

Institute of Natural Resource Sciences

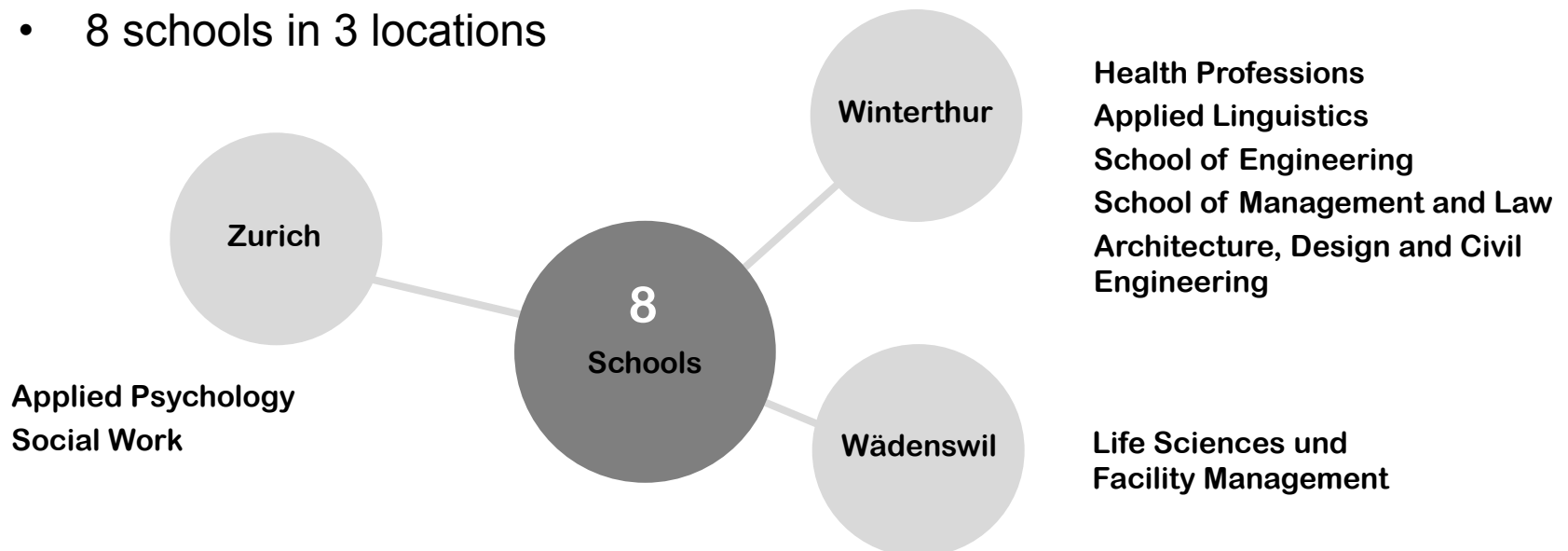


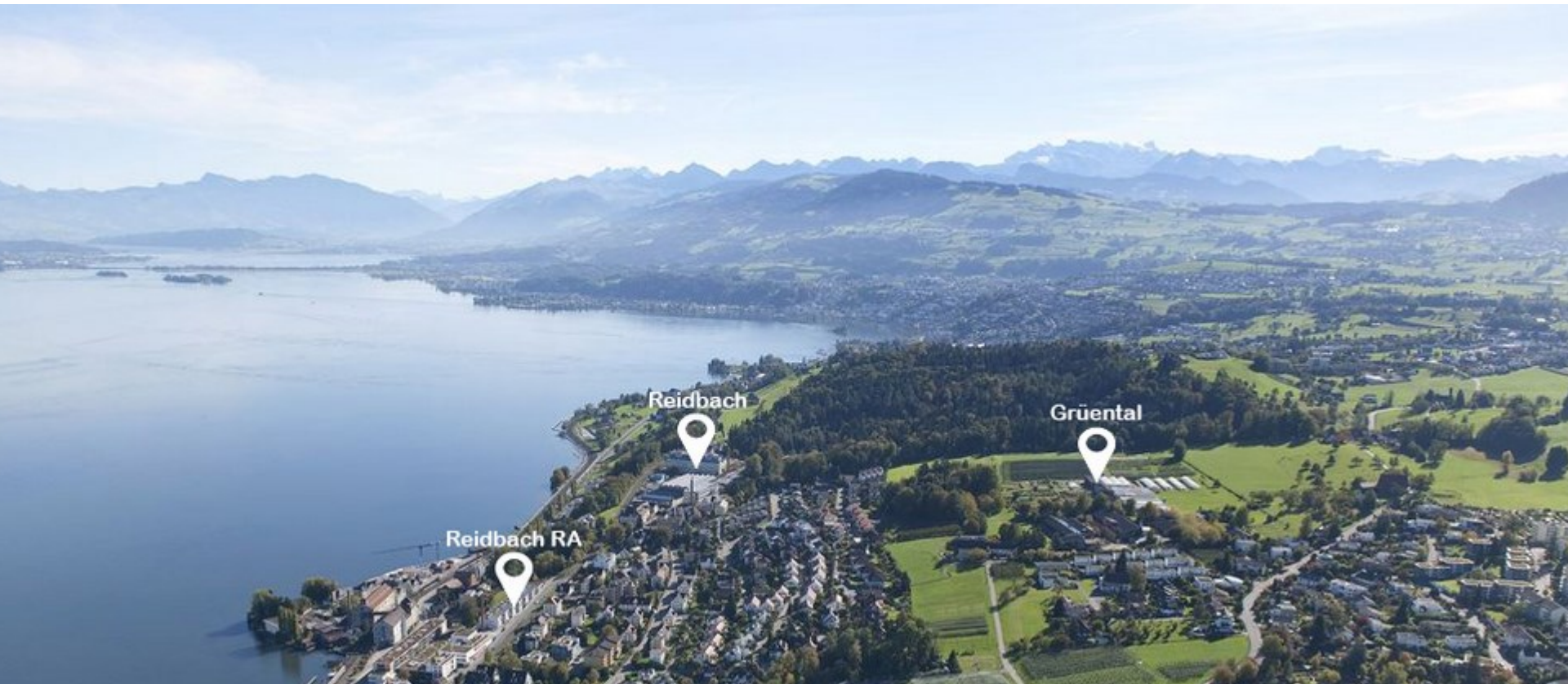
Source: Frank Bröderli

The ZHAW in numbers

ZHAW Zurich University of Applied Sciences

- Part of the Zurich Universities of Applied Sciences and Arts
- 11 000 students (Bachelors and Masters)
- 2800 staff members
- 8 schools in 3 locations





School

Life Sciences und Facility Management (LSFM)

Locations

- Wädenswil
- Zurich (Technopark)
- Wergenstein

Degree programmes and continuing education

- 5 Bachelor's degree programmes / ~ 1390 students
- 3 Master's degree programmes / ~ 150 students
- A wide range of continuing education, courses and conferences

Institutes in the LSFM School



Chemistry and Biotechnology



Food and Beverage Innovations



Natural Resource Sciences



Facility Management



Applied Simulation

Institute of Natural Resource Sciences

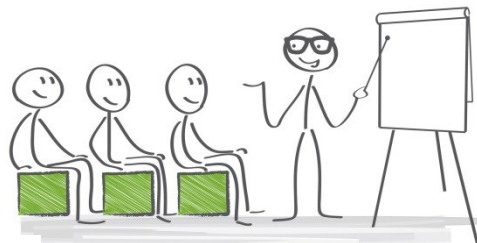


Institute of Natural Resource Sciences

- Bachelor's degree programme in Natural Resource Sciences
- Master's degree programme in Environment and Natural Resources
- Continuing education for professionals (many MAS and CAS courses) and organisation of conferences
- Research and services

→ scientifically-based & practice-orientated

Facts and figures (as of December 2017)



Illustrations: Fotolia.com

596 **BSc students**
61 **MSc students**
1090 **participants in continuing education**
(CAS courses, training courses, conferences)



190 **staff members**

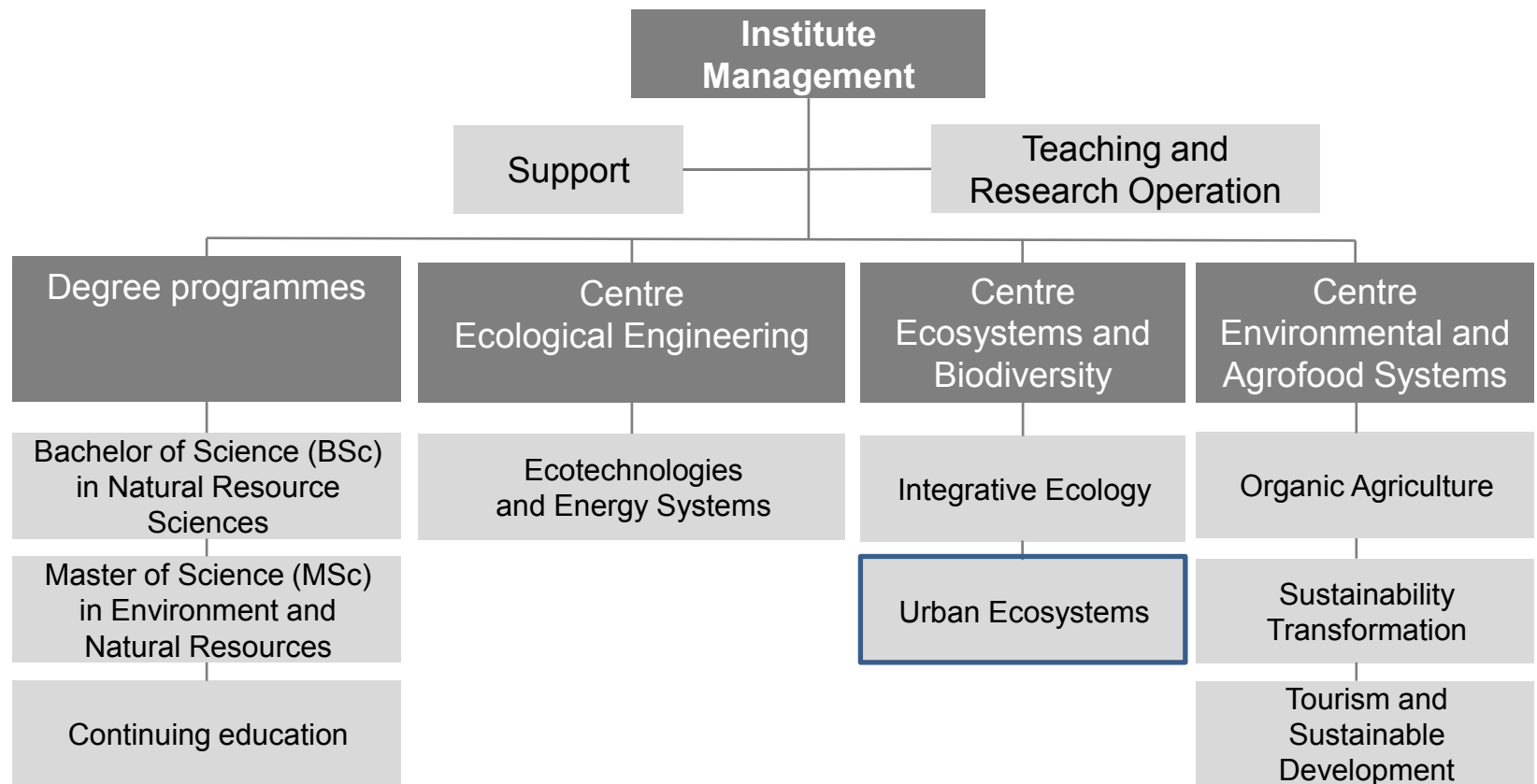


400 on going **projects** in
R&D / Services



27 million
in proceeds

Organigram



Head of Institute: Prof. Dr. Rolf Krebs

Urban Ecosystems



«Are green spaces in
the town worthwhile or
are they expensive?»

Source: www.shutterstock.com

Urban Ecosystems

Research groups and main areas of focus:

- **Green Care:** horticultural and therapeutic use of green spaces
- **Open Space Management:** designing of public and private open spaces working towards sustainability.
- **Urban Ecology:** concept of green roofing in order to be at one with nature
- **Planting Design:** aesthetic and sustainable planting of vegetation in urban spaces



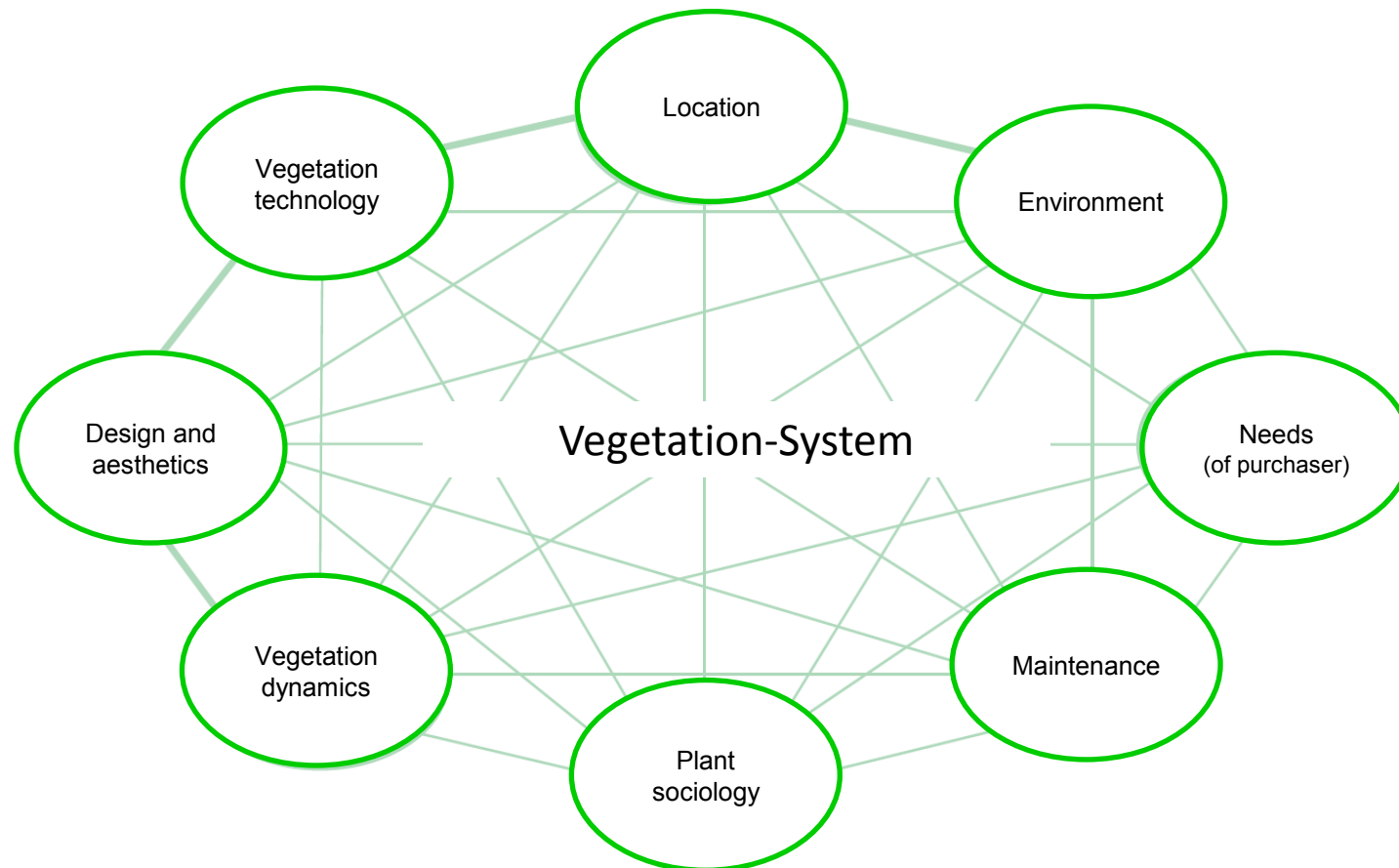
Research group for Planting Design

Main focus:

- Development of sustainable planting concepts, methods and plant combinations for different locations and situations in urban green space
- Moderation of the maintenance
- Monitoring and further development
- Consulting
- Development of optimal substrate



Research group for Planting Design



Research group for Planting Design

Bild Bern?

- Our aim is to create a well-functional vegetation system. All these points have an influence on a vegetation system and have to be integrated in the planning.
- A sustainable vegetation system has to be s

Locations



Campus Grüental, Campus Reidbach
and Castle, **Wädenswil**



Center da Capricorns, **Wergenstein**

Milestones

1942	Foundation of the Swiss College for “Obstverwertung” by the Swiss Apple Juice Trade Association
1970	Beginning of the first Higher Technical College (HTL) degree programmes in fruit-growing, viticulture and horticulture
1975	Renaming of the College as the Wädenswil School of Engineering (ESW)
1976	Concordat as sponsor of the school consisting of the cantons of Bern, Aargau, Grisons, Zurich and 13 further cantons as well as the Principality of Liechtenstein
1993	New school structure with 6 departments, including the specialist department of fruit-growing, viticulture and horticulture
1998	The ESW becomes the University of Applied Sciences Wädenswil (HSW)
1999	Bologna Declaration: implementation of a new horticulture study programme in place of fruit-growing, viticulture and horticulture
2004	Renaming of the “Horticulture” study programme as Natural Resource Sciences; the specialist department Fruit-growing, Viticulture and Horticulture becomes the department of Natural Resource Sciences
2007	The University of Applied Sciences Wädenswil becomes the School of Life Sciences and Facility Management and part of the newly founded Zurich University of Applied Sciences; The department of Natural Resources Sciences becomes the Institute of Natural Resource Sciences
2009	Start of the master’s degree programme MSc in Life Sciences specialisation Natural Resource Sciences
2017	Start of the master’s degree programme MSc in Environment and Natural Resources

Degree programmes



BSc in Natural Resource Sciences

Focus: Professional qualification for the environmental sector

- **5 Specialisations (Majors):**
 - Organic Agriculture and Horticulture
 - Renewable Energies and Ecological Engineering
 - Nature Management
 - Environmental Systems and Sustainable Development
 - Urban Ecosystems
- **Supplementary qualifications (Minors):**
 - Species Knowledge and identification
 - Education and Consulting
 - Field Diagnostics and Analysis
 - Life Cycle Assessment and Labelmanagement
 - Profile International
- **Duration: 6 semesters**
- **Degree «Bachelor of Science ZFH in Natural Resource Sciences»**

MSc in Environment and Natural Resources

- Focus: **interdisciplinary skills** and applied research; extending **expertise and knowledge of methods** as well as improving **scientific competences**
- Master's Research Units: **Agrofoodsystems, Ecosystems & Biodiversity, Ecological Engineering**
- Duration: **3 semesters** (full-time), part-time study possible
- Degree: **Master of Science (MSc) ZFH in Environment and Natural Resources**
- Optional: **Double Degree with the University of Ljubljana, Slovenia as Master of Science (MSc) in Water Science and Environmental Engineering**

Internationality at IUNR

- Student exchange programmes (**SEMP, Bilateral or Free Mover**) in more than 60 partner universities in Europe and worldwide
- Wide range of **modules taught in English** each spring semester (4th semester BSc; 2nd Semester MSc)
- BSc or MSc – **thesis abroad**
- **Double Degree** with the University of Ljubljana, Slovenia
- **Minor International Profile**
- **Summer Schools** in different countries
- **Language courses** in home country

Further information at www.zhaw.ch/en/lisfm/study/international

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Continuing Education

The six research units within the Institute offer a wide range of topics:

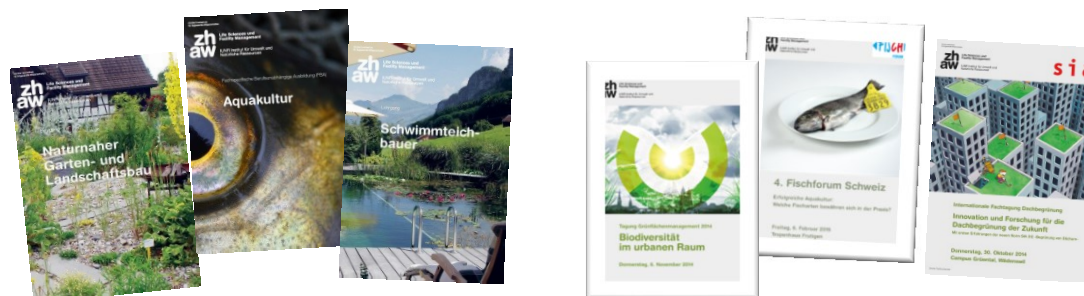
- **Training course certificates (MAS and CAS)**

Topics: Species knowledge and identification
Environment and environmental education,
Nutrition and food production



- **Continuing education, courses and conferences**

Course range from Aquaculture to Horticulture and from “Skyfood” to Roof Greening



The Grüental gardens



Source: IUNR, Photo: Erich Stutz

The Grüental gardens

- **Unique location** with a view of Lake Zurich
- Varied gardens with over **4000 different types of plants**
- Topics are closely connected to research and study in the institute

Highlights include:

- **Grassland:** addresses the importance of the grass for our society and the difficulty of sustainable food and raw materials production
- **Display gardens:** biodiversity which you can reach out and touch
- **Medicinal plant garden:** displays the use of medicinal plants – for anyone who is interested and for those working with medicinal plants



Research



Source: Esther Volken

Research focuses



Preservation of the landscape as a valuable resource.



Possibilities of using the regional value added.



Systems approach, i.e. observation of the lifecycle of products and shutting down of metabolic cycles.



Development of city and countryside taking into account ecological, economic and social interests.

Research units

- Ecotechnologies and Energy Systems
- Integrative Ecology
- Organic Agriculture
- Sustainability Transformation
- Tourism and Sustainable Development
- Urban Ecosystems

Ecotechnologies and Energy Systems



Source: Frank Brüderli

Ecotechnologies and Energy Systems

Research groups and main areas of focus:

- **Aquaculture Systems:** The research group focuses on different aspects of aquaculture, such as primary production, microalgae and feed, welfare conditions and their control.
- **Ecotechnology:** utilisation, treatment and avoidance of wastewater, as well as a combination of fish and plant breeding in the circulatory system
- **Life Cycle Assessment:** Life cycle assessment is a holistic approach to quantify the full range of environmental impacts caused over the whole life cycle of products and services
- **Renewable Energy:** energy efficiency and sustainable energy supply
- **Soil Ecology:** chemical or physical strains on the soil and sustainable irrigation systems



Ecotechnologies and Energy Systems

Reference project **PVT Solar power plant, Lintharena SGU**

Installation of a combined PVT and a PV facility on the rooftop of the Lintharena SGU

- The PVT part of the facility will generate heat, as well as electricity, which will be used to pre-heat the groundwater for the thermal heat pumps.
- Through this combination, the solar modules will produce a higher electricity yield and the thermal heat pumps will therefore need less electricity.



Source: Jürg Rohrer

Goals

- Collecting of operational experience over 5 years
- Appraisal of the yield of heat and electricity from the PVT modules
- Giving statements concerning efficiency and recommendations for future utilisation

Integrative Ecology



«Are the protection and
usage of water resources
compatible?»

Source: www.shutterstock.com

Integrative Ecology

Research groups and main areas of focus:

- **Ecohydrology:** protection and sustainable management of water ecology systems
- **Environmental Planning:** reduction of negative environmental influences in the areas of construction, recreational use and agriculture
- **Geoinformatics:** analysis of complex spatial and temporal patterns in the environment
- **Vegetation Ecology:** changes in the natural flora
- **Wildlife Management (WILMA):** conflicts pertaining to wild animals and formation of the landscape in a way which is suitable for wild animals



Integrative Ecology

Reference project **Red deer project, Eastern Switzerland**

Investigation into the biology and ecology of the red deer, as well as the interaction between animal and man

Starting position

Large population of red deer lead to conflicts (agricultural civilisations and protective forests are harmed, road traffic accidents)

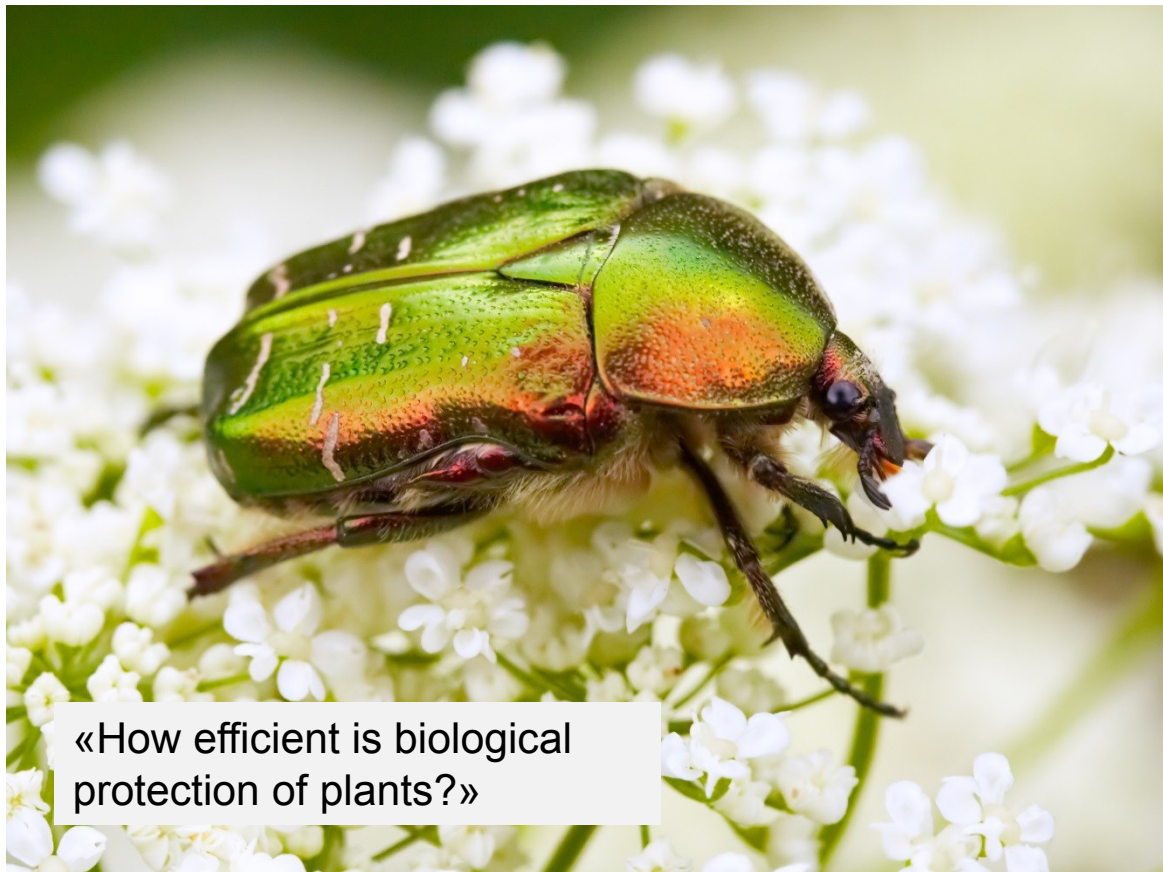


Source: P. Eggenberger

Goals

- Taking a representative sample of the red deer and equipping them with telemetric collars
- Monitoring of spatial use, measuring of physiological parameters (pulse, body temperature)
- Preparing a solid foundation for the handling of the red deer which fits with the overall goals of the project

Organic Agriculture



«How efficient is biological
protection of plants?»

Source: www.shutterstock.com

Organic Agriculture

Research groups and main areas of focus:

- **Environmental Genomics and Systems Biology:** decoding of the life cycle through genomics, metagenomics, transcriptome and proteomics
- **Horticulture:** production of vegetables, fruits and ornamental plants
- **Plant Protection:** environmentally friendly solutions for the protection of plants in fruit-growing, viticulture and horticulture, as well as for ornamental plants, greenery in the city and special crops



Organic Agriculture

Reference project **Microorganism as a protective shield in the root area**

Biofilm of microorganisms on the roots of important, cultivated plants as a means of protection against harmful insects

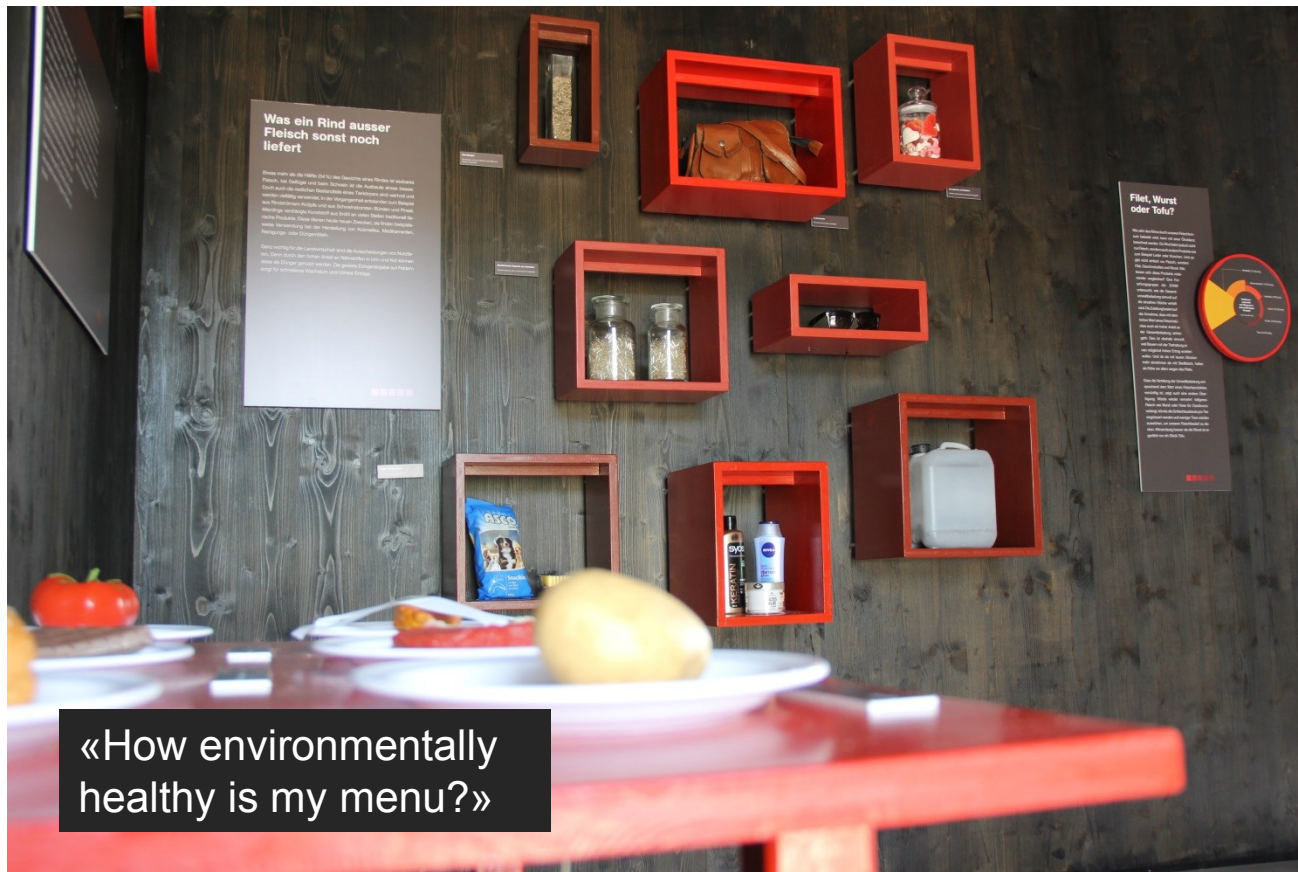
Goals

- The establishment of selected fungi in the rhizosphere of agriculturally important cultivated plants
- Better understanding of the interaction between plants, microorganisms and vermin
- Development of a new strategy concerning biological control of soil-borne vermin



Source: J. Razingger

Sustainability Transformation



Source: Esther Volken

Sustainability Transformation

Research groups and main areas of focus:

- **Agricultural and Resource Economics:** The target is to enhance productivity and sustainability in agriculture and along the supply chains of foods
- **Geography of Food:** valuation methods and analysis of labels in the area of nutrition
- **Regional Development:** strengths of the region as a natural space, a cultural space and as an economic area on the basis of natural and cultural potential
- **Sustainability Communication and Environmental Education:** methodology and general conditions for successful extra-curricular teaching and learning
- **Grüental gardens:** infrastructure for “learning through research” in an active and ludic manner



Sustainability Transformation

Reference project **Eco-Confession box**

The eco-confession box is a scientainment concept concerned with raising awareness of sustainable behaviour in an exciting manner.

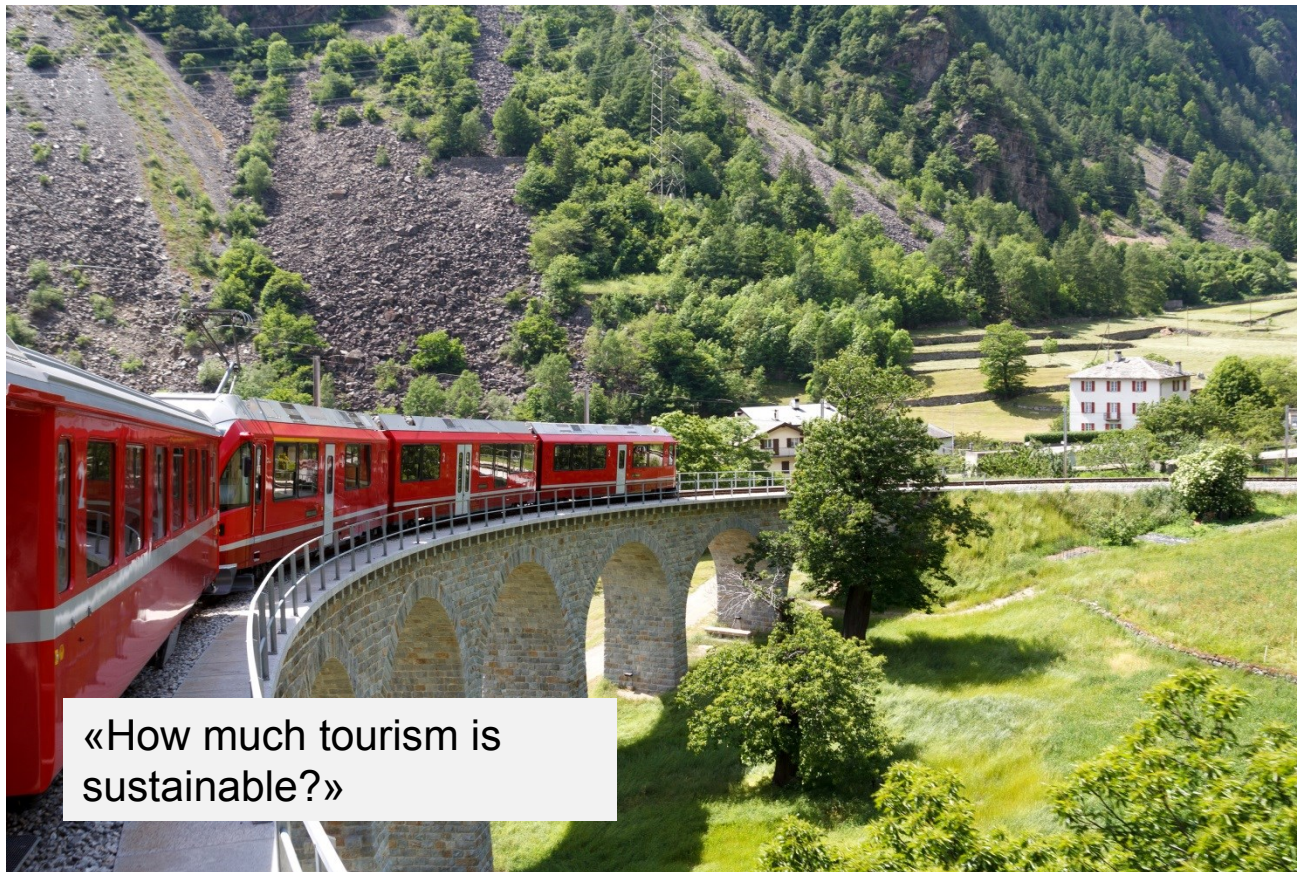
Goals / Approach

- To raise awareness with the general public of acting in an environmentally friendly manner in everyday life
- To put to the test a new approach for ecological skills transfer
- A central facet is the eco-confession box as an accessible «box» for the confession of eco-sins which have been committed – useable as a mobile unit at events and exhibitions



Source: Balthasar Bosshard

Tourism and Sustainable Development



«How much tourism is sustainable?»

Source: www.shutterstock.com

Tourism and Sustainable Development

Main area of focus:

Construction of nature and national parks as well as tourism possibilities with a link to the region



Tourism and Sustainable Development

Reference project «**Landscape quality and tourism**»

As a central resource for tourism, the landscape should be integrated into touristic positioning and configuration of possibilities.

Goals

- Development of methods to raise the awareness of tourism and the population as to the worth of the landscape
- Inclusion in touristic positioning of the estimation of the landscape
- Development of new tourism possibilities and products



Source: Gwendolin Bitter

Urban Ecosystems

Reference project **GRÜNSTADT SCHWEIZ** (Switzerland as a green city)

Development of a label for sustainable greenery in the city, with bronze, silver and gold rankings

Goal

Preparation of a solid foundation which will provide the cities with a means by which green spaces can be treated sustainably

From 2016

Honouring the cities which accord their green spaces great significance



Source: Martin Goetsch