Regenerative Food Processing

All streams
are main streams
for planet's health

OLIVE OIL AWARD ZURICH

Tnote 05.05.2022

Institute of Food and
Beverage Innovation

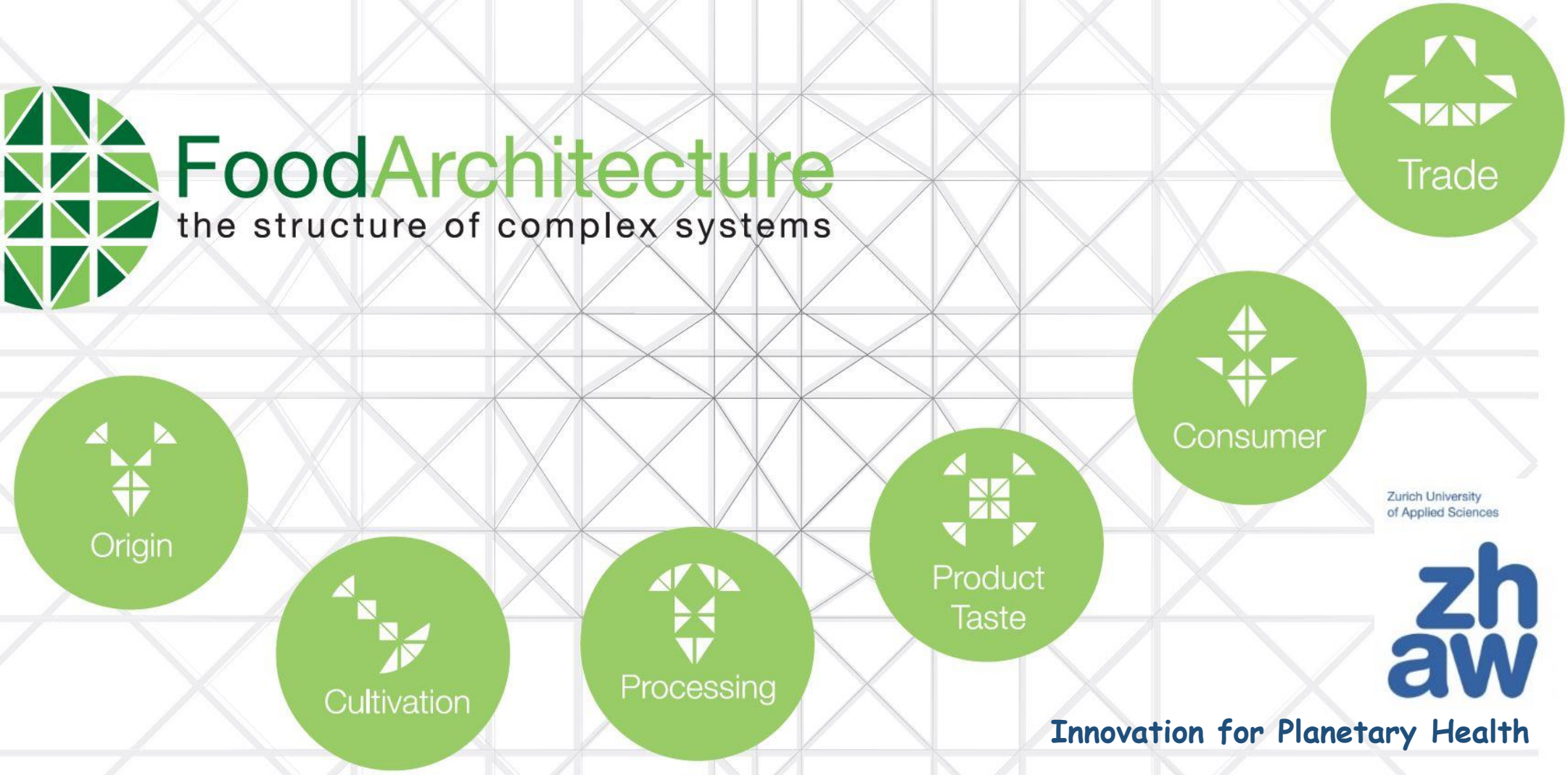
OLIVE OIL AWARD ZURICH

2002-2020

Annette Bongartz
& Team

FoodArchitecture

the structure of complex systems



Zurich University of Applied Sciences

zhaw

Innovation for Planetary Health

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Architecture is fundamental to any comprehensive understanding of **culture**.

The approach of including **food as nutrient** and **requisites for self-staging** ties in with reflections on the relationship between being and dwelling.

Heidegger (Building, Dwelling, Thinking: 1953) posits **dwelling as the fundamental form of human existence** by relating it to building.

Relationships between growing, preparing, preserving, eating, drinking, and living are preconditions of existence.

The transmission of the knowledge of the means of life, as well as the acquisition of the skills to produce and use them, forms the basis of human development.

The agronomic and industrial production of raw materials and food, trade, preparation and presentation, express man's ability to organize her/his/it's environment in terms of **meaningful consumption** of food and drink, and thus to articulate his **cultural world**.

Through FoodArchitecture, individual cultures, as well as humanity as a whole, express themselves and develop approaches of a common understanding of the world.

Only by confronting the food habits of another culture and the resulting consequences can we recognize their otherness and develop approaches for common action in a **growing alliance of the willing to regenerate life on the planet**.

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

The most relevant Questions on Food

Origin
Where does it come from?

Processing
How is it made?

Health
What is in my Food?

Ethics
Does it harm me, my family, other people, animals, the environment?

Hühn, T. (2021) The 4 most relevant Questions on Food, ZHAW, Wädenswil.

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Re-volution of Agro-Food-Systems

Arising challenges facing the **boundaries of planetary resources**

- Increasing world population / resource consumption
- Climate change / crop failures
- Plant and animal diseases
- Deforestation
- Pesticide Application
- Global Transportation
- Monocultural Systems
- Loss of Biodiversity

Sustainable/regenerative production methods
for food and -ingredients

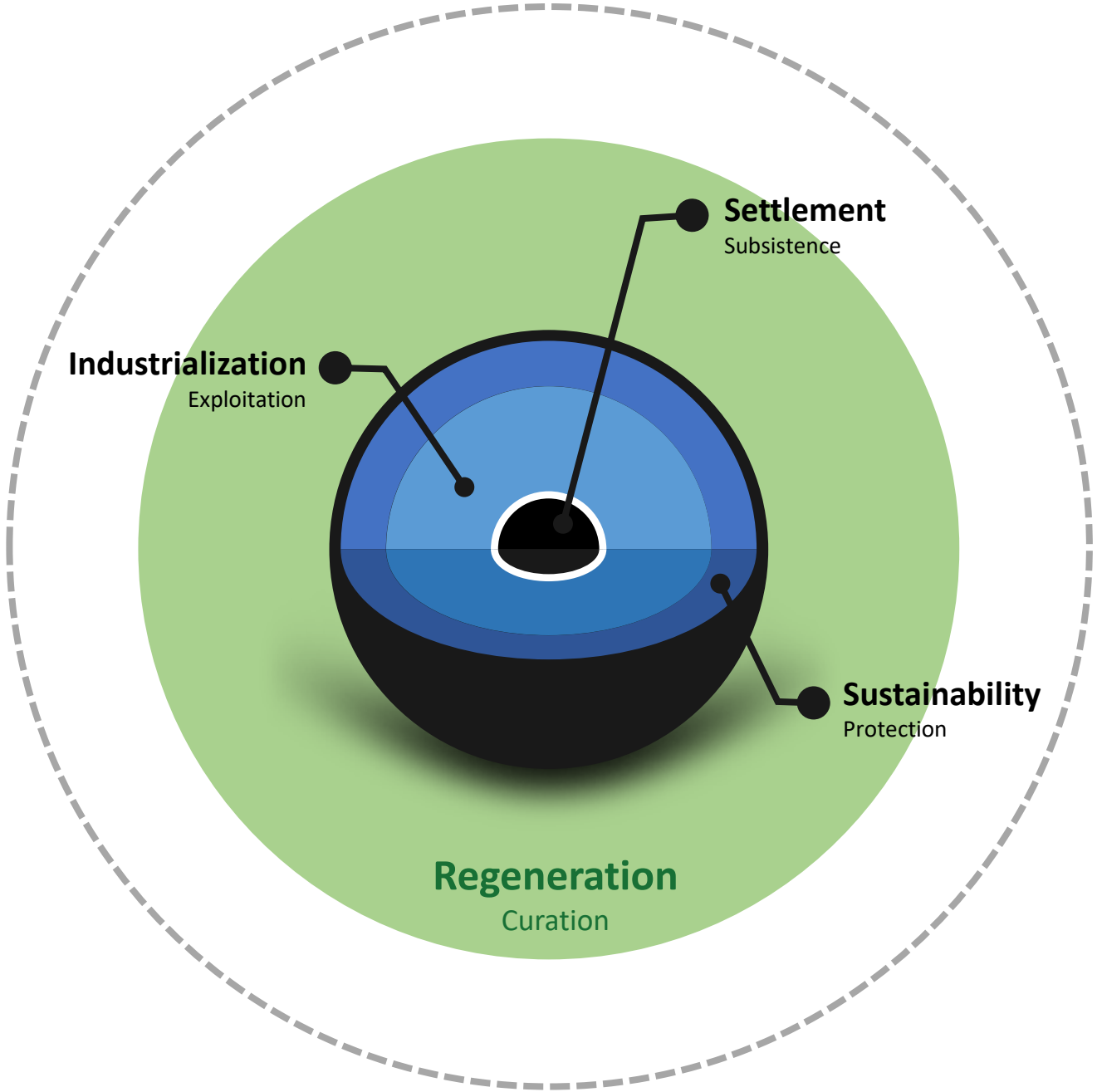
- Food production independent from location and season close to consumption - De-territorialization
- Cultivation of cells in instrumented bioreactors
- Usage of nature as unique source
- Upcycling of biomolecules

FoodArchitecture
the structure of complex systems

zh aw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Human
Consumption
Population
growing

Planetary



Health

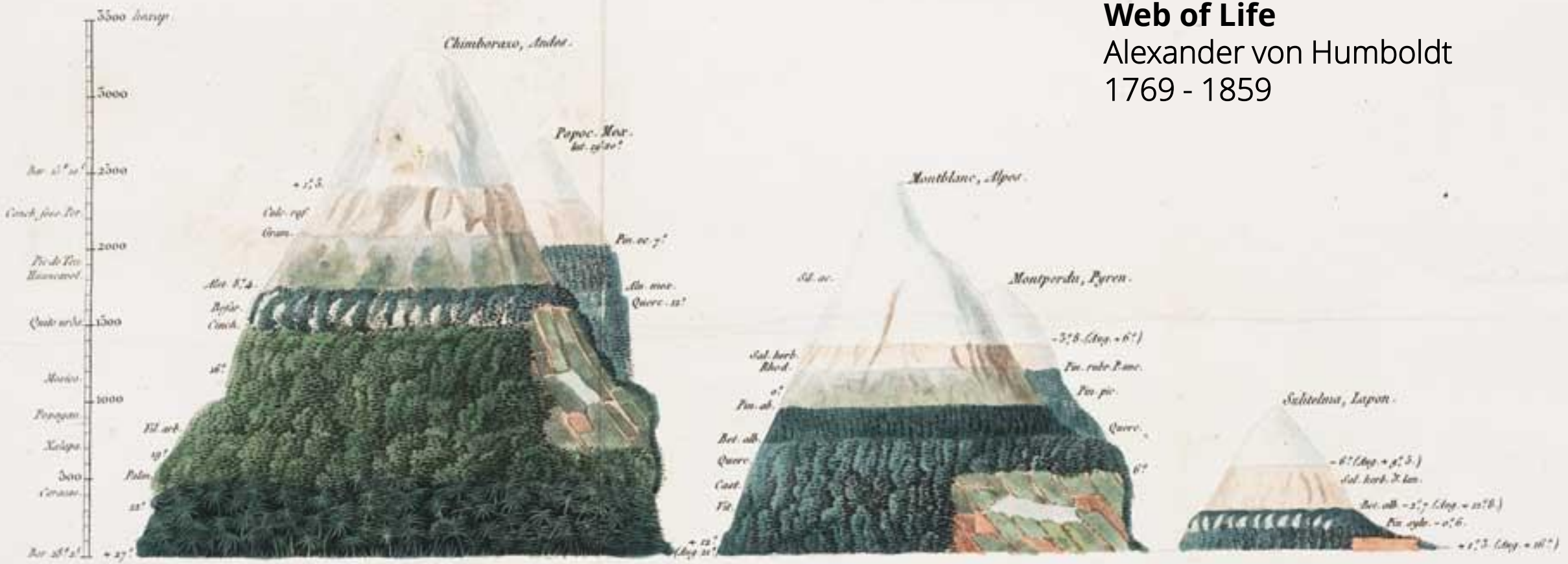
Biodiversity
shrinking

From Doughnut*- to Regenerative-Economy

Protection is not enough

***Kate Raworth**
Dougnut Economy, 2017

Web of Life
Alexander von Humboldt
1769 - 1859



Plaga æquinoctialis, lat. 0°-10°.
(Humboldt. Bonpland.)

Zona temperata, lat. 42°-46° bor.
(Wahlenberg. Buch. -Ramond. Decandolle.)

Zona frigida, lat. 68° bor.
(Buch. Wahlenberg.)

Geographiæ plantarum lineamenta.

Plantarum nomina appesuimus ea altitudine qua quæque crescere desinunt. Numeri nudi significant temperaturam mediam annuam, thermometri cent. gradibus expressam: numeri uncis inclusi, temperaturam mediam mensis Augusti.

ON

THE ORIGIN OF SPECIES

BY MEANS OF NATURAL SELECTION,

OR THE

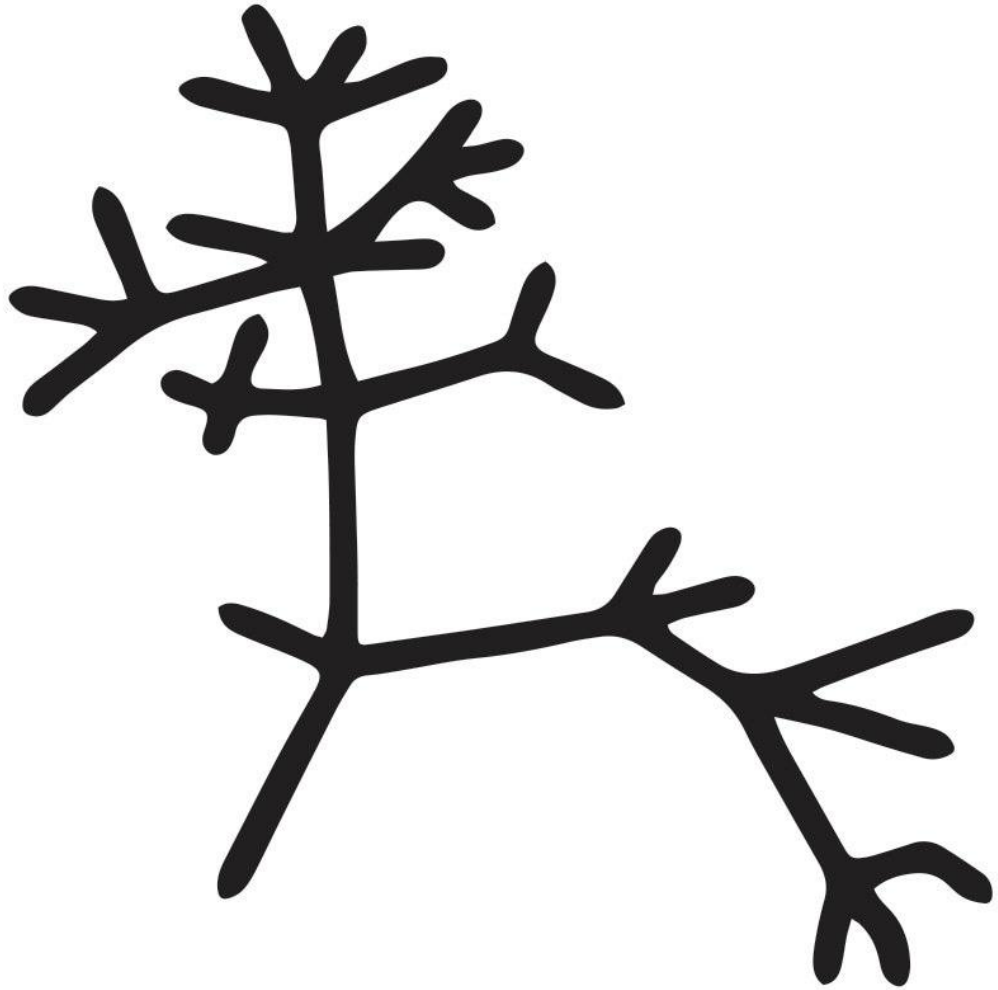
PRESERVATION OF FAVOURED RACES IN THE STRUGGLE FOR LIFE.

By CHARLES DARWIN, M.A.,

FELLOW OF THE ROYAL, GEOLOGICAL, LINNÆAN, ETC., SOCIETIES;
AUTHOR OF 'JOURNAL OF RESEARCHES DURING H. M. S. BEAGLE'S VOYAGE ROUND THE WORLD.'

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1859.

Tree of Life
Charles Darwin
1809–1882



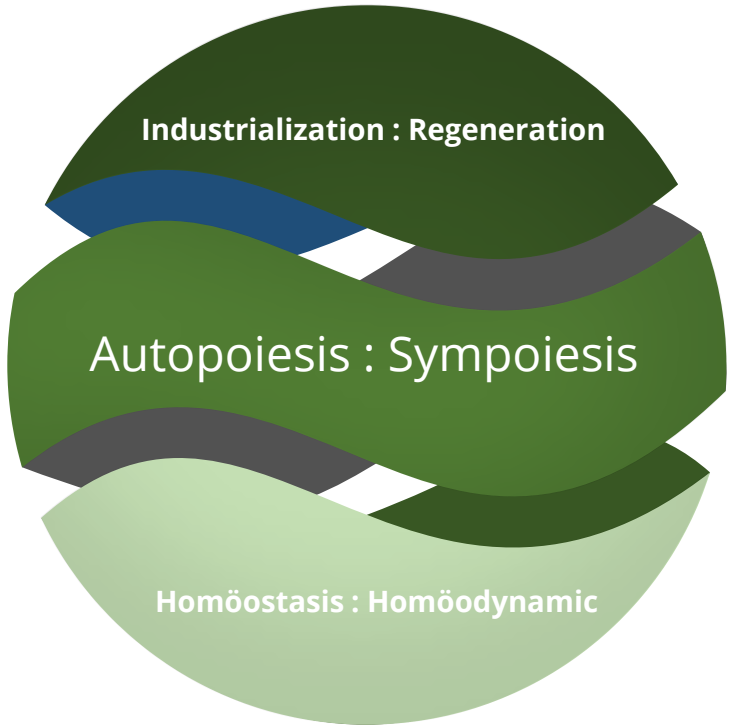
FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

James Lovelock
The Gaia Hypothesis, 1972

Humberto Maturana & Francesco Varela
The tree of knowledge, 1987

Donna Harraway
Stay with the trouble, 2018



Macrobiom

Interaction, relation, structural coupling:
biocenosis

Holobiom

Integration, determination, entanglement:
evolution

Microbiom

Adaption, nutrition, metabolism:
salutogenesis

From Exploitation to Curation

SYSTEM RECONSTRUCTED

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

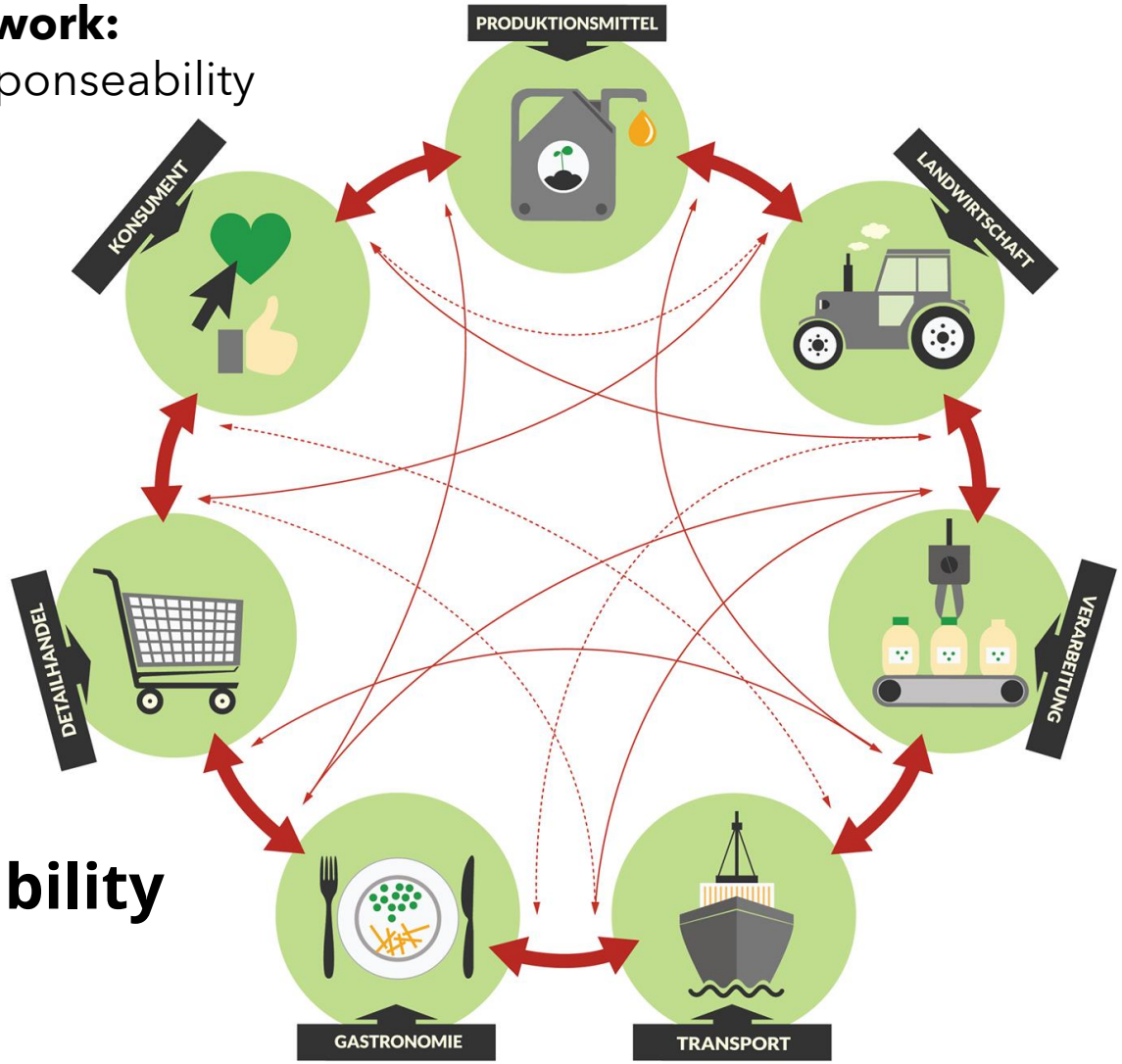
Valuechain

Value Chain:
Delegated responseability

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Value Network:
Shared responseability



From delegated
to shared responseability

VALUES RESPECTED

FoodArchitecture
the structure of complex systems

zh aw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Transparency:
Trusted Food

From Value-Chain to -Network

FOOD UNCHAINED

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Narratives of food

Narratives such as **"The battle to save the planet is won on the plate"** raise awareness that impact is created with every decision we make about **what we eat**.

After a period in which parts of society in the Western world followed a **value orientation** in which many things came with a **price tag**, a greater emphasis on works is occurring via an increasing debate on values in mature economies.

This **work orientation** is characterized by the reflection process that with the production of food and services effects arise and these are to be subjected to a more **comprehensive consideration**.

FoodArchitecture
the structure of complex systems

zh aw

Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Customer User Experience UX-Design

System acceptability
Is the impact on the environment and the social system acceptable?

Practicability
Does it function to an affordable engagement and price?

Usability
Is the usage easy to learn, does it work and is it easy to remember how?

Reliability
Can the user rely on the function and durability?

Compatibility
Is there a fit to the existing environment?

Perception @
first place - home
second place - work
third place - community

Hühn, T. (2021) The 4 most relevant Questions on Food, ZHAW, Wädenswil.
nach: Nielsen J. (1993) Usability engineering. Morgan Kaufmann. San Francisco

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

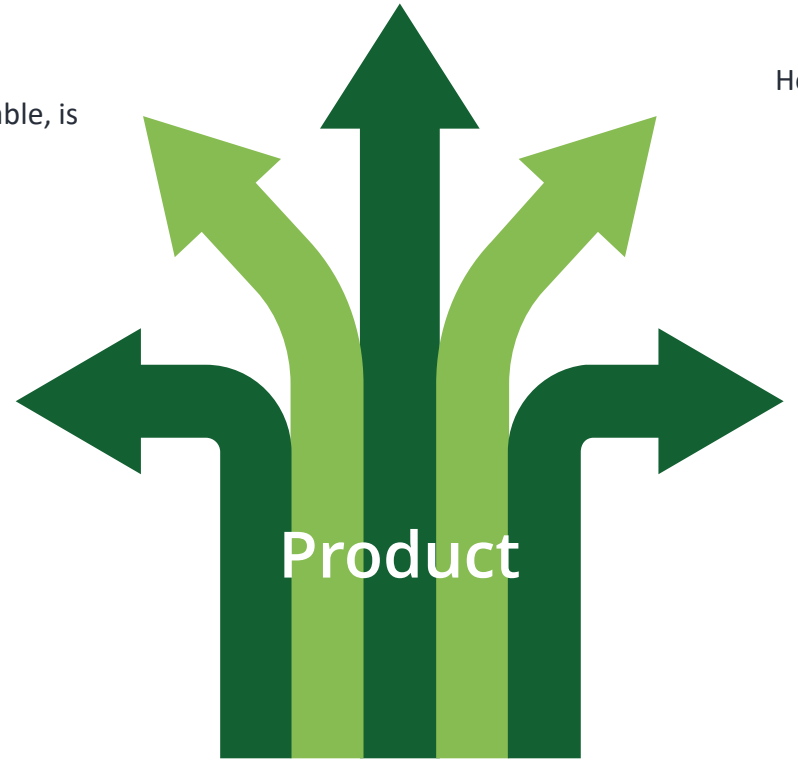
Sensory User Experience

SX-Design

Harmony
Can the product tell a perceptible story and is it balanced overall?

Aroma
Is the perception complex, are individual components recognizable, is there a sequence and what impression remains?

Taste & Texture
How is the tactile, textural, trigeminal and gustatory perception on the palate?



Appearance
What does the product and packaging look like?

Persistance
Which impression lasts and are there postolfactoric events?

Process

Hühn, T. (2021) Sensory User Experience, ZHAW, Wädenswil.

FoodArchitecture
the structure of complex systems

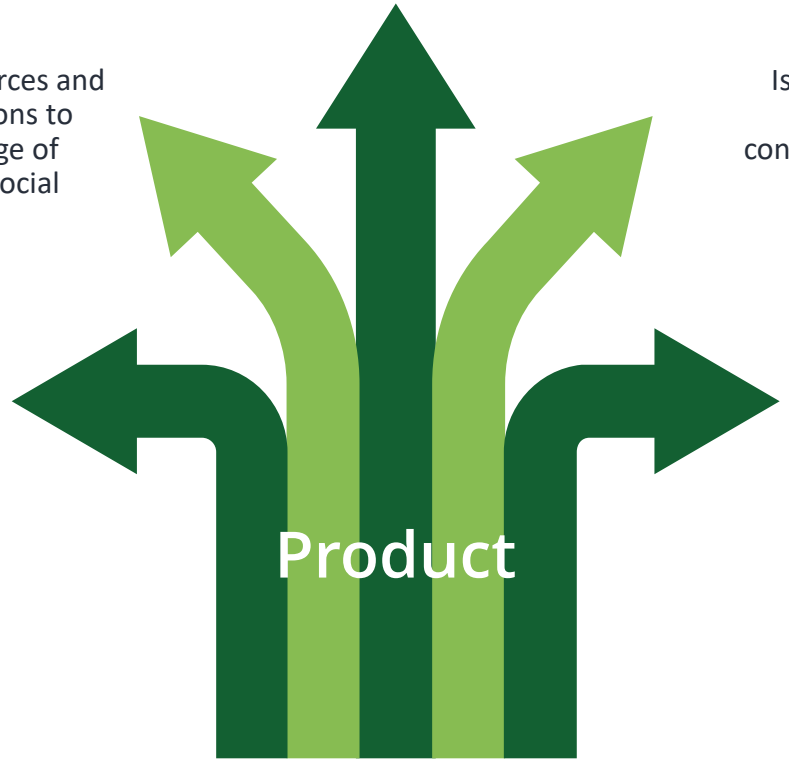
zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Regenerative User Experience[RX-Design]

System Curation
Does the business model contribute to bio-, social-diversity, mitigate global warming and Planetary Health?

Resource Utilization
Is there a conscientious use of resources and sourcing of materials, are the emissions to the environment minimized, the usage of renewable energy granted, and the social values respected?

Economic Resilience
Is there a fair treatment of all members of the network and does the operation contribute to create and sustain a long-term regenerative economy?



Stream Valorization
Are all streams respected as mainstream and are they valorized to reduce Food-Waste?

Up-/re-cycling Potential
Are the molecules, materials, and substrates composed in a way that optimizes impact generation and up-/re-cycling capabilities?

From UX and SX to RX-Design

INTERCONNECTED EXPERIENCE

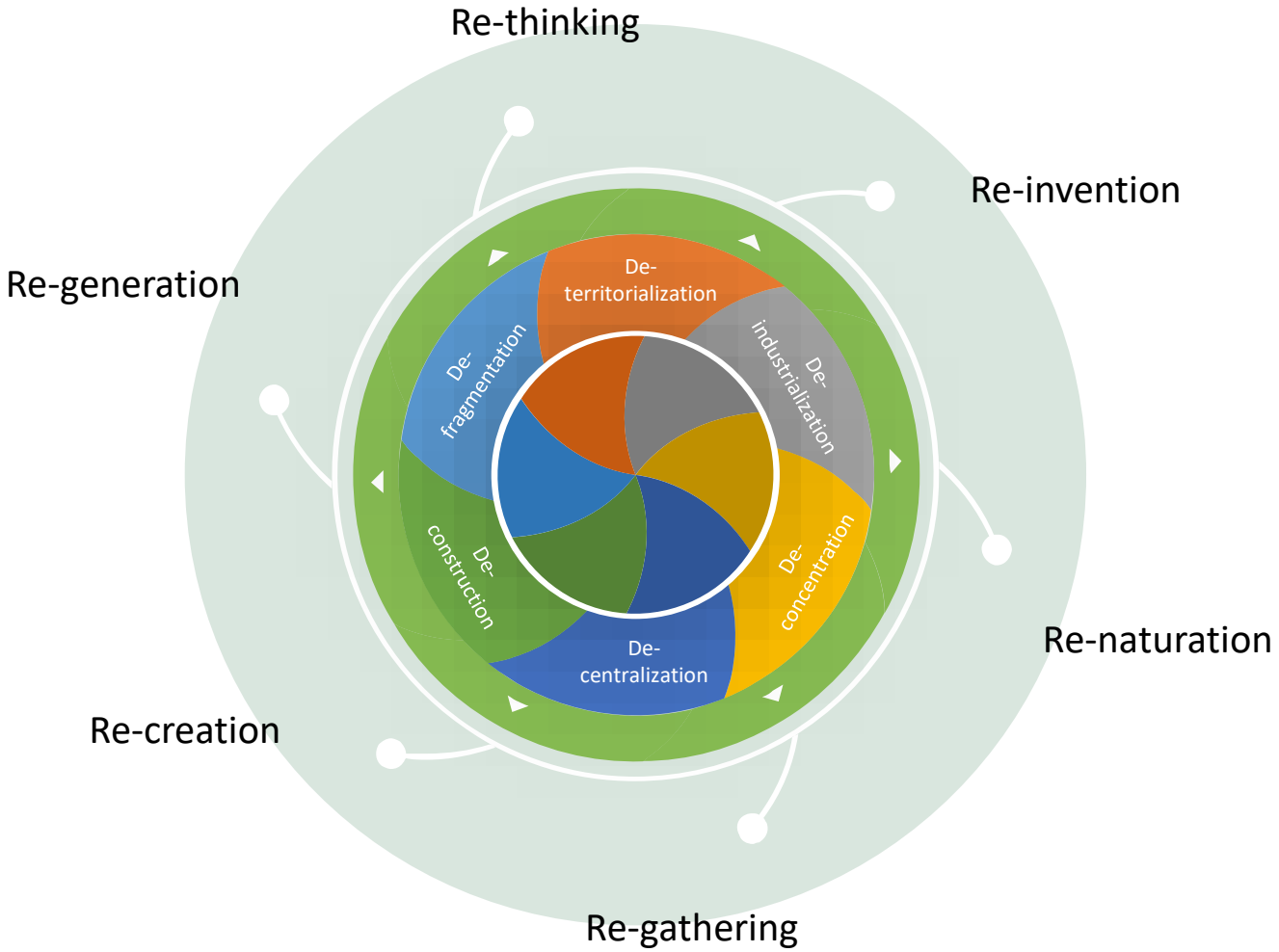
Process

Hühn, T. (2022) Regenerative User Experience, ZHAW, Wädenswil.

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

The transformational Circle



Hühn, T. (2021) The De-/Re-Circle, ZHAW, Wädenswil.

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Mainstream all streams – Valorize all elements – Upcycle biomolecules – evolve and loop

Extracting, Separating, Preserving **more of the valuable**

Transforming the **natural compostion** of ingredients into **valuable products** with

signature taste, **nutritional functions** and **beneficial business models** contributing to **Planetary Health**

FoodArchitecture
the structure of complex systems

zh aw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Classification vs Standardization

Enables inclusive processing of fluctuating raw materials through detection, classification and process modification rather than standardizing and discarding raw materials because criteria are not met.

LABTORY

Regenerative Processing by Automation

LABTORY

Unites Laboratory and Factory, experimentation and production, observes and optimizes continuous processes through automated thinking, modulation, simulation and control to enable regenerative foodmanufactoring.

Hühn, T. (2021) LABTORY – Regenerative Processing by Automation, ZHAW, Wädenswil.

ORO DE CACAO

PATENTED COLD EXTRACTION
MAYA TRADITION - SWISS INNOVATION
Ek Chuah
1100 b.C.
2016

Partners


SPIN
COLD
BREW
Kaffeearomen
Rotation
Feinstvermahlung


COFFEE
SPIN COLD BREW
arabica & rice
COFFEE
SPIN COLD BREW
arabica-sidamo

Partners

FoodArchitecture
the structure of complex systems

zh aw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Biotransformation vs Dissipation

Enables molecular Upcycling on the base of whole plants through the production of concentrated cell feed to reduce food waste and contribute to curate the system for planetary health.

CULTURY

Active Ingredients by molecular Upcycling

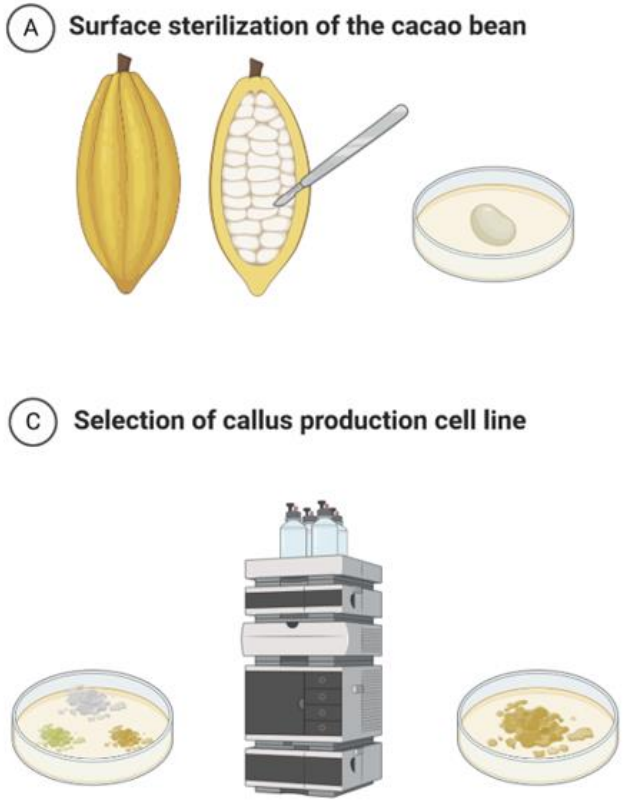
CULTURY

Unites regional and regenerative production of agricultural products as a substrate with plant-based cell cultures for the generation of active Ingredients and a base for personalized food.

FoodArchitecture
the structure of complex systems

zhaw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Cellular Agriculture: Chocolate from the tank

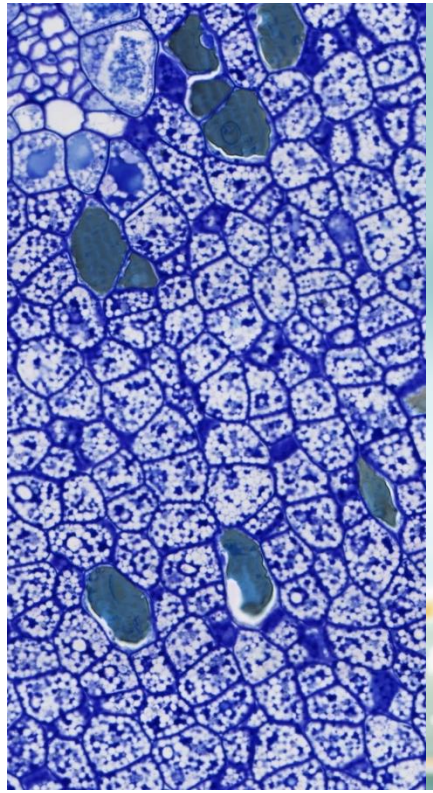


Regine & Dieter Eibl
Pioneers of Cell Culture Research

FoodArchitecture
the structure of complex systems

zh aw
Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.

Production of chocolate bars with suspension cells of the cacao tree



ZHAW, Wädenswil / Photo: Ansgar Schlueter 2016 ZHAW, Wädenswil / Photo: Frank Brüderli

Establishment of the cell culture from one freshly harvested, immature pod (USDA-ARS Tropiculture Research Station, Puerto Rico)

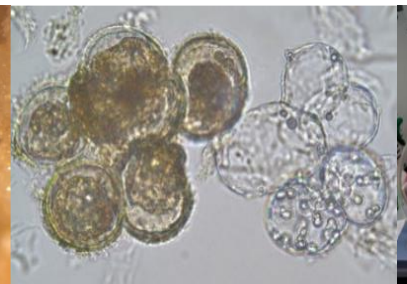
Callus induction by wounding the seeds

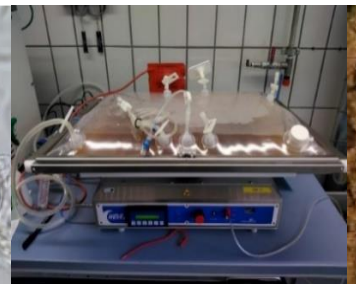
Callus propagation in petri dishes

Transfer into shake flasks to initiate formation of suspension cells

Propagation of suspension cells in shake flasks and a wave-mixed bioreactor

Servus TV





MSc in Preneurship
for Regenerative Agro Food Systems

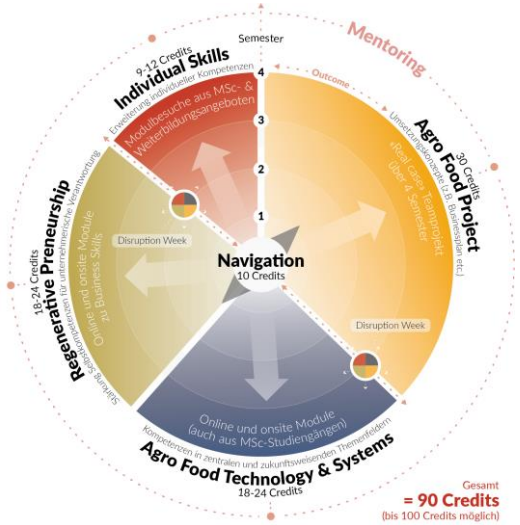
Entrepreneurship – as founders, independently drive disruptive innovations which have the potential to change systems.

Intrapreneurship – as initiators and coordinators, take the lead in cross-system innovation processes within established companies.

Commonpreneurship – as coordinators and drivers, shape processes of social change.

zh aw

Environment | Food | Health | Society
Unsere Kompetenzen in Life Sciences und Facility Management.



Food Campus Berlin

The Future of Food and Planetary Health

«Die Schlacht um die Nachhaltigkeit wird auf dem Teller·entschieden.»

Jörg Reuter
Projektleiter

Start-up Community for Change

Network

FoodArchitecture
the structure of complex systems

- Beyond sustainability - it’s about regeneration, within planetary limits and social thresholds.
- From value chain to a transparent value network with shared responsibility.
- Holistic User Experience (Consumption, Sensory, Regeneration) by interconnection.
- Mainstream all streams, upcycle molecules and regenerate the system.