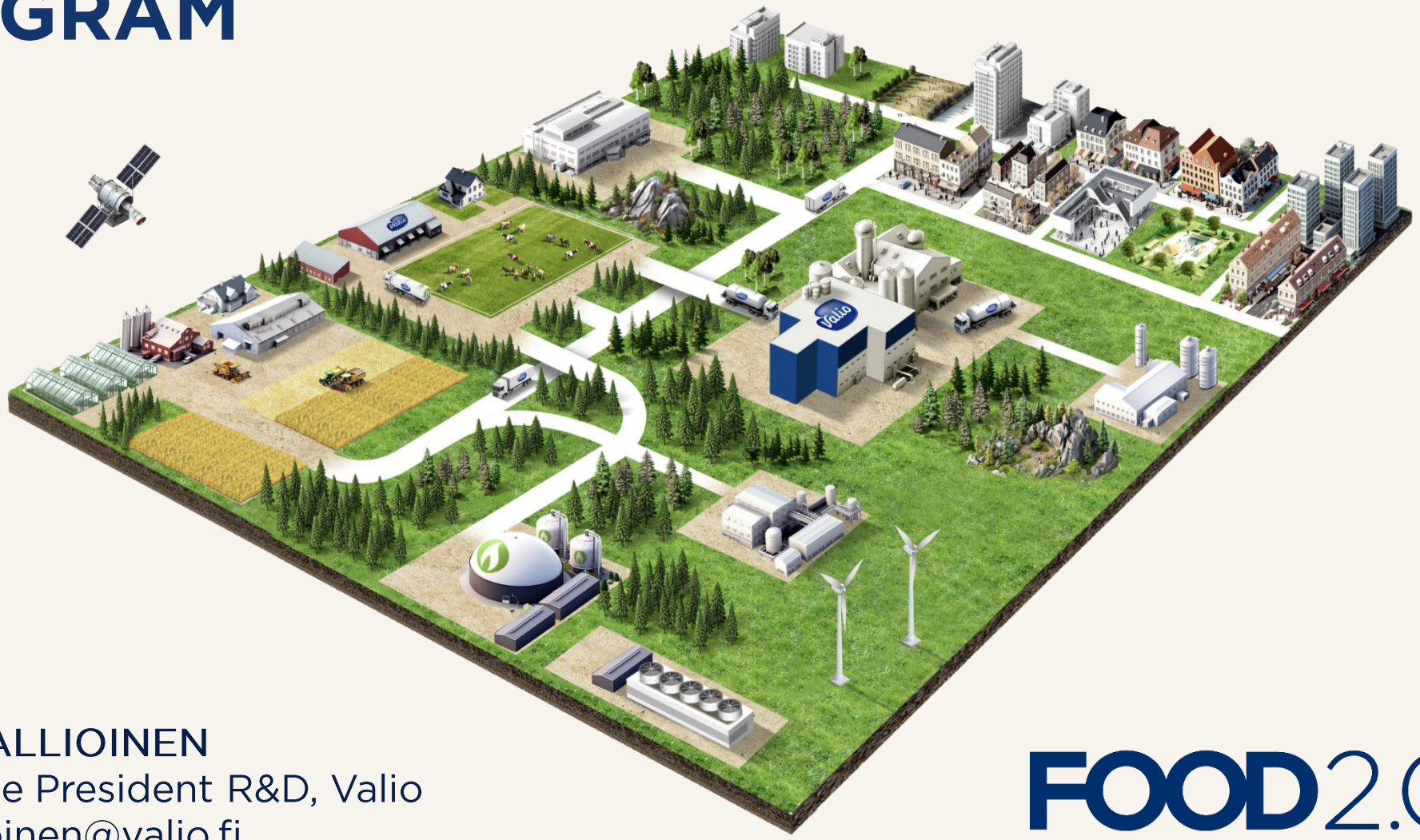
Benchmark from other Veturi-ecosystem

- Borealis - Success cases from SPIRIT-program - Sanna Martin

15.30 **Discussion**

15.55 **Summary and closing**

TARGETS OF THE FOOD 2.0 PROGRAM



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FOOD 2.0 | Valio

17.6.2024

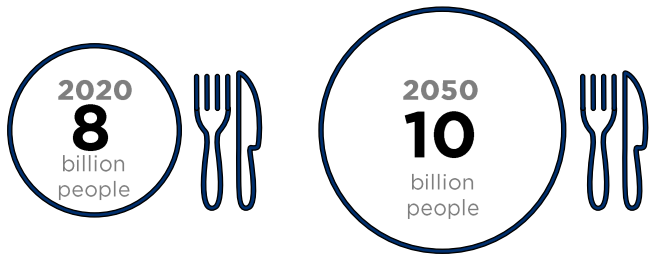
THE GLOBAL FOOD SYSTEM IS FACING SIGNIFICANT CHALLENGES – HOW DO WE SOLVE THEM?

WE NEED MORE FOOD

– WHERE AND HOW SHOULD IT BE PRODUCED?

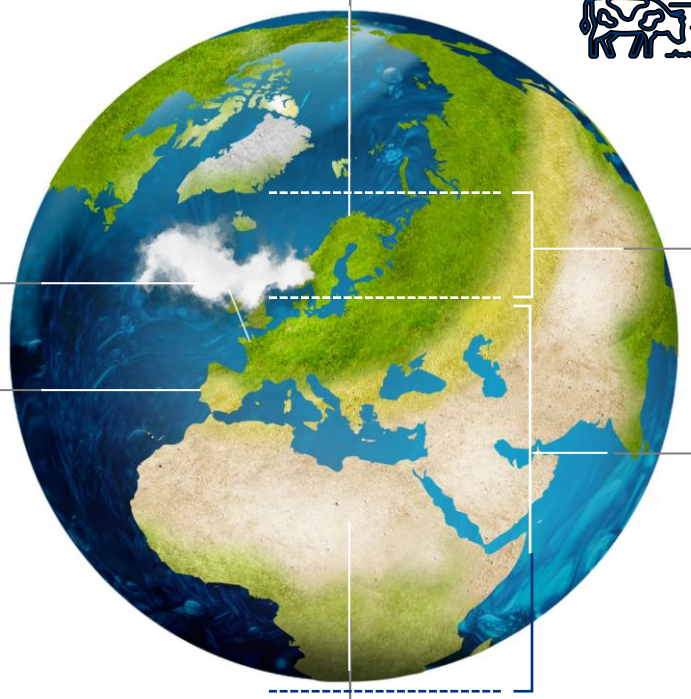
The world's food should be produced where it makes the most sense in terms of farming conditions, where it is economically viable and sustainable for both climate and nature.

The need for food will increase by 50% by 2050



Source: World Resources Institute and UN World Population Prospects 2022

It makes sense to grow food crops that are directly suitable for humans in regions with good crop security.



In the north, summer is short and cool, and not all crops produce sufficient yields profitably. That is why we also need grass and cows.

Sufficient water is required for farming.

In many areas, droughts are an issue.

640–1,200

Solar irradiance
(kWh/m2/year)

Source: IEA

1,200–2,100

Solar irradiance impacts the length of the growing season and the temperature all around the world.

17.6.2024

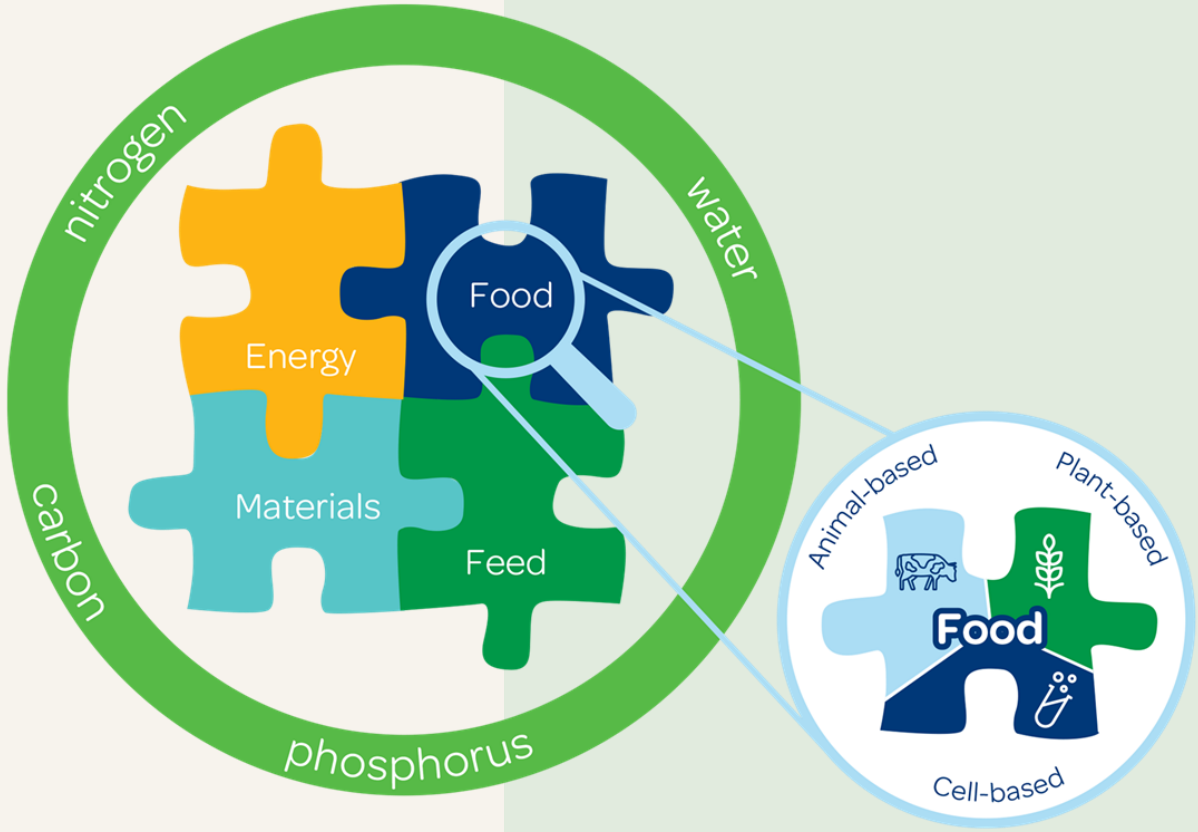
FOOD 2.0 – NATURE-SMART FOOD SYSTEM

THE NEW FOOD 2.0 SYSTEM:

BUILDS ADDED VALUE ON SUSTAINABLY PRODUCED FOOD

- ✓ circulates nutrients efficiently in integrated value chains
- ✓ promotes biodiversity
- ✓ recognises the complementary roles of plant-based, animal-based and cell-based foods
- ✓ builds on resource- and data-efficient technologies

ENCOURAGES ALL PLAYERS TO STRIVE FOR A COMMON GOAL



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ROADMAP

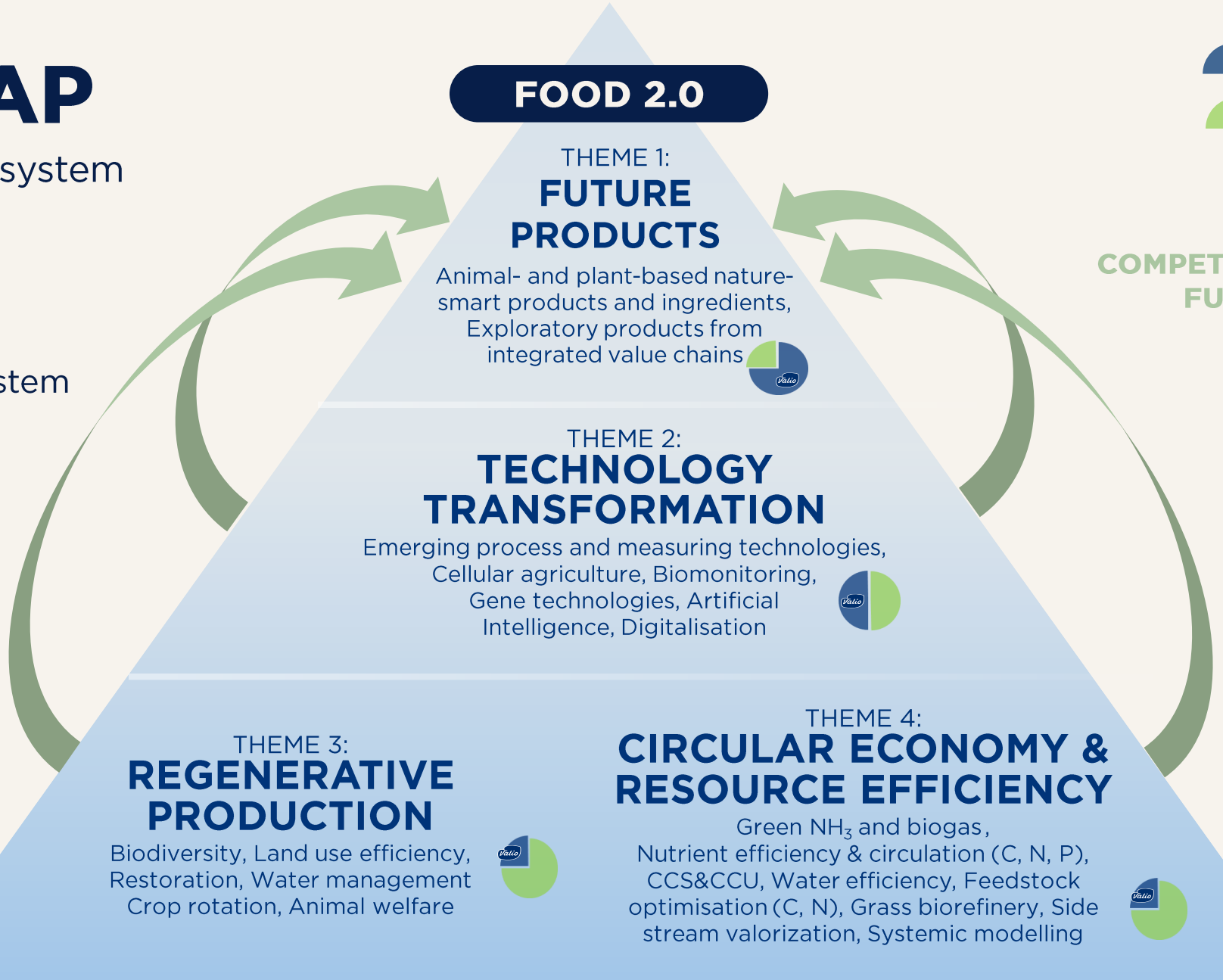
Nature-smart food system

TARGETS:

100 PARTNERS
involved in the ecosystem

EUR 100 MILLION
investments in RDI
across the ecosystem

EUR 1 BILLION GROWTH
in food exports
by 2032



ECOSYSTEM

COMPETITIVE FUTURE

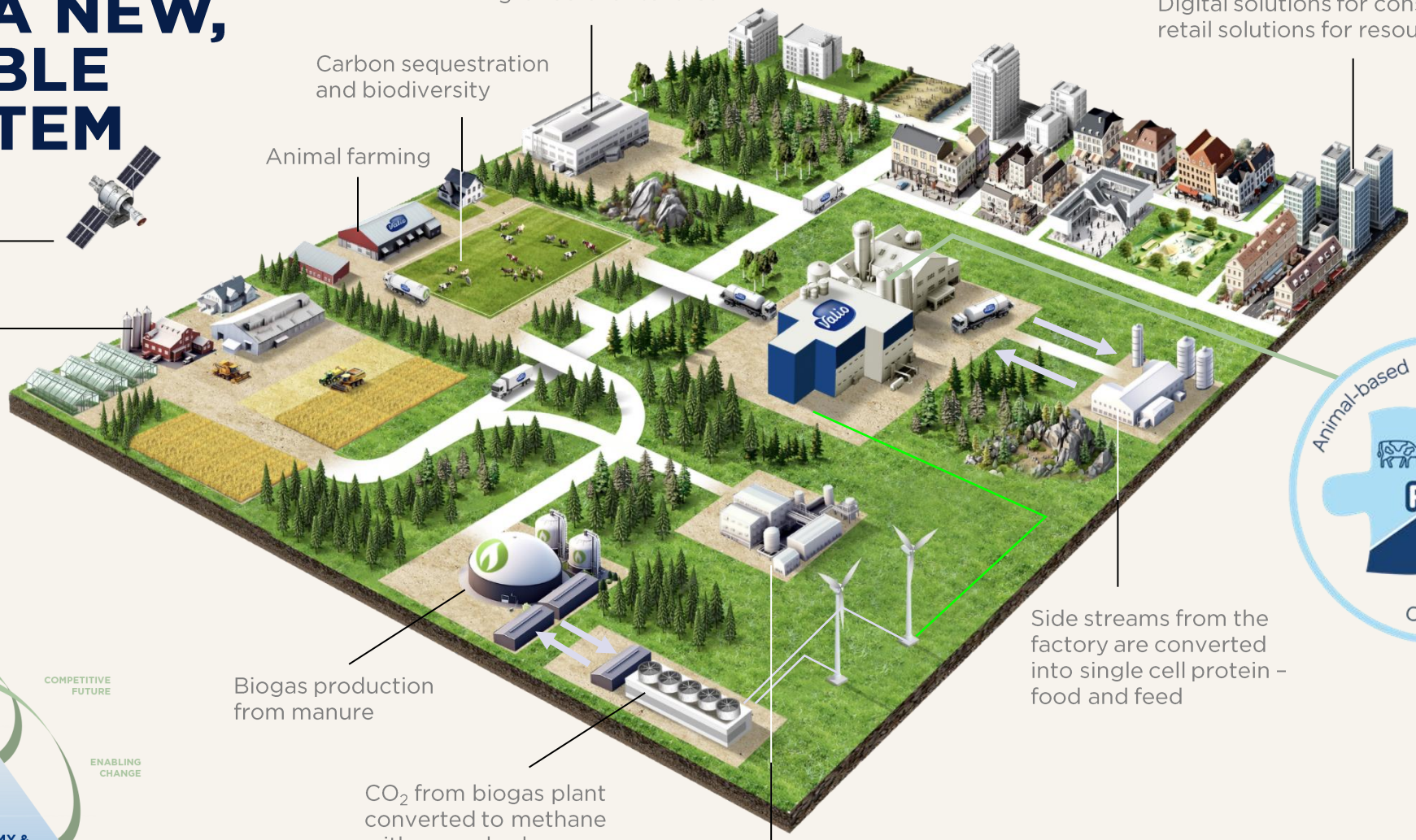
ENABLING CHANGE

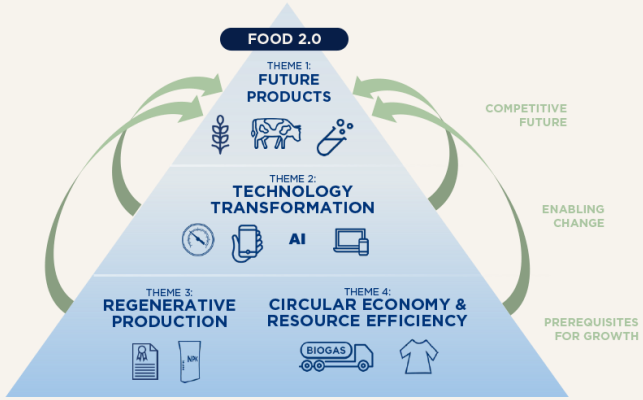
PREREQUISITES FOR GROWTH

NEED FOR FOOD 2.0 ECOSYSTEM RDI

Nutrients	Biodiversity and animal welfare	Climate impact	Resource efficiency	Human nutrition	Digitalisation	Disruptive & enabling technologies
Nitrogen and phosphorus circulation in food system	Measuring and modeling biodiversity	Carbon cycle and capture in integrated food system	Agri-food biorefineries	Nutritionally valuable compounds from side streams	Data ownership, quality and integration	Gene technologies for resilience and efficiency
Roadmap for green ammonia in Finland	Sustainable farming practices	Agricultural aerosols	Water- and energy-efficient processes	Nutritional quality of new foods	Computational modeling for assessing sustainability	Cellular agriculture
Systemic modeling of nitrogen circulation	Monitoring and verification of animal welfare	Sustainable farming practices	Side-stream valorisation and logistics	Health monitoring, sustainable and personalised diet	Artificial intelligence in food system	Power-to-X in food system
Technologies for recycled nutrients		Climate impact modeling	Renewable energy from agricultural biomasses		Robotics and automatization	Remote sensing in food system
			Biogas production value chain optimisation		Sensors and edge computing	Water management
			Agrofibers			
			Recycling of agricultural plastics			

WORKING TOGETHER TO BUILD A NEW, SUSTAINABLE FOOD SYSTEM





INNOVATIVENESS as A DRIVING FORCE

IN THE BEGINNING

Valio executive board argued the establishment of Valio laboratory in 1916 as follows:

”Only a country with an economy totally based on science may reach and maintain the first position in the economic battle of nations.”

Valio laboratory began operations in March 1917.

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RIITTA PARTANEN
Head of Research, Valio
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FOOD 2.0 | Valio

FOOD 2.0 ECOSYSTEM
AND LINKS TO THE OTHER VETURI COMPANIES

ENERGY

XYLO GAS
KEMPOWER
HETE
ABB
Green Electrification 2035
WÄRTSILÄ
ZERO EMISSION MARINE 2030
st1
NESTE
Novel sustainable & scalable solutions for transportation and chemicals
SUOMEN LANTAKAASU

MATERIALS

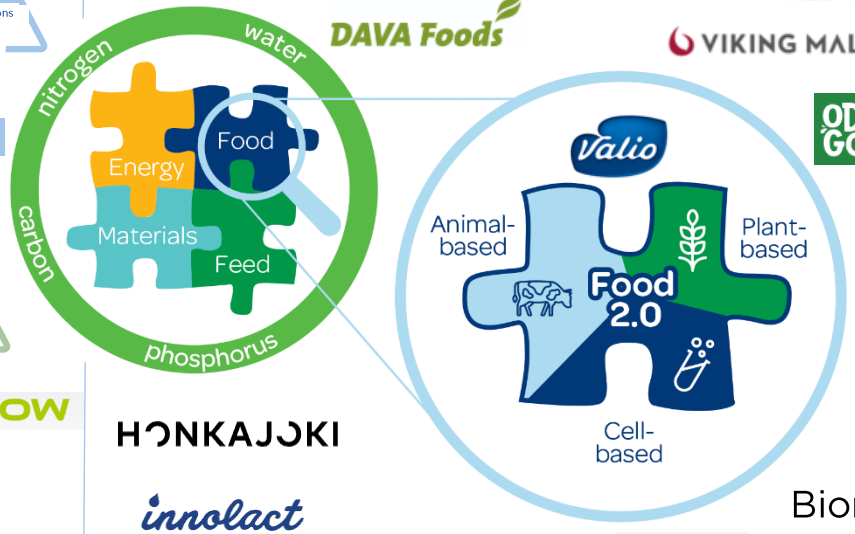
Valmet
Beyond Circularity
fortum
Metsä
EXPANDFIBRE
WOODGROW
NORDIC BIOPRODUCTS GROUP
BOREALIS
SPIRIT

CONSULTANCY

ULTRA LEAN BUSINESS
SWECO
gaia
PART OF SWECO
INVENIRE
ideascout
CO • DESIGN • EXECUTE
Ihan parasta!
Health & Experience Finland Ltd

FOOD AND FEED

YARA
MAANVAALIJA
KINNARIN TILA
1667
mäsli
ROSTEN
SUOMEN NESTELANNOITE OY
FILTSON
Osuuskunta Pohjolan Maito
Bonne
ARCTIC HAPPY JUICERY
Vöner
Plant based food
Atria
BIO KASVU
EOS EUROPE
HKFOODS
BOR
Apetit
DAVA Foods
VIKING MALT
SENSON
More by Nature
ODDLY GOOD
ORIGIN OCEAN
Volare
biomush
AIRCOHOL
IN GOOD SPIRITS
HONKAJOKI
innolact
Bionto
ÄRO-TANNER OY
enifer
KeinoX
SÄHKÖPOJAT
FrostDry
NANO
HIILIPÖRSSI
BSAG
Baltic Sea Action Group
BIOSAFE



DIGITAL, DATA, AI

YIELD SYSTEMS
ATR
SIEMENS
ORION
A Digital Boost for the Pharmaceutical R&D
MONAD
Cense analytics
POLAR
emblica
Mtech
Biomensio
DIGISALIX
Bittium
Seamless and secure connectivity
4BARN
Amazon
digia
datasense
smart environment solutions
Data Space Europe

RESEARCH

UNIVERSITY OF EASTERN FINLAND
Luke
LUONNONVARAKESKUS
VTT
ILMATIETEEN LAITOS
SYKLI
foodwest
OULUN YLIOPISTO
SeAMK
ysao
HAMK-Hämeen ammattikorkeakoulu

FINANCIERS AND ENABLERS

SITRA
BUSINESS FINLAND

ACTIONS TO SUPPORT EXPORT AND GROWTH

By joining forces we can all grow – everone can contribute!

FINANCIAL AND BUSINESS

- Investments for start-ups or joint-ventures
- R&D capabilities and collaboration
- Large companies can be the first customers for start-ups

JOINT DEVELOPMENT, NETWORKS AND VISIBILITY

- Joint R&D&I projects – financing e.g. from Business Finland or EU
- Active search of partners and linking companies for collaboration
- Visibility in events, media, etc.

BUSINESS FINLAND INSTRUMENTS

- Exchange program of experts through Business Finland INTO-financing
- New market scouting with Business Finland Global network – Global Food and Foodtech team

CONCRETE SUPPORT ACTIONS FROM VALIO FOR SMES

- Oddlygood – joint venture with Mandatum
- Suomen Lantakaasu – joint venture with St1
- Enifer - Minority investment
- Foodwest – Minority investment

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Next ecosystem event – SAVE THE DATE!

Webinar: Market insights and new networks to facilitate access to new export markets

Food 2.0 program in collaboration with Business Finland Global Food and Foodtech team

Monday 23.9.24 at 14:30-16 o´clock

BUSINESS
FINLAND

ROADMAP THEME PRESENTATIONS

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VIRPI KLING
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JUHA NOUSIAINEN
SVP Climate

ROBERT HARMOINEN
Lead - Theme 4, Valio
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FOOD2.0 | Valio

17.6.2024

ROADMAP

Nature-smart food system

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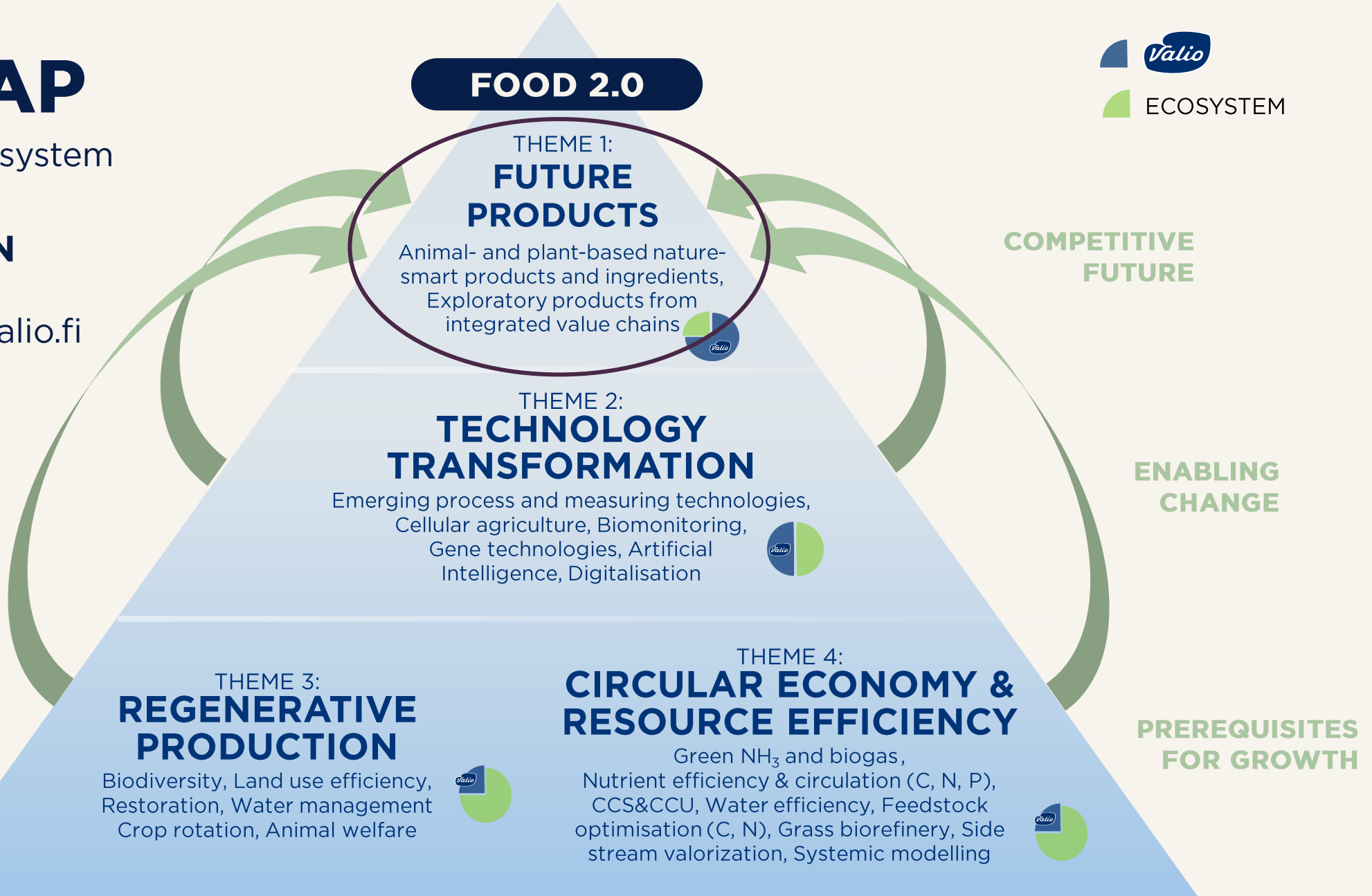


ECOSYSTEM

CHALLENGES

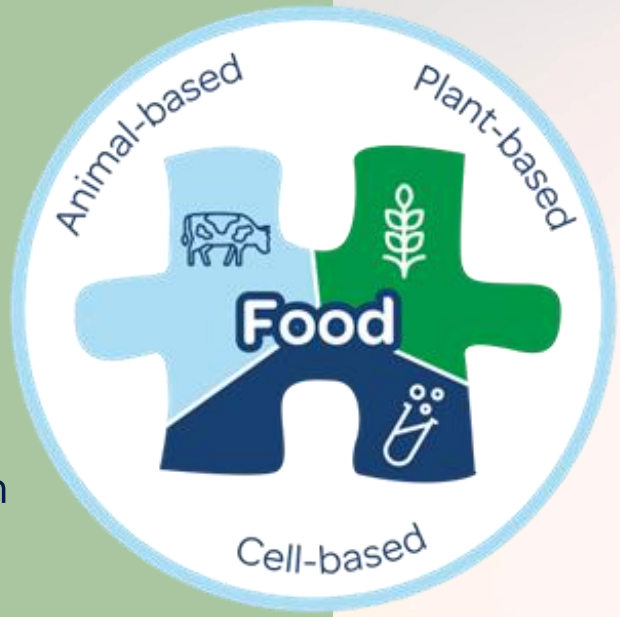
Consumer acceptance

Nutrition

New business models, building added value

17.6.2024

FUTURE PRODUCTS HOW DO WE GET THERE?



- Understanding the needs of the future consumers & B2B customers
- Utilizing the complementary roles of animal-, plant-, & cell-based production
- Delivering targeted nutrition for individual needs
- Mastering the impact of processing on digestive & sensory properties
- Creating value through sustainability work – e.g. Carbo partnership
- Cross-idustrial collaboration!

17.6.2024

CO INNOVATION:

NUTRITIONALLY VALUABLE COMPONENTS FROM ANIMAL-BASED SIDE STREAMS

Big and small companies wanted!
Could your company be involved in the project?

et al.

Mikko.Immonen@valio.fi

TARGETS

- Identifying nutritionally significant components
- Developing enrichment processes
- Creating novel approaches to commercialize biomaterials

→ *Increasing the value of the present side streams*

POTENTIAL RESEARCH AREAS, for example

- Exosomes
- Vitamins and minerals
- Protein, peptides, and bioactive compounds
- Complex lipids

17.6.2024

ROADMAP

Nature-smart food system

NIINA VALKONEN
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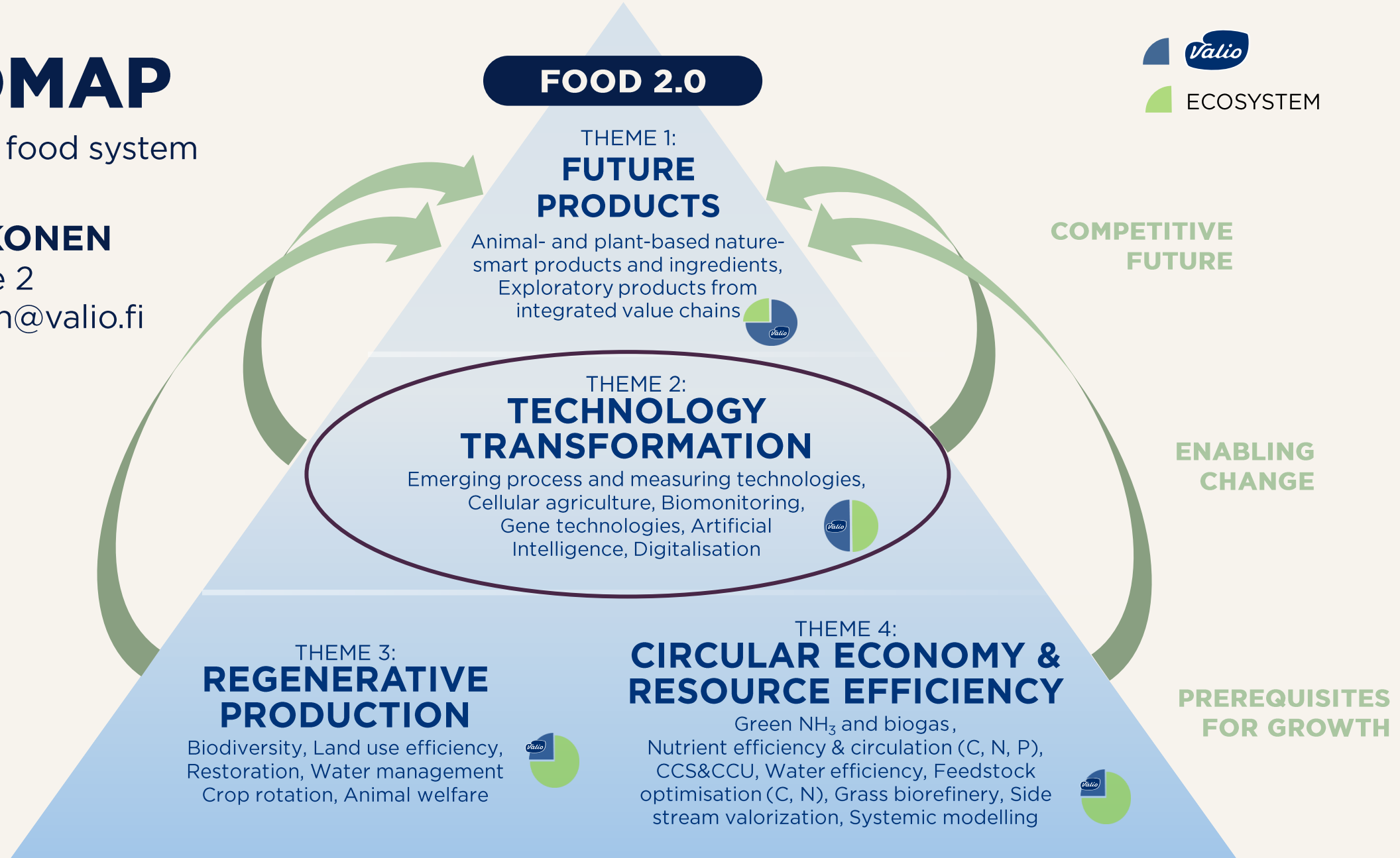
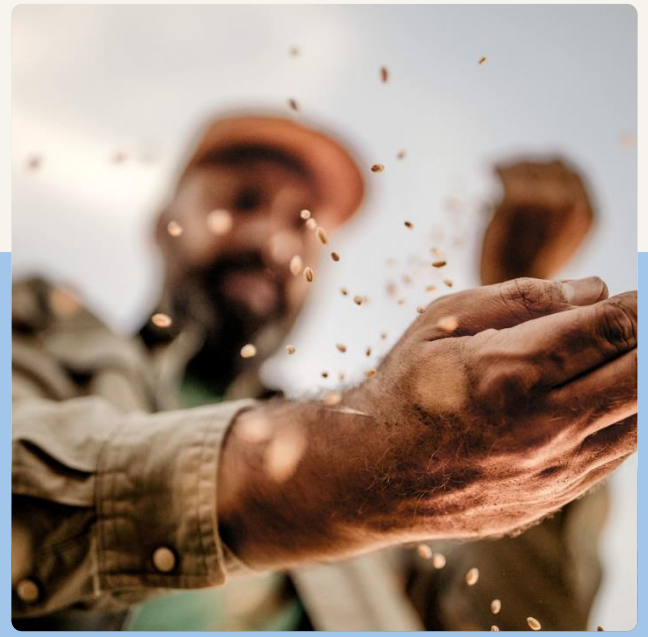
Valio ECOSYSTEM

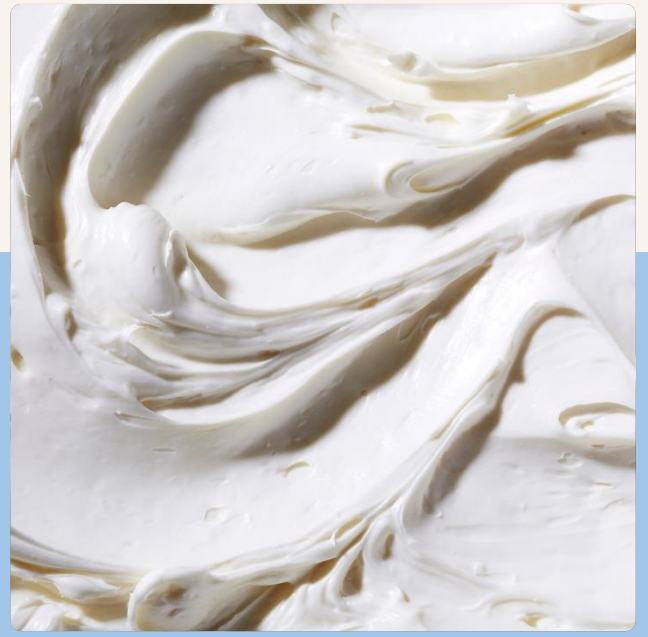


CHALLENGES



PROCESS INEFFICIENCY

RELEVANT TECHNOLOGIES AND APPLICATIONS?



GROWING DATA DEMANDS

OPPORTUNITIES

ENABLING

- Data collection, quality, ownership, data space
- Data use, integrations, combinations, models
- AI, robotics, automatization
- Measuring technologies, biomonitoring

WHOLE VALUE CHAIN AFFECTED, WIDE COLLABORATION AND ACTIONS NEEDED

WORK AREAS

- Digital twins of processes, farms, virtual laboratory
- Data driven process improvements in factories and R&D
- Cellular agriculture research, emerging processes
- Personalization, nutritional data

PROJECT EXAMPLE, GLOBAL COLLABORATION

INTERNATIONAL NSF GLOBAL CENTERS PROPOSAL, SUBMITTED

- The participants are USA (coordinating), Canada, UK, Finland, Japan.
- Each country funds its own project, in Finland BF and Research Council of Finland.
- Consortium is formed for 5 years and it aims combining the best expertise worldwide

THE RESEARCH WORK IS BUILT AROUND 4 THRUSTS (THEMATIC AREAS)

- Thrust 1: Bio- and use-inspired plant and microbial food ingredient production
- Thrust 2: Sustainable biorefining and processing for functional plant and microbial ingredients
- Thrust 3: High quality affordable and diversified food design
- Thrust 4: Environmental, social and economic implications of the future food bioeconomy

FOOD INNOVATION AND DIVERSIFICATION TO ADVANCE THE BIOECONOMY CO-INNOVATION

- Microbial food ingredient production (VTT)
- Hybrid (CellAg-plant) food design (VTT)
- Data-driven RDI (UH)
- Company parallel projects

17.6.2024

ROADMAP

Nature-smart food system

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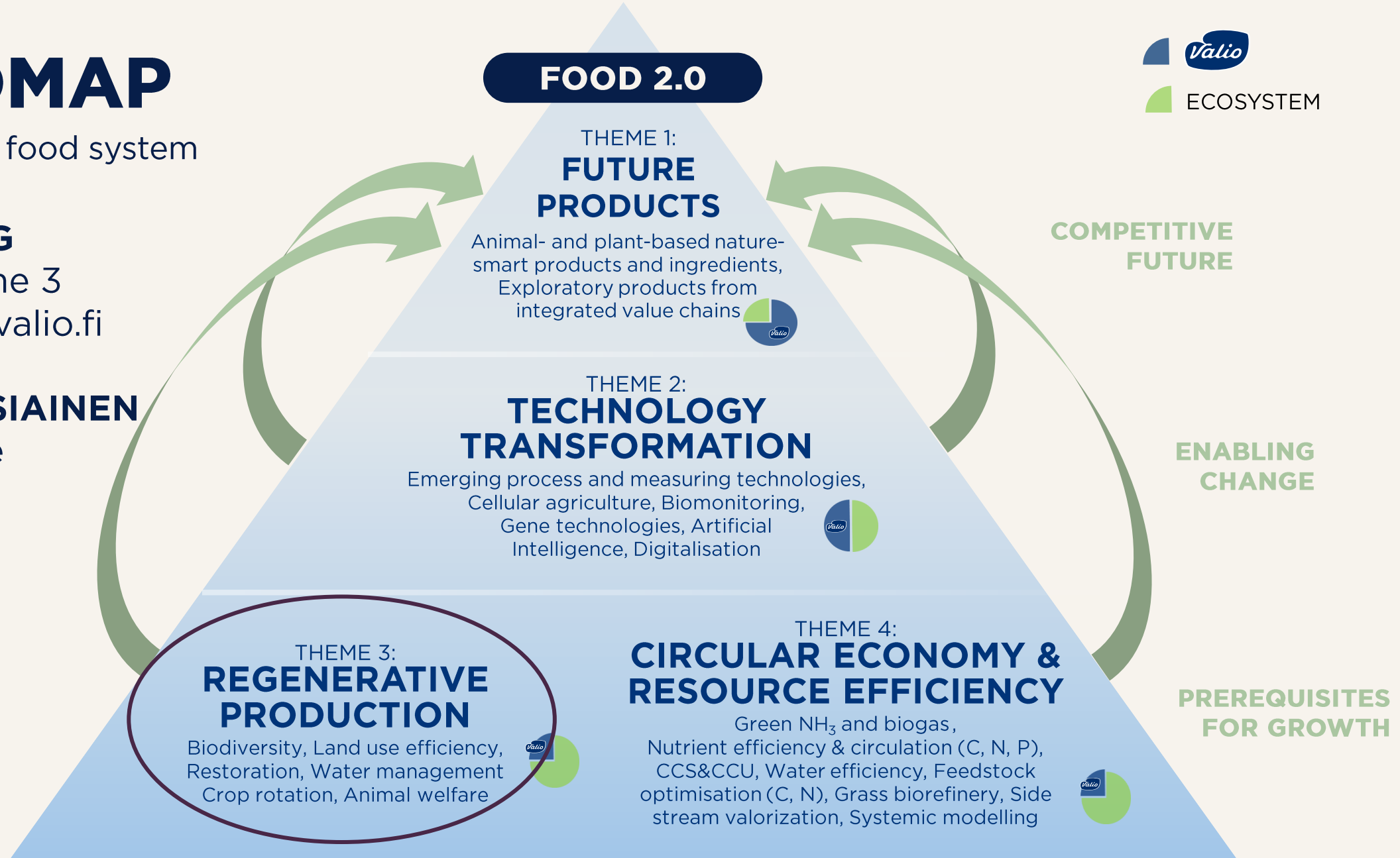
JUHA NOUSIAINEN
SVP Climate



ECOSYSTEM


CHALLENGES
CLIMATE CHANGE
NATURE LOSS
LAND-USE CHANGE

OPPORTUNITIES: REGENERATIVE PRODUCTION

- Carbon balance and climate impact measurements/modelling
- Actions for carbon neutrality
- Regenerative farming
- Agricultural aerosols
- Biodiversity actions
- Restoration
- Land-use efficiency
- Animal well-being
- Sustainable production

17.6.2024

CO-INNOVATION PROJECT DRAFT

FIELD PLOT-BASED CLIMATE IMPACTS LINKED TO PRODUCT LEVEL CARBON FOOTPRINTS

WHAT WE WANT TO ACHIEVE

- To link the field plot-based climate impacts to product level carbon footprint calculations and tools for primary production and industry needs
- To clarify the life-cycle calculations based on information collected from farms and different systems by considering the local conditions of arable farming, such as soil properties, environmental effects and farming practices
- To develop new ways to collect and combine data for life-cycle calculations
- To verify the carbon sequestration into soil based on latest scientific data

WHAT IS THERE FOR YOUR ORGANIZATION?

- Possibilities for measuring and verifying the climate effects of arable farming based on modern technology and latest studies
- develop a life-cycle calculation of your own value chain and thereby offer customers product-specific carbon footprints that consider, e.g., the positive effects of regenerative farming
- promote the company's innovation activities and practical applications

Create your own project, and build responsible and verified business solutions with the country´s top researchers and stakeholders

CONSORTIUM

FINNISH METEOROLOGICAL INSTITUTE

Luke

CENSE
THE GREEN TRACKER

Valio

Could your company be involved in the project?

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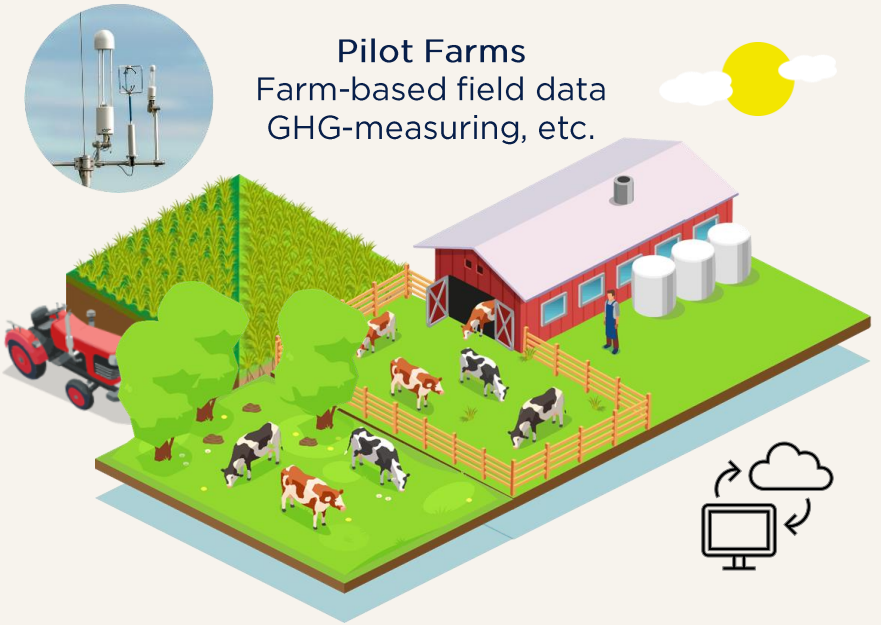
layla.hockerstedt@fmi.fi



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ROADMAP

Nature-smart food system

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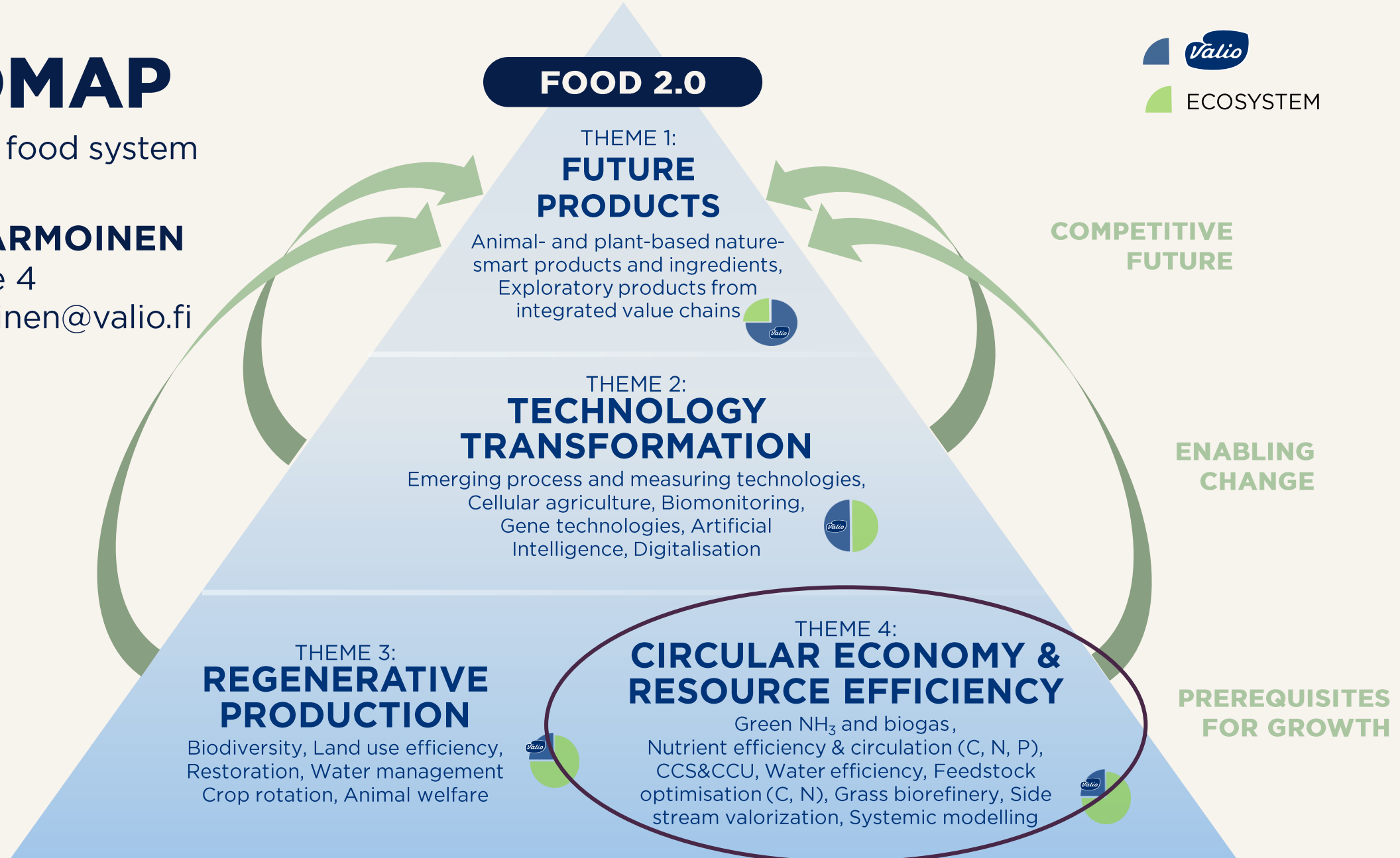


Valio ECOSYSTEM

CHALLENGES

LINEAR ECONOMY

CLIMATE CHANGE

Food system responsible for 30 % of global GHG emissions

Population grows and welfare is increased → even more demand

Carbon is added into atmosphere

NUTRIENT INSUFFICIENCY

Sufficient nutrients are essential to feed the needs of growing population

Domestic food production relies on imported fossil nitrogen fertilizers

Food system is leaking nutrients

SOLUTIONS

CLIMATE CHANGE

- Carbon cycle and capture in integrated food system
- Renewable energy from agricultural biomasses
- Biogas production value chain optimisation
- Power-to-X in food system

NUTRIENT SUFFICIENCY

- Nitrogen and phosphorus circulation in food system
- Systemic modeling of nitrogen circulation
- Technologies for recycled nutrients
- Roadmap for green ammonia in Finland
- Biogas production value chain optimisation

17.6.2024

PROJECT DRAFT FOR CARBON - AND NUTRIENT CYCLE

Co-Innovation project to tackle challenges on carbon and nutrient cycles of the food system

- Topics of public research:
  - Alternative processing methods of biofertilizers to increase utilization of current nutrients in the food system
    - For biofertilizers from municipal wastes
    - For biofertilizers from agricultural origin
  - Domestic green ammonia and fertilizer production
  - Capturing of BioCO_2, best methods of CO_2 utilization and CO_2 logistics in Finland
  - The concept design for next generation biogas plant that has maximum profitability and positive environmental impact
- The cycle of carbon and nutrients requires wide range of companies

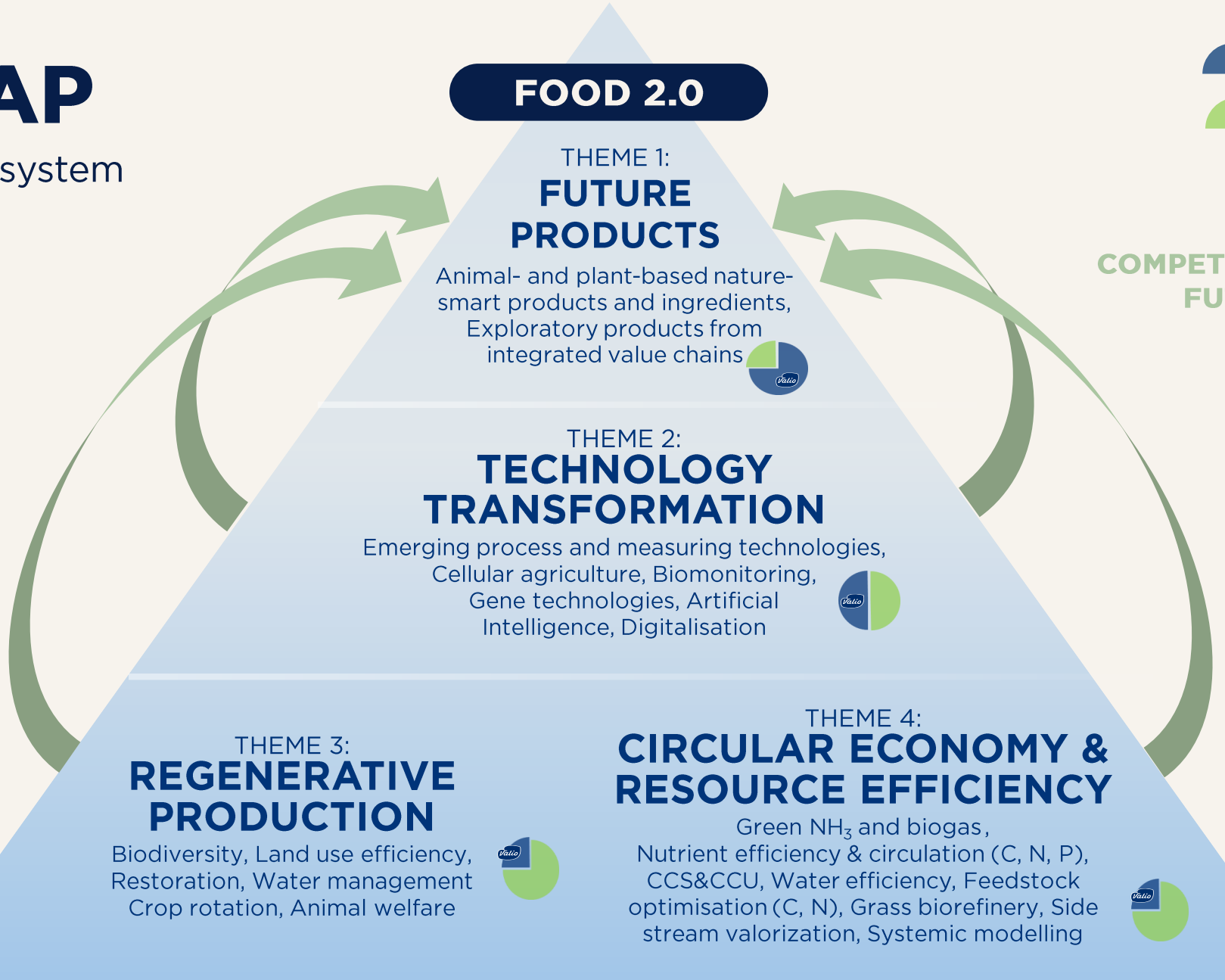
  We welcome companies to participate the public research and to set up their own sideprojects!

To be submitted in January 2025

17.6.2024

ROADMAP

Nature-smart food system



ECOSYSTEM

COMPETITIVE FUTURE

ENABLING CHANGE

PREREQUISITES FOR GROWTH


DISCUSSION
Together we make life BETTER


WE NEED A
SUSTAINABLE FOOD
SYSTEM
How do we get there?


THANK YOU!
Have a great summer!

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