ETH zürich

World Food System Center

Annual Report 2013

World Food System Center

Cover Image

Processed image of roots from a mature maize plant. The color coding shows gaps within the root crown and explains the density of lateral branching patterns of the roots. Image processing allows researchers to phenotype a root 6-7 times faster than by hand. Phenotyping enables the identification of beneficial root traits for key crops under diverse growing conditions, such as drought or nutrient poor soils. This information is crucial for advancing plant breeding that can build resilient food production systems.The special image processing software used for this image was developed by Tino Colombi, Norbert Kirchgessner, Chantal Le Marié and Andreas Hund from the Crop Science group at ETH Zurich (Prof. Achim Walter).

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Dear Colleagues,

In 2011, ETH Zurich embarked on a journey – to create a world class center that leveraged the vast expertise across the institution, and eawag, to address the pressing problems of food systems and contribute to food and nutrition security globally. Over the last years, the World Food System Center – the Executive Office, its 34 professorial members and their research groups – has worked together with key external partners to establish new research projects, programs, educational initiatives as well as outreach and dialogue platforms. As we reflect on the previous years, we feel we have taken the important first steps towards our longer term vision – to contribute to a healthy world through sustainable food systems. We are happy to share these achievements with you in our very first Annual Report.

Since our inauguration in September 2012 we have worked at building up a community of researchers, academics, students, external stakeholders and partners. This community has supported us to realize important achievements in 2013. We were able to establish a new research platform, the "World Food System Grants Platform", which, beginning 2014, will award 1.4 million CHF in competitive research grants for projects addressing food system challenges. We entered into collaboration with the Swiss Federal Office of Agriculture to conduct a foresight study to inform the development of food systems research in Switzerland. A vibrant alumni community of future food systems leaders was established, bringing together international participants of our first intensive summer school program. We were also pleased to host over 300 interested members of the public and stakeholders as well as the two events we organized together with external partners.

In mid-2013, we started working with our members and Scientific Advisory Board to define our strategy for the next two years, in order to build on our lessons learned during the start-up of the Center and to consolidate our activities where we felt we would have the most impact. The results of this process are also presented in this report. Our success in implementing these ideas will depend on the continued exchange with partners, and we hope this report sparks ideas for how you or your organization can get involved with our activities. Over the coming years we will continue striving towards greater collaboration across disciplines and sectors, and to integrate systems approaches into addressing the challenges of food and nutrition security.

Prof. Nina Buchmann
Chair

Michelle Grant
Executive Director

Plant-specialist aphids (*Aphis nerii*) feeding on Butterfly milkweed (*Asclepias tuberosa*). Management practices have critical implications for the maintenance of native plant species, and the natural biodiversity they support, in agricultural landscapes.

A healthy world through sustainable food systems

«Our mission is to be a leader in scientific research, education and outreach across the food system that contributes to the key challenges of food and nutrition security and environmental and social wellbeing. We do this by working across temporal and spatial scales and in collaborative partnerships with key stakeholders.»

Objectives

Generate new scientific knowledge with political, industrial and societal relevance and disseminate it to key stakeholders in a manner that supports real world impact;

Provide leadership and foresight on issues connected to food security based on innovative solutions for pressing problems of the world food system;

Build the capacity of the next generation of decision makers who can provide leadership in all issues related to sustainable food systems;

Build up strategic partnerships with industry, foundations, research institutions, policymakers, international organisations, NGOs and other stakeholders that foster new ways of working together;

Engage with partners to strengthen information dissemination and impact;

Act as the initial reference location for reliable and up to date information on the global food situation for key internal and external stakeholders.

Core Values

We are fully committed to uphold the independence of university research, education and outreach;

We understand that social and environmental sustainability are key aspects of our work;

We are diligent in disseminating new knowledge to relevant stakeholders and in supporting the translation of outputs into real-world impact;

We offer an accessible and visible platform to cultivate discussion, debate and exchange between groups with differing viewpoints and stay open to all opinions;

We focus on integration, collaboration and innovative ways of working together in multi-, trans- and interdisciplinary matters;

We work with others in strategic partnerships to achieve together what no partner could achieve on their own;

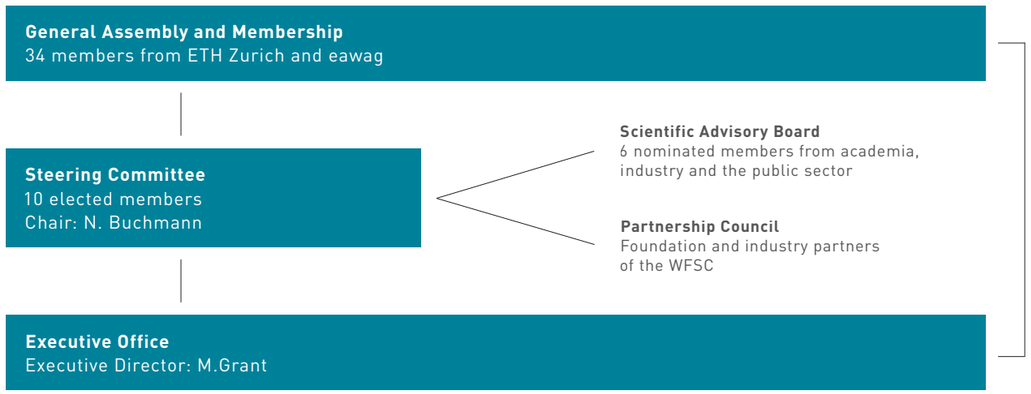
We orient all our work towards global challenges of high societal relevance.

The World Food System Center

The Challenge

The question of how to feed the world in a way that ensures human health, environmental sustainability and social wellbeing is one of the defining and most complex global challenges of our time. ETH Zurich (the Swiss Federal Institute of Technology) established the World Food System Center (WFSC) in 2011 in order to play a leading role in addressing these challenges.

In the coming decades, our food system will face unprecedented challenges in its ability to feed and nourish the world. These have arguably become the most pressing, complex, and defining challenges of our time. With the expected global population approaching 9 billion by 2050, there is a worldwide sense of urgency to find solutions. There are nearly a billion hungry people on the planet today, and billions more who suffer from the phenomenon of 'hidden hunger', which results from a chronic lack of access to sufficient nutrients and vitamins. Meanwhile there is also the paradox of high rates of overweight and obesity and the related consequences for human health. To further add to these challenges, the environmental basis for food and agricultural production is facing unprecedented strain from phenomena such as climate change, resource constraints, emerging pests and pathogens, and deterioration of soil quality.



WFSC Organizational Structure.

The World Food System Center at ETH Zurich

The WFSC was established at ETH Zurich based on the belief that the real-world solutions needed to tackle the challenges our food system faces require collaboration from global and local stakeholders across the entire food value chain. In order to do this, we support multi- and transdisciplinary approaches to addressing these challenges through research, education, and outreach activities that contribute to sustainable food security.

The WFSC's 34 professorial members and their research groups bring expertise from six departments of the ETH and three groups of eawag (Swiss Federal Institute of Aquatic Science and Technology). Our programs bring opportunities to students, scientists, and professors who are using a food systems approach in their research and studies. We encourage creative approaches and interactive platforms to engage with a wide range of local and global stakeholders including those from the academic community, policymakers, partners, and the broader public.

Organizational Structure

The core of the WFSC is formed by the member group, which in 2013 comprised of 34 professors from six different departments of the ETH Zurich and three different groups of eawag. The Steering Committee, formed by a group of ten elected members and led by a Chair, oversees the strategy and operational functions carried out by the Executive Office. The Scientific Advisory Board of six external advisors provides strategic advice to the Steering Committee and connections to key external organizations. The Partnership Council is formed by foundations and industry partners who make substantial donations to the programs of the Center through the ETH Foundation.

The REDES workshop in February 2013 in ETH Zurich's Main Building.

Core Activities

The WFSC acts as a platform to bring together our members' multidisciplinary expertise with strategically relevant external partners. Our work is focused around three core activity areas:

‹Research› that contributes new knowledge of relevance for society, policymaking, industry and not-for-profit organizations.

‹Education› that provides the next generation of decision makers with the knowledge and skills necessary to be effective leaders in creating sustainable food systems.

‹Outreach› that supports the dissemination of new knowledge to key stakeholders and translation into real-world impact.

Approach

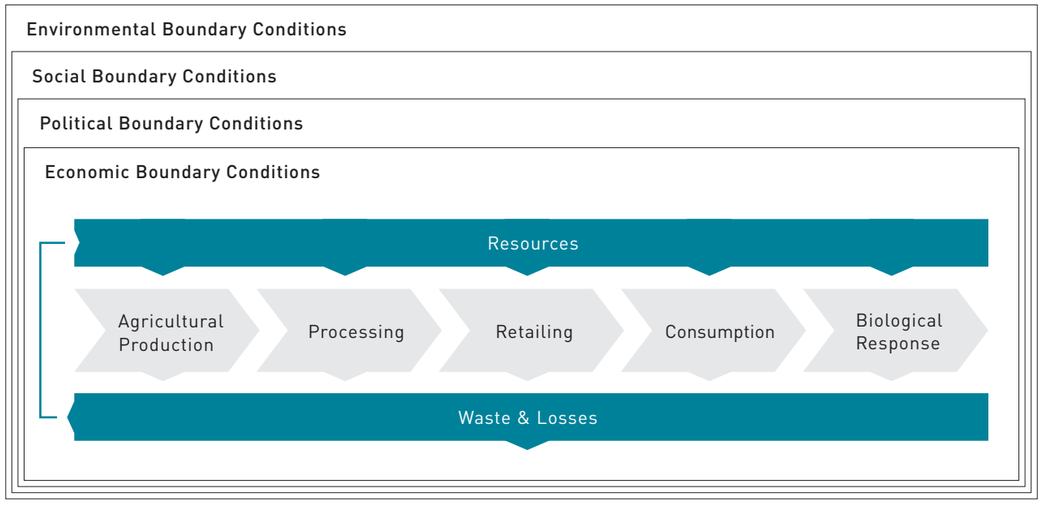
Food system challenges are driven by complex phenomena like climate change, water and energy scarcity, population growth and demographic changes. They are shaped by boundaries that reflect environmental, social, political, and economic realities.

Our Center aims to take a food systems approach because we believe we will be most successful when experts from different fields bring their diverse experiences to work together collaboratively.

The world food system (WFS) can be conceptualized as one that integrates all food system activities (from production through consumption and the body's biological response), inputs (resources), and outputs (which include waste and losses). These activities, inputs, and outputs are constrained by complex boundaries set by environmental, social, political, and economic conditions. These boundary conditions are not static, rather they interact with change drivers and cross both national and geographic borders. All of this affects the very important outcomes of the food system (food and nutrition security, social welfare, and environmental health).

The food system is a complex system. As a global system comprised of many interconnected local and regional systems, challenges and interventions in one part of the system or globe will always have effects on other parts. This makes designing interventions challenging, as it is difficult to make assumptions or predict outcomes without leading to unintended consequence. There is typically no single solution that is appropriate for all levels and contexts. For this reason a systems approach is critical to design appropriate interventions that positively support the outcomes of food and nutrition security, environmental health and social welfare.

A food systems approach requires inter- and transdisciplinary methods that have the ability to consider activities, outcomes, interactions, as well as feedbacks and engage all relevant stakeholders. This requires new tools, new ways of thinking and new ways of working together.



The Key Elements of the World Food System.

Center Milestones

Key Dates

The WFSC Inauguration in September 2012.

2011

June – WFSC founded (for an initial period of 4 years) with 1st General Assembly of 25 inaugural members.

October – WFSC Partnership Council established.

October – Mercator Research Program launched.

December – WFSC operations commence with Executive Director Michelle Grant.

December – 2nd General Assembly of 30 WFSC members.

2012

February – Mercator Research Program First Call research projects selected.

March to May – WFSC partners with 'Treffpunkt Science City' program on the world food system.

July – Joint summer school with ETHsustainability on 'Eating Tomorrow' for 30 Bachelor, Master and PhD students.

December – 3rd General Assembly of 32 WFSC members.

The WFSC holds the REDES workshop with the BLW in February 2013.

Participants of the first WFSC Summer School in August 2013.

2013

January – 1st meeting of the external Scientific Advisory Board.

February – Mercator Program Second Call research projects selected.

February – Food System Film Series commences for students of ETH Zurich.

March – New team members join the WFSC Executive Office.

June – Coop Research Program launched.

July – WFS Grants Platform established.

October – Global Grain Value Chain research project concludes.

October – ETH President Ralph Eichler hosts ‹Lokaltermin› on world food system.

October – Launch of the world food system theme on the ETH Zukunftsblog.

December – 4th General Assembly of 34 WFSC members.

Identifying Partners

The Center forges strategic partnerships at the organizational and project level. During the Center's start-up phase, the main focus was on building partnerships at the project level in line with thematic focus areas and together with important stakeholders. In 2013, the Center continued this work while also developing relationships with potential partner organizations both internationally and within Switzerland.

The WFSC's Scientific Advisory Board, Partnership Council, and Collaborative Partners all play key roles in the partnership building process.

«Working together with such a competent, committed and experienced team is for our foundation both rewarding and a great opportunity. What the WFSC has already achieved is impressive and we are looking forward to the next steps. Together we can foster organic agriculture and a healthy world through sustainable food systems.»

Regula von Büren, Project Manager
Mercator Foundation Switzerland

«The WFSC has succeeded in bringing together 34 professors and multiple industry partners to contribute to projects that provide opportunities for understanding, reinforcement and creation of sustainable food value chains. With new professorships in place, first projects completed and multiple initiatives ongoing the Center is well placed to bring global impact.»

Dr. Ian Roberts
Chief Technical Officer, Bühler Group

ETH Zurich Vice President Research and Corporate Relations, Prof. Roland Siegwart, opening the Center's Inauguration.

Partnership Model

The WFSC strives to work with others in strategic partnerships to achieve together what no partner could achieve on their own. This core value forms the basis for how the Center develops and implements all projects, programs and activities. The WFS is complex and includes a wide variety of stakeholders and interests.

To facilitate greater exchange within academia and between academia and external partners and stakeholders, the WFSC:

- engages with multiple stakeholders and disciplinary perspectives to frame challenges, produce new knowledge, and evaluate and implement solutions;
- promotes education that targets key stakeholders and is developed based on real-world challenges and contexts; and
- supports and participates in networks that foster communication and outreach.

WFSC Scientific Advisory Board member Dr. Martin Bloem at the Center's Inauguration.

The Scientific Advisory Board

The Center's Scientific Advisory Board (SAB) met for the first time in 2013 (see Appendix). The SAB includes six members who meet annually to:

- facilitate dialogue between the Steering Committee and representatives from government, scientific and international organizations and decision making bodies;
- support the formation of partnerships and strategic alliances to important organizations internationally; and
- advise the Steering Committee on strategic issues.

The Partnership Council

The Center's Partnership Council (PC) meets semi-annually with the WFSC Steering Committee and Executive Office. Members of the PC represent foundation and industry partners who provide significant financial support through the ETH Foundation and who are interested in playing an active role in collaborating with the Center. The Partnership Council meetings serve as a platform for exchange, collaboration and implementing concrete projects. The PC supports the WFSC by facilitating access to:

- networks and contacts;
- real-world data and cases;
- industry specific and applied knowledge; and
- infrastructure, financial, and human resources.

«Contribute to secure und sustainable supply chains, but also to food security worldwide is an important aim of the Coop Fund for Sustainability. The innovation and research network – the World Food System Center at ETH – will help Coop to find concrete answers to real problems, but also to motivate students for a holistic approach to food security starting with agriculture and ending in the consumers' plate.»

Dr. Sibyl Anwander Phan-huy
Head of Sustainability and Public Affairs,
Coop Switzerland

«Syngenta aims to bring greater food security in an environmentally sustainable way to an increasingly populous world. The WFSC provides a research platform for a holistic view on food security and sustainable agriculture. Together, the WFSC and Syngenta will contribute to raising public awareness for the global challenges related to agriculture and farmers and our cooperation will contribute to shaping global policy.»

Regina Ammann
Head of Public Policy, Syngenta

Collaborative Partners

Collaborative Partners include organizations that are working closely with the Center on projects or programs, however, are not suitable for membership in the SAB or the Partnership Council. Collaborative partners include other university food centers, research institutions, not-for-profit organisations, international organisations and associations.

Research

The Center's research activities are focused around three interdisciplinary themes – Sustainable Production Systems, Healthy Food, and Resilient Food Markets – and reflect the core competence of the members' expertise.

Our research activities consist of managing competitive research programs, developing flagship research projects, and supporting special collaborations. Together, these activities enable the Center to work towards achieving our research goals.

Research Programs

In 2013 the Center established a new World Food System Grants Platform that awards 1.4 Million CHF in competitive grants annually and currently hosts two research programs (the Mercator Research Program[1] and the Coop Research Program).

The Mercator Research Program aims to explore the role and potential of organic production systems (certified or non-certified) to contribute to global food security. The program supports PhD research projects supervised by WFSC members, in collaboration with partners from different disciplines. The ten-year program is structured around annual calls, with the first call launched in 2011. The program typically supports two new PhD students each year (see table opposite).

The Coop Research Program was initiated in 2013 to support research that addresses challenges and opportunities for sustainability in food value chains. The program aims to provide knowledge necessary to drive food value chains, in the short and long term, towards goals of quality and quantity that support human and environmental health and create value for all stakeholders. The five-year program is structured around annual calls that will fund Post-Doctoral projects supervised by WFSC members, together with relevant external partners. With the initial call launched in 2013, the first projects will begin in mid-2014 (see table opposite).

1 The Mercator Research Program is a part of the broader Mercator Program, which has three integrated activity areas: research, education, and outreach.

Core Activities

Contribute new knowledge that plays a role in addressing the global challenges of food and nutrition security;

Develop new research models based on partnerships;

Facilitate inter- and transdisciplinary research within ETH Zurich;

Manage the boundary between science and decision making, ensuring prominence, credibility and legitimacy.

Flagship Projects

A research strategy workshop in 2013 led to a new Center initiative to facilitate larger-scale research projects that capitalize on the cumulative expertise of WFSC members and promote a food systems approach and the synergies made possible by the Center. These Flagship Projects or Platforms are envisioned as:

- Visionary and potentially high risk;
- Cutting across thematic focus areas to take a food systems or whole of value chain approach;
- Bringing together multiple PIs with disciplinary expertise to enable an interdisciplinary approach to a common topic; and
- Involving key stakeholders from industry, government, and/or not-for-profit organisations, in non-competitive roles, representing different aspects of the food system.

Flagship projects will draw on the core competence of WFSC members. In late 2013, the Center took initial steps to explore how such platforms and projects could best be realized.

Special Collaborations

The Center's research activities are rounded out by a variety of diverse initiatives with collaborative partners. In 2013, the Center began collaborating with the Stellenbosch University Food Security Initiative, with the goal of seeking concrete opportunities for researchers from ETH and Stellenbosch to work together on world food system research questions of mutual interest. The collaboration will kick off with a formal research workshop with participants from both institutions in March 2014.

The Center also entered into an agreement with the Swiss Federal Office of Agriculture to conduct a foresight study for a sustainable Swiss food system. The study will inform the FOAG regarding the direction of Swiss research within the framework of the world food system, addressing the challenges by global changes in society and the environment as well as considering use and provision of ecosystem services in terms of food security. The study will include a participatory component and will conclude in 2015.

WFS Grants

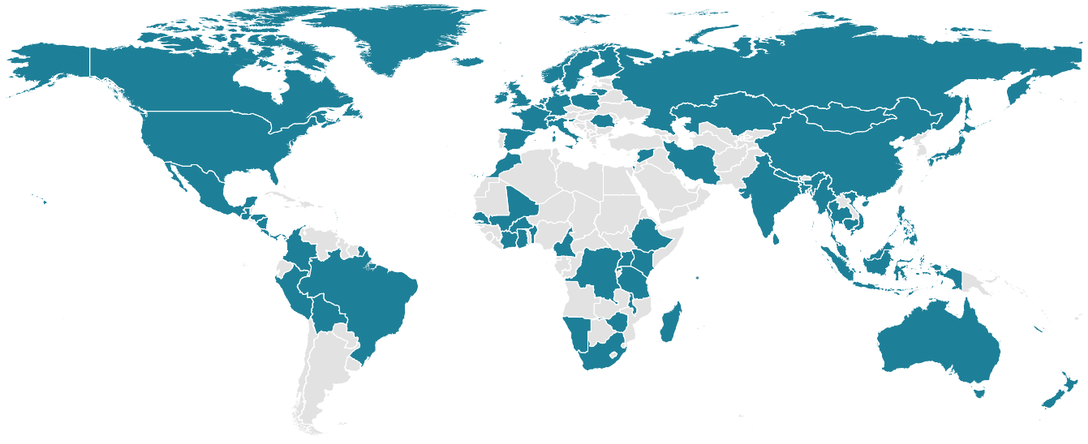
Funded research projects

Project Title	Timeframe	Principal Investigators	Amount (CHF)	Program
Elements of successful novel dual purpose chicken production systems (INDUCE).	2014 – 2017	Prof. M. Kreuzer Animal Nutrition	250'000	Coop Research Program
Novel approach to biologically control spoilage of fresh vegetables using naturally produced reuterin (BioControl).	2014 – 2016	Prof. C. Lacroix Food Biotechnology	278'000	Coop Research Program
Cadmium availability in soils and its uptake by cocoa in Latin America (CdOCOA).	2014 – 2016	Prof R. Schulin Soil Protection	204'000	Coop Research Program
Improving buckwheat as an agronomically attractive crop for healthy food (ImproBuck).	2014 – 2016	Prof A. Walter Crop Science	272'278	Coop Research Program
A comprehensive examination of nitrogen cycling and microbial communities within soil microenvironments in integrated organic farming systems in Switzerland (NORGS).	2014 – 2017	Prof. J. Six Sustainable Agroecosystems	245'000	Mercator Research Program
Zinc biofortification of wheat through organic matter management in sustainable agriculture (ZOMM).	2013 – 2016	Prof. R. Schulin Soil Protection	392'000	Mercator Research Program
Greenhouse gas emissions of dairy production systems based on longevity and zero-concentrate strategy as compared to conventional systems (Long Life Cow).	2012 – 2015	Prof. M. Kreuzer Animal Nutrition	192'000	Mercator Research Program
Managing trade-offs in coffee agroforests (MOCA).	2012 – 2015	Prof. J. Ghazoul Ecosystem Management	228'000	Mercator Research Program
Resilience in food value chains: Feasibility study.	2013	Prof. P. Edwards Plant Ecology	51'000	Partnership Council and Plant Ecology Chair
Perspectives of the global grain value chain.	2011 – 2013	Dr. M. Weber and Dr. M. Sonnevelt Agricultural Economics	200'000	Bühler and ETH Foundation
Novel structuring processes for the generation of consumer function-tailored properties of plant protein based composite foods (PRO3).	2011 – 2014	Prof. E. Windhab and Dr. E. Rondeau Food Process Engineering	270'000	Bühler and ETH Foundation

Concluded Projects

Two of the Center's research projects successfully concluded in 2013. The "Perspectives of the Global Grain Value Chain" project was an initial pilot project of the Center, conducted by the chair of Agricultural Economics and supported through a partnership with Bühler. Principal Investigators Dr. Michael Weber and Dr. Martijn Sonnevelt analyzed 10 crop-country case studies (e.g., soybean in Brazil, maize in Mexico) and developed a new methodology for analyzing the global grain value chains. The innovative analysis and simulation model is publicly available on the project's website (www.gvc.ethz.ch). The project also involved five bachelor and master's thesis projects and was supported by an engaged Technical Board. The board consisted of high level representatives from government and industry organisations and met regularly and provided connections to networks, knowledge and data.

A feasibility study on 'Resilience of Food Value Chains' involving the Center and its Partnership Council was also successfully conducted in 2013. The initial project outputs include a food systems framework tool that is used in summer school courses organized by the Center. The chair of Sustainable Agroecosystems has taken the lead on continuing this work, which aims to create scientifically grounded yet practical tools for decision makers for the integrated assessment of interventions in food value chains.



Where we work

WFSC members bring research expertise and experience from their work around the world. This map highlights many of the countries where our members are actively engaged with collaborative research.

Thematic Focus Areas

The Center's members have defined three thematic focus areas around which the Center will frame its research activities. These themes:

- are interdisciplinary and of significant importance in relation to food and nutrition security;
- reflect the expertise of the members;
- are where ETH can provide significant scientific contributions;
- reflect opportunities for collaborations across disciplines and with external partners.

Meanwhile the Center maintains a systems approach and an orientation to addressing world food system challenges. Inter-linkages among themes are recognized and work at the intersection of these areas is especially encouraged. Furthermore, the Center aims to remain flexible and open to take on other important and emerging issues in the future.

Sustainable Production Systems

Establishing sustainable food production systems that are resilient in the face of increasing perturbations.

The key topics covered include:

- The principles, design and management of agroecological systems, and their products, across scales;
- Improving resilience against system disturbances and managing tradeoffs between intensification, sustainability and diversity;
- Improving resource use efficiency, eliminating waste and losses and closing material flow cycles;
- Increasing both genetic and system diversity and harnessing new technological opportunities for sustainable production and food security;
- Developing novel approaches to urban and peri-urban agriculture;
- The role and impact of biodiversity and ecosystem services on food production.

Healthy Food

Design and processing for safe, accessible, high quality and healthy food and food products.

The key topics covered include:

- Sustainable technologies for enhancing food quality and safety;
- Systems approaches to address micronutrient deficiencies;
- Sustainable protein value chains;
- Healthy and sustainable food behavior and choices;
- Personalized and functional foods to prevent and manage chronic disease.

Resilient Food Markets

Creating and connecting to effective food markets that create value for all stakeholders.

The key topics covered include:

- Certification and standards for sustainable food systems;
- Technology transfer and adaptation to developing contexts;
- Improving access to market information and infrastructure;
- Use of agricultural by-products and waste to create value-added products;
- Opening and establishing new markets for value-added products for specific consumer needs;
- Analyzing the impact of agricultural and environmental policies and interventions on food markets and value chains.

Member Research

Selected Projects

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1
Sustainable Campus Catering: A study of consumer preference for climate-friendly meals, a part of the Seed Sustainability platform. Sandroo Hodel (MSc, Consumer Behavior Group).

2
Price Volatility on the Cocoa Market: Analysis of market structure and integration in Cote d'Ivoire. Marisa Munz (MSc, Agricultural Economics Group).

3
AlpFUTUR: Dairy cow carrying a GPS device on alpine pasture in the Lower Engadine. Prof. Andreas Lüscher (Forage Production and Grassland Systems, Agroscope).

4
Addressing Malnutrition: Nutritionally enhanced (Fe) rice growing in the greenhouse facility at ETH Zurich. Prof. Wilhelm Gruissem (Plant Biotechnology Group).

5
Dietary Guidelines and Food Choices: Meal selected by study participant following food pyramid recommendations, Jana Barbey (MSc, Consumer Behavior Group).

6
Nutritive Extruded Snacks: Texture analysis to measure force needed to chew nutritionally improved snack foods, Florian Oberhauser (MSc, Food Process Engineering Group).

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1
Zinc Biofortification: Field experiment comparing management practices and their long-term effect on zinc uptake by wheat. Roman Grüter (PhD student, Soil Protection Group).

2
Buckwheat Seed Production: Examining methods to multiply seed while avoiding crosspollination. Tobias Beeler (MSc, Crop Science Group).

3
Trade-Offs in Coffee Agroforestry: Establishing a plot to determine ecosystem services provided by shade trees. Maike Nesper (PhD student, Ecosystems Management Group).

4
Bean Pods as Permanent Carbon Sinks: Use of stable isotopes and labeling to determine if bean pods act as a permanent sink during growth, Fiona Cimei (MSc, Grassland Sciences Group).

Education

The overall objective of the WFSC education activities is to build the capacity of the next generation of decision makers who can provide leadership in all issues related to sustainable food systems. The Center aims to do this by creating, maintaining, and facilitating a space for learning about food systems that is scientifically grounded, yet practically oriented and socially inclusive.

The educational programs are designed to explore all aspects of the food system, and are not bounded by the three thematic focus areas that frame our research activities. They are designed to be complementary with existing ETH curricula.

Our education activities take an explicitly interdisciplinary and systems approach, using innovative methods to provide students with new tools and ways of thinking necessary for tackling the challenges of the world food system. We offer opportunities to undergraduate and graduate students enrolled at the ETH Zurich, other Swiss universities and colleges, and institutions abroad.

To achieve these objectives, the Center's core educational activities are:

- Extracurricular Courses;
- Student Research and Thesis Opportunities;
- Alumni Support and Career Development; and
- Summer Schools.

Extracurricular Courses

The WFSC organized and taught an extracurricular course, ‹World Food System Film Series› for the first time in 2013. The course featured four recent documentary films dealing with food system issues, with each screening followed by a panel discussion with ETH faculty and practitioners. Over 100 students from more than 10 departments enrolled and had the opportunity to earn 1 ECTS credit point. The Center plans to offer the course annually.

Ideas for additional courses in the future that complement the regular curriculum include topics such as visualizing and communication of scientific content and making connections between research and policy. The aim of such offerings is to provide an integrative platform for students from different disciplines to work together to understand their potential contribution to wider societal challenges. The programs foster skills in critical and independent thinking, analysis, reflection, and interdisciplinary exchange.

Student Research and Theses

The Center supports undergraduate and Masters research and thesis projects in various ways.

In collaboration with the ETH Seed Sustainability platform, which is organized through ETH Sustainability, the WFSC supports Bachelor and Master thesis projects on sustainable food system themes. Seed Sustainability acts as a link between research-related questions from business and society and the research interests of universities. The Center's first collaborative project is being launched in spring 2014 and aims at exploring ways to make catering at ETH Zurich more sustainable.

Center members also offer opportunities for students to complete theses on topics of relevance to the world food system, and the Center is able to offer support to facilitate the integration of these students into the WFSC network and activities. Two current examples of such projects are «New Processing Solutions for Indian Rice Flakes» and «3D Printing - Technologies and Applications for Food».

Alumni Support and Career Development

The Center coordinates an Alumni Network for students who participate in the Summer School and research projects funded through the Center. This network provides opportunities to continue supporting these future leaders and allows the alumni to network with one another. A regular newsletter is developed by the Center and distributed to all Summer School alumni, keeping them informed about opportunities, news from the WFSC, and resources relevant to their work or studies. Activities include regular lunch exchanges, excursions, development of an online social networking community, and support for exploring internships and other educational or career opportunities.

«The best part of this summer school is that we can exchange ideas and perspectives with people who are in different cultures and from different research backgrounds to make a better understanding of a sustainable world food system.»

Jiaqi, China.

Summer Schools

The Center organizes summer schools open to students at the ETH and other higher education institutions around the world. Each two-week, intensive program brings together 20 to 25 university students who are selected in a competitive admissions process from a wide range of disciplines and nationalities. The curriculum is also interdisciplinary and multicultural, allowing students to work in diverse groups and in collaborative ways. The courses incorporate various pedagogic methodologies including, but not limited to: lectures, workshops, field trips, student presentations, small group and plenary discussions, artistic and creative activities, and small-group case study and project work.

This approach allows academic content and rigor to be blended within an immersive and experiential learning context to create a unique opportunity for the participants. A comprehensive selection process helps the Center identify strong candidates who show potential to take initiative and bring innovative ideas to address the challenges of the world food system. An interdisciplinary faculty and core facilitation team guides the learning process throughout the entire program.

This first course, which was made possible by the kind support of the Mercator Foundation Switzerland, was very successful from the perspective of student and faculty participants alike and will continue to form the basis for future courses. The Center plans to partner with the Mercator Foundation to offer this basic course annually.

In the coming years, the Center hopes to expand our summer school offerings, together with external partners, to include special, advanced courses that go in-depth on related or other topics falling within the world food system framework.

WFS Summer School 2013

Organic Production Systems

The first WFSC summer school coures took place in August 2013 in Rheinau, Switzerland where students spent two weeks living and studying on the country's largest organic farm. The setting offered an ideal hands-on and experiential learning framework plus opportunities for practical work and lectures.

The course was taught from a food systems perspective while exploring the role and potential of organic production systems (certified or non-certified) to contribute to global food security. Field trips brought the class to several organic farms in the region and to FiBL (the Swiss Research Institute for Organic Agriculture), where they learned about long-term research experiments on organic agriculture. The course curriculum followed the food system and included the different stages of the value chain, from agricultural production to post consumption, as well as the connections to the environment, society, economy and policy. The program further explored the food system outcomes, in particular food and nutrition security.

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«The WFSC Summer School was easily the most intense and rewarding course I have attended during my PhD. Seeing the agrofood system from the perspectives of many different disciplines - both from speakers and other participants – left me with a much deeper understanding of the complexity we are dealing with when trying to create sustainable agriculture and food systems.»

Rebecca, Norway and Great Britain.

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1
Farm work: Students participating in farm work during summer school, Rheinau, Switzerland.

2
Group work: Student teams use food system framework to analyze food value chains.

3
Rheinau: Class of 2013.

Outreach

The overall goals for WFSC Outreach are to increase the impact of research by supporting the dissemination and implementation of research findings; to increase public awareness of the challenges of the world food system and the solution approaches; to act as an initial reference location for food relevant issues at the ETH; and to increase the visibility of the work, impact, potential and expertise of the ETH in food systems. This involves providing ongoing opportunities to learn and finding supportive ways to assist the young scientists we work with to communicate the lessons, methods, and findings they are learning in other WFSC activities.

While much of the Center's outreach work is linked to the research supported by the WFSC, our activities in this area are typically broader in scope than the three thematic focus areas that frame our research. Through outreach activities, the Center is able to explore the breadth of the food system, complementing the expertise of our members with the experience of colleagues and peers from outside the ETH Zurich.

To reach these goals, the Center focuses on the following core outreach activities:

- Public Lectures and Scientific Events;
- WFSC Ambassadors; and
- Research Dissemination and Participation.

Public Lectures and Scientific Events

The WFSC organizes a series of public lectures and scientific events that aim to bring internationally known and recognized speakers with expertise in one or more aspect of the world food system to ETH Zurich. These speakers will have interdisciplinary experience and take a food systems approach to their work in addressing food system challenges.

The WFSC Public Lecture series will continue annually with events planned in the spring and fall terms. One lecture each year will be a featured outreach event of the Mercator Program and focus on organic production systems.

WFSC Ambassadors

As part of the Mercator Program's outreach activities, the Center will develop an ambassadorship program to support opportunities for students to participate in short-term travel or study programs, internships, or similar activities that are aligned with the Mercator Program objectives and thematic focus (i.e., certified or non-certified organic production systems). Ambassadors will bring back contributions to the Center's outreach platform as well as lessons learned to their home departments or organizations. This program forms part of the Center's future plans.

Dissemination and Participation

World Food System Blog

The ETH launched a new sustainability blog, Zukunftsblog, in fall 2013, with the world food system as one of its featured themes. The blog includes regular contributions from WFSC members who have written on topics such as the sustainability of chocolate and coffee, the future of family farming, resilience in food systems, and addressing micronutrient deficiencies.

Outreach Event

World Food Day 2013

The WFSC welcomed a large, international audience to ETH Zurich as host of an event marking World Food Day in October 2013. The event featured a public lecture, an awards ceremony for the Our Common Food ideas competition, and an exhibition that showcased ETH research on the topics of food waste and loss. Our Common Food was an exciting ideas competition that was initiated by the Swiss National FAO Committee (CNS-FAO) to identify promising, practical ideas for solutions to food losses and waste. Entries from Swiss and international students were evaluated by a jury of experts who included WFSC Executive Director, Michelle Grant, and WFSC Partnership Council member, Ian Roberts of Bühler Group as well as representatives from the Swiss Agency for Development Cooperation (SDC), the Swiss Federal Office for Agriculture (FOAG), the Swiss Association of Agricultural and Food Scientists (SVIAL) and the School of Agriculture, Forestry and Food Science (HAFL). The public lecture featured Ambassador Martin Dahinden, Director-General of SDC, Prof. Bernard Lehmann, Director of the FOAG, Dr. Ian Roberts, CTO Bühler, and Dr. Joseph Mpagalile from the FAO.

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1
Research Exhibit at World Food Day Event: Our Common Food finalist Ima Zainuddin (PhD student, Plant Biotechnology group), explains her research on postharvest loss in cassava.

2
World Food Day: Keynote address from Ian Roberts, CTO of Bühler Group and WFSC Partnership Council.

3
Our Common Food: Public lecture and award ceremony at ETH Zurich.

Dissemination and Participation

Lokaltermin of the ETH President

In October, ETH President Eichler welcomed over 100 representatives from Swiss business, policy and research to a special event highlighting the challenges confronting the world food system and the ways the sectors can work together to find solutions. Presentations by WFSC members and a panel discussion of researchers and agro-food industry representatives focused on the activities of the Center and the importance of cooperation between sectors to meet the challenge of feeding the world. Prof. Wilhelm Gruissem, Prof. Achim Walter, and Dr. Martijn Sonnevelt were invited speakers at the event.

Research Dissemination and Participation

The WFSC uses a variety of means to communicate to wider audiences about food system topics and research findings from projects supported by the Center. To support a participatory approach in our research, the WFSC establishes advisory boards with stakeholder representatives who accompany the research project whenever appropriate. This allows the projects to remain implementation oriented, integrate new knowledge, data and networks, and to involve the relevant stakeholders from the start of the research.

The WFSC also makes use of existing platforms to improve the communication of findings from the work of the member groups. The special theme of the September 2013 issue of *Globe*, the ETH magazine, was "Food – Better eating / Ernährung – Besser essen". Featuring numerous WFSC members, the issue examined what is behind the meals on our plates and highlighted how their research is driven by a vision for a high-quality, healthy food for everyone, using environmentally friendly means.

Outreach Event

REDES Workshop

In February 2013, the WFSC, in partnership with the Swiss Federal Office for Agriculture and Agroscope, hosted a conference on resource efficiency and food security in Switzerland (REDES). The conference brought together a broad cross-section of stakeholders from the Swiss agro-food sector and offered an opportunity to share finding of the REDES research project and explore the national and international policy implications. A ‹world café› format allowed the 130 conference participants to exchange and discuss critical topics in small groups and formulate the relevant next steps for the Swiss agro-food community. The main topics included: increasing agricultural productivity while saving resources, reducing food waste, the Swiss role in a sustainable global food system, identifying major knowledge gaps, and land-use strategies to increase food security and resource efficiency. The outcomes of the conference feed into an ongoing research and implementation project of the FOAG.

Outlook

Looking back on the WFSC's first full year of operations, there are numerous notable milestones to celebrate. There were many exciting 'firsts' upon which the Center has continued to build: the launch of the WFS Grants Platform with a new research program, the initial meeting of the Scientific Advisory Board, the first WFS summer school course, the first professorial chair associated with the ETH strategic initiative began (Sustainable Agroecosystems), to name just a few.

When the SAB met for its second meeting in January 2014, the group was impressed by the breadth and amount of activities the Center had engaged in during 2013. The Board commended the WFSC Steering Committee and Executive Office for all the efforts to grow the Center to where it is in a short period of time and offered valuable feedback that informs the WFSC's strategic planning.

In the coming months, the WFSC will continue to pursue our mission as we build our profile both in Switzerland and internationally, primarily though the expansion of our work in our three core activity areas. As we build our capacity in each of these areas, we will strive to do so through establishing new partnerships while strengthening existing ones.

In 2014, the Center will also take on an exciting opportunity to organize its first international scientific conference. The WFSC received funding from the Centro Stefano Franscini to hold the event in the ETH conference facility at Monte Verità. The Center will partner with the Berkeley Food Institute at the University of California, Berkeley, and bring together internationally recognized researchers with world food system expertise and experience working in interdisciplinary teams.

In addition, the World Food System Center will collaborate with ETH Sustainability to coordinate the first cross institutional 'ETH Week' in 2015, on the topic of food systems. The program will engage and motivate ETH Zurich students in the 3rd year of their Bachelor studies by providing a platform for applying collaborative, interdisciplinary and creative methods to address complex societal challenges.

Regarding the near future, the World Food System Center will focus on the following goals:

Research

- Build up research opportunities in currently under-represented themes;
- Pursue activities to develop at least one new flagship research project; and
- Foster exchanges and partnerships with international research community (for example through a conference at Monte Verità in mid-2015).

Education

- Continue WFS summer school courses (basic and advanced), attracting a strong, competitive, and diverse pool of applicants from around the world;
- Strengthen the WFSC's role as a portal for student opportunities at ETH;
- Expand opportunities for career development such as facilitating internship opportunities with collaborative partners; and
- Collaborate with ETH Sustainability to host the first ETH week in 2015 on the topic of food systems.

Outreach

- Implement Mercator Program outreach activities, including ambassadorship program;
- Further develop WFSC alumni network and opportunities for alumni, including opportunities to represent the Center at scientific and professional events;
- Continue bringing high-profile experts to ETH for public lecture series; and
- Establish and support advisory boards and stakeholder workshops for relevant projects.

Members

D-ARCH

Prof. Alfredo Brillembourg
Architecture and Urban Design

Prof. Hubert Klumpner
Architecture and Urban Design

Prof. Gerhard Schmitt
Information Architecture

D-BAUG

Prof. Stefanie Hellweg
Environmental Engineering

D-BIOL

Prof. Wilhelm Gruissem
Plant Biotechnology

Prof. Samuel Zeeman
Plant Biochemistry

D-GESS

Prof. Isabel Günther
Development Economics

D-HEST

Prof. Christophe Lacroix
Food Biotechnology

Prof. Martin Loessner
Food Microbiology

Prof. Raffaele Mezzenga
Food and Soft Materials

Prof. Laura Nyström
Food Biochemistry

Prof. Michael Siegrist
Consumer Behavior

Prof. Shana Sturla
Food and Nutrition Toxicology

Prof. Erich Windhab
Food Process Engineering

Prof. Michael Zimmermann
Human Nutrition

D-USYS

Prof. Nina Buchmann
Grassland Sciences

Prof. Consuelo De Moraes
Biocommunication and Entomology

Prof. Stefanie Engel
Environmental Policy and Economics

Prof. Emmanuel Frossard
Plant Nutrition

Prof. Jaboury Ghazoul
Ecosystem Management

Prof. Michael Kreuzer
Animal Nutrition

Dr. Pius Krütli
Natural and Social Science Interface

Prof. Andreas Lüscher
Forage Production and Grasslands

Prof. Bruce McDonald
Plant Pathology

Prof. Pierre Mérel
Agricultural Economics

Prof. Rainer Schulin
Soil Protection

Prof. Sonia Seneviratne
Land-Climate Dynamics

Prof. Johan Six
Sustainable Agroecosystems

Prof. Bruno Studer
Forage Crop Genetics

Prof. Susanne Ulbrich
Animal Physiology

Prof. Achim Walter
Crop Science

Prof. Peter Edwards
Singapore ETH Centre

eawag

Dr. Christian Stamm
Environmental Chemistry

Prof. Hong Yang
Water, Environment and Food Security

Dr. Christian Zurbrügg
Water and Sanitation in Developing Countries

* as of December 2013

Members of the Steering Committee

Scientific Advisory Board

The Center's SAB was formed in 2012 and had its first meeting in January 2013. The SAB is comprised of six members who are nominated by the Steering Committee and come from academia, international organizations, think tanks and the public sector.

Current Members (2012-2016):

Dr. Martin Bloem
Chief, Nutrition and HIV/AIDS Policy, UN World Food Programme

Prof. em. Richard Hurrell
Institute of Food, Nutrition and Health, ETH Zurich; Board Member of GAIN (Global Alliance for Improved Nutrition)

Ian Johnson
Secretary General, Club of Rome

Prof. Bernard Lehmann
Director of the Swiss Federal Office for Agriculture

Prof. Michèle Marin
President, Toulouse Research Center, INRA (French National Institute for Agricultural Research)

Josette Sheeran
President and CEO, Asia Society
Former Executive Director of the UN World Food Programme;
Former Vice-Chair of the World Economic Forum

Partnership Council

The Center's PC was formed in fall 2011 and meets semi-annually with the WFSC Steering Committee and Executive Office. Members of the PC represent foundations and industry partners who provide significant financial support for projects and programs through the ETH Foundation and who are interested in playing an active role in building joint initiatives.

Current Members
(as of December 2013):

Stiftung Mercator Schweiz
Regula von Büren

Syngenta Crop Protection AG
Regina Ammann

Bühler Group
Dr. Ian Roberts

Coop Switzerland
Dr. Sibyl Anwander Phan-huy

Executive Office

The executive office manages the administrative business of the WFSC and supports the SC. The WFSC Team's primary responsibilities are to promote and coordinate contacts between academia, industrial partners and agencies; support development and coordination of research, education, and outreach projects; manage the Center's finances; and prepare reports and pertinent materials for the Center's members and governance and advisory bodies.

Michelle Grant
Executive Director

Bastian Flury
Project Manager

Aimee Shreck
Outreach and Communications Manager

Anna Katarina Gilgen
Project Coordinator

Finances

Income

Total Income	**949'879**
ETH Zurich Infrastructure Funding	250'000
Membership Fees	28'500
ETH D-USYS Contributions	141'750
ETH Foundation[1]	438'629
Third Party Contributions	91'000

Expenses

Total Expenses	**887'187**
Programs	
Research[2]	443'000
Education	47'202
Outreach	22'747
Management and Infrastructure	
Personnel[3]	346'291
Office and Administration	11'946
Travel	8'539
Communications & PR	1'948
Miscellaneous	5'513

Income and Expenses for the calendar year 2013.

1 Donation to the ETH Foundation WFS Initiative from the Mercator Foundation Switzerland.

2 Covers: two PhD projects in the framework of the Mercator Research Program, postdoctoral researcher for the Resilience in Food Value Chains: Feasibility study.

3 Including 15% social benefits.

Selected Publications 2013

Abbeddou S, Diekmann J, Rischkowsky B, Kreuzer M, Oberson A (2013) Unconventional feeds for small ruminants in dry areas have a minor effect on manure nitrogen flow in the soil-plant system. Nutr Cycl Agroecosyst 95:87-101

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Boreux V, Kushalappa CG, Vaast P, Ghazoul J (2013) Interactive effects among ecosystem services and management practices on crop production: pollination in coffee agroforestry systems. Proc Natl Acad Sci USA 110:8387-8392

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Content World Food System Center
Layout Lex Schaul
Photos Cover and p.2 Tino Colombi, with software developed in the Crop Science Group; p.5 WFSC; p.6 Rupesh Kariyat, Laboratory of Biocommunication & Entomology; p.9 Maya Jörg, for the WFSC; p.11 Inauguration, Giulia Marthaler, for the WFSC; p.11 Redes Event, Maya Jörg, for the WFSC; p.11 Summer School, Stiftung Mercator Schweiz / Jonas Jäggy; p.12 Giulia Marthaler, for the WFSC; p.13 Giulia Marthaler, for the WFSC; p.18.1 Heidi Hostettler, for Seed Sustainability; p.18.2 Johan Six, for the WFSC; p.18.3 Claudia Hoffmann, Agroscope; p.19.4 Wilhelm Gruissem, Plant Biotechnology Group; p.19.5 Jana Barbey; p.19.6 Florian Oberhauser; p.20.1 Roman Grüter; p.20.2 Tobias Beeler; p.20.3 Maike Nesper; p.20.4 Fiona Cimei; p.23.1 WFSC; p.23.2 WFSC; p.23.3 Stiftung Mercator Schweiz / Jonas Jäggy; p.25 Maya Jörg for the WFSC; p.26 Maya Jörg for the WFSC.

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