ETH zürich

WFSC Newsletter Issue 5 | June 2016

World Food System Center News

WFSC News & Upcoming Events

Center Phase 1 Report
A report on the activities of the World Food System Center's first phase of operations is now available on the WFSC website (www.worldfoodsystem.ethz.ch). The report reviews our key activities from 2012-2015 with a special highlight on 2015. After a successful evaluation by the ETH Office of the Vice President for Research, we began our second phase at the start of 2016, and look forward to continuing to build our programs and partnerships over the coming years.

New Professorship
On June 1, 2016, ETH Zurich, in partnership with Agroscope, has appointed WFSC member Bruno Studer as Associate Professor of Molecular Plant Breeding. The new professorship will be shared between Agroscope and ETH Zurich with a view to strengthening plant breeding in Switzerland. We congratulate Prof. Studer and look forward to continuing our work with him and his group.

Agora Project to Begin
The WFSC is excited to begin collaborating on a new outreach project supported by the Swiss National Science Foundation's Agora program. The three-year project, *Edible Research: Hands-on learning for sustainability in agroecosystems*, will begin in August 2016 under the leadership of the Sustainable Agroecosystems group. As a project partner, the WFSC will be involved in organizing workshops for teenagers in Zurich schools that will introduce them to the world of agricultural ecosystems. Taking place in a greenhouse in the center of Zurich, students will be exposed to various agroecosystem research projects, and learn how basic principles of agroecology and organic farming can help to produce food in a more sustainable way.

Special Issue on Food Systems The WFSC was invited to co-edit a special issue of Sight and Life magazine focusing on food systems. The issue includes contributions about the WFSC flagship project, *Enhancing Resilience in Food Systems*, the WFSC study tour, *Tackling Food System Challenges with IT Innovation*, and many more articles that resonate with the theme of food systems for enhanced nutrition. The full issue will be available at www.sightandlife.org/library.html.

ETH Studio AgroFood
A new ETH Studio AgroFood was established in May to prepare students to engage thoughtfully, foster an innovative mindset, and enable the next generation of professionals to face the challenges derived from digital disruption in the AgroFood sector. With digitalization revolutionizing the sector at an incredible pace, there are great opportunities for innovation in Switzerland's small-scale agricultural system. The WFSC is excited to collaborate in the initial 2.5 year pilot phase, which will bring students and diverse stakeholders together through interdisciplinary courses, conferences, and research projects. The Steering Group includes Prof. Achim Walter (Director), Jürg Brunnschweiler, Michelle Grant, Prof. Nina Buchmann and Eduardo Pérez (Project Manager).

Research

Flagship Project Update: Enhancing Resilience in Food Systems
The WFSC flagship project on food system resilience continues to grow, with new partners, additional funding, and new case studies underway. New funding from the Swiss Federal Office for Agriculture (FOAG) supports a PhD student who will study resilience in the Swiss food system and a joint project with the FOAG and the UN Food and Agricultural Organization (FAO) is supporting a study of food system resilience in Burkina Faso and Switzerland using FAO's SHARP assessment tool. This partnership includes a course and field visit for ETH Zurich students at the FAO headquarters. In collaboration with new partners TFT-Earth, the project is also setting up another case study to assess the resilience of the oil palm value chain in Malaysia. Starting this summer, this project will involve training of local staff on the resilience guidelines and will be supported by ETH Master's student, Olivia Pfister. Learn more about the project at www.resilientfoodsystems.ethz.ch.

New WFS Grants Awarded

Eight new cross-disciplinary food system research projects totaling more than 2.1 million CHF were funded through the Center's WFS Grants Platform this year. In March, the ETH Zurich VP for Research confirmed funding recommendations from the independent review panel. The panel was faced with an especially challenging task, with a record number of high-quality submissions to the two research programs. The new projects cover a broad range of topics and involve researchers from 11 different WFSC member groups. The researchers will be investigating the potential of new and novel technologies, such as non-thermal microplasma for improving food safety, drying techniques for the preservation of leafy greens, and nitrification of urine as an organic fertilizer. They will be applying a range of inter-disciplinary approaches, including whole value chain analyses, systems approaches, and life cycle analyses. The scope of the studies ranges from a study of the implications of organic agriculture globally, to an in-depth study of the resilience capacity in the Ethiopian tef and Ghanaian cocoa value chains. Beyond ETH Zurich, the projects involve partners in sub-Saharan Africa, Latin America, and Europe. Further information about the ongoing projects can be found at www.worldfoodsystem.ethz.ch/research. The next call for proposals will open in July 2016.

South Africa Meets ETH Zurich

WFSC researchers met with a delegation from Stellenbosch University in March 2016, building on the collaborative partnership established in 2014 with the Stellenbosch University Food Security Initiative. Researchers met for a workshop to discuss their ongoing and future work. To date, five collaborative projects around sustainable agriculture and human nutrition have started, which have resulted in positive collaborative experiences and a common desire to continue working together towards solutions for food and nutrition security challenges in Africa. The workshop was part of a larger event, in which ETH Zurich also hosted delegations from three other South African universities, University of Cape Town, University of Pretoria and University of the Witwatersrand in the framework of "South Africa meets ETH Zurich."

Participants at a stakeholder workshop on resilience of the cocoa value chain in Ghana (Kumasi, January 2016).

Sustainable Campus Catering

Three years ago, the WFSC teamed up with the ETH Sustainability office and the Seed Sustainability program to tackle the challenge of making catering at ETH Zurich more sustainable. With a multi-sectoral, participatory approach, the project engaged a wide range of stakeholders including students, researchers, service providers and university administrators. The team conducted solution-oriented research using the student dining halls as a "living lab." More than 30 participants discussed the key findings and implications of the initiative at a final workshop in April. After a review of the project's activities and findings to date, the ETH Zurich Catering Commission decided to move forward with defining a binding "ETH sustainable catering programme" with a commitment to reducing greenhouse gas emissions and further developing sustainability standards. Learn more about the project at http://tinyurl.com/ETHsuscat.

Researchers from University of Stellenbosch in South Africa at a workshop with collaborators from ETH Zurich World Food System Center, March 2016.

UPCOMING EVENTS

WFS Summer School (7-21 August 2016) The 2016 course on *Organic Agriculture and Food Systems* will take place in Rheinau, Switzerland.

Fall Public Lecture at ETH (4 October 2016) *Beyond Organic: Diversification in Food Systems*, featuring a keynote lecture by Dr. Emile Frison, of the International Panel of Experts on Sustainable Food Systems.

WFS Research Symposium (4 November 2016) The WFSC's first annual symposium featuring food systems research supported by the Center and conducted by members will take place at ETH Zurich.

WFSC Annual Meeting (6 Decembr 2016)

www.worldfoodsystem.ethz.ch/news/event-calendar

Q&A with Anja Gramlich, Postdoctoral fellow on the project "Cadmium availability in soils and its uptake by cocoa in Latin America."

Q. Why is Cadmium (Cd) contamination in cocoa a problem?

A. Cadmium is toxic for plants, animals and humans; it can limit plant yields and chronic Cd ingestion causes kidney damage and cancer in humans. New regulations establish critical values of Cd in cocoa products imported to the EU from 2019 on. These regulations could threaten the livelihoods of many smallholder farmers, especially from some regions in Latin America, where the Cd content in cocoa beans is rather high.

Q. How does your study address this issue?

A. We carried out a survey of Cd concentrations in cocoa and a variety of soil and site factors on 55 cocoa farms in Honduras to identify the sources of Cd in cocoa and the factors governing its uptake. In a separate study, we looked into management effects on Cd uptake to cocoa on a long-term field trial in Bolivia. This trial compares organic and conventional cocoa production, as well as monoculture and agroforestry system effects.

Q. You recently organized a workshop with project partners, what did you learn from this?

A. Since we had the chance to visit the laboratories of our partners in Bolivia and Honduras during our field work, this workshop was a good opportunity for the scientists from our partner institutions to get familiar with the methods we used in our laboratory at ETH to chemically analyze the field samples we collected. This exchange certainly improved the quality of our joint publications. We also organized a public seminar, where we presented results and discussed them with all involved stakeholders, including representatives from the chocolate industry. Together, we began developing a follow-up project to study in more detail the effects of different varieties on Cd uptake by cocoa.

Q. What are the most important outcomes of the project?

A. The survey in Honduras showed that plants grown on soils developed on alluvial sediments contained highest Cd contents. The study in Bolivia revealed that local variations in the soil available Cd were the most important factors determining leaf Cd contents. At the same available concentrations however, trees grown in agroforestry systems contained lower contents than the ones from monocultures.

Dr. Anja Gramlich is a postdoctoral researcher working with Prof. Rainer Schulin on a research project funded by the WFSC's Research Program, Sustainability in Food Value Chains, which is supported by Coop.

Survey of Cadmium concentrations in cocoa in Honduras.

Outreach

Workshop at eco.naturkongress: "To Meat or Not to Meat"
The WFSC and five researchers participated in the annual eco.ch festival, Switzerland's largest public event on sustainability. The 2016 program theme was *Welternährung und die Schweiz* and our workshop invited the conference participants to exchange with researchers about sustainable livestock production and consumption. They explored questions such as, is there room for animal source foods in a sustainable food system? Can we enjoy meat and dairy in our diet and have a sustainable lifestyle? Can / should animals be part of a sustainable Swiss food system? A big thank you to the researchers who shared their work and perspectives: Dr. Isabelle Gangnat and Florian Grandl (Animal Nutrition Group), Dr. Manuel Schneider (Agroscope), Dr. Mike Ruckle (Forage Crop Genetics Group), and Dr. Valeria Galetti (Laboratory of Human Nutrition). Read Dr. Gangnat's blog about the topic at www.eco.ch/fleisch-essen-oder-nicht/.

Sustainable Proteins of the Future
The Center's newest member, Prof. Alexander Mathys gave a keynote in our spring 2016 public lecture on *Tackling Food System Challenges through Innovation: Sustainable Proteins of the Future*. After his introducing the topic to a full house and sharing some of the research his group is conducting on novel proteins such as algae and insects, Prof. Mathys then moderated a lively discussion with a panel of industry experts

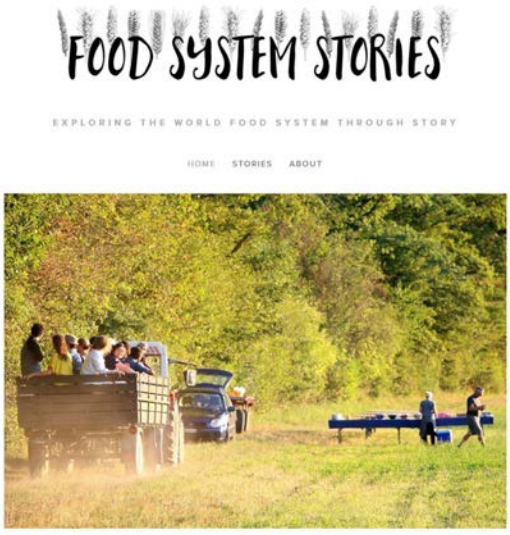
Prof. Alexander Mathys at public lecture on sustainable proteins at ETH Zurich in March 2016

ETH Zurich students at FAO headquarters in Rome during 3 day course on Food Security and Resilient Food Systems.

including Dr. Béatrice Conde-Petit (Bühler AG), Matthew Robin, (Elsa-Mifroma Groupe) and Urs Fanger (Entomos AG). Further information at www.worldfoodsystem.ethz.ch/outreach-and-events/past-events/sust-prot.html

Food System Stories

In April we launched a new blog featuring the voices and perspectives of the WFSC alumni network, the students and participants of our educational programs. This creative space offers them a platform to share short stories and communicate about their observations, experiences, and food system interests in an informal way. It also provides a space to showcase outputs and lessons learned from the Center's Mercator Ambassador Program. We invite you to read the stories and follow the blog at www.foodsystemstories.org.



WFSC Alumni blog, Food System Stories.

Education

Course on Food Security and Resilient Food Systems at FAO

During the 2016 spring semester, we collaborated with the Swiss Federal Office for Agriculture and the UN FAO to offer a 3-day course for Master's students at the FAO headquarters in Rome. This was the sixth time the course was offered, after being initiated in 2010. This year, the course was taught by the Sustainable Agroecosystems Chair. It was integrated with the WFSC's flagship project on enhancing resilience in food systems and a broader initiative involving the three organizations, which aims to identify, discuss, and disseminate grass-root innovations for building resilience in food systems. The initiative involves Master's thesis projects, training on FAO's SHARP tool for assessing resilience, and a small grant program for students.

Summer Schools

Our fifth summer school course will take place in August with 24 students from 18 countries at the Gut Rheinau organic farm in Switzerland. The program introduces students to a world wide community of young scientists and professionals (WFSC alumni) that join hands to tackle world food system challenges. With a focus on organic agriculture and food systems participants get a chance to apply systems thinking to concrete challenges by interacting with stakeholder and experts from across the food system. Our upcoming summer school courses are planned for South Africa and Ivory Coast. Further details about our summer school program and future calls for applications are available on our website at www.worldfoodsystem.ethz.ch/education/summer-schools.html

Study Tour visit to large scale strawberry farm in Watsonville, California.

ETH Meets California Study Tour: Tackling Food System Challenges with IT Innovation

The WFSC traveled in April with a group of 20 students from ETH Zurich and five California universities on an educational trip in the Silicon and Central Valleys of California. The one week tour covered over 760 km and brought us to 21 different organizations with the goal of investigating the potentials and challenges for disruptive and innovative technologies to address the most pressing food system challenges. Tour stops ranged from start up incubators to salad processing plants and large and small innovative farms, while activities included a design thinking workshop, tours, and lectures.

The study tour was part of a 10 day event organized by ETH Global and was possible thanks to our local partners, the Mixing Bowl Hub and UC Davis. For more information about the study tour, see www.worldfoodsystem.ethz.ch/education/study-tours.html.

A Study Tour stop ot the Yolo Food Bank to learn about food insecurity in California's Central Valley.

Q&A with Stephan Pfister

Principal Investigator for the three year project "Global Organic Agriculture," which is starting in 2016.

Q. This project involves high spatial resolution modeling to compare conventional and organic crop production. What is innovative about your approach?

A. Combining various agricultural models at high spatial resolution is so far a missing piece of information for identifying hotspots for improved agriculture. While supply chains are largely managed by international cooperation, the production of crops is in the hands of millions of farmers and therefore hardly optimized or monitored. Additionally, the combination and improvement of models will allow us to analyze potential performance differences between organic and conventional production, which is so far limited to few case studies.

Q. What do you expect will be your biggest challenge?

A. Compiling the huge amount of data required for global modeling at acceptable quality will be one key challenge which will affect the extent to which models can be improved or will need to be simplified. Anticipated restrictions regarding data quality involves high uncertainties in the results and consequently more difficult interpretation concerning which crops are most suitable for organic production in which regions. This will be another challenge for us.

Q. What are you most excited to learn?

A. First of all, it will be exciting to collaborate with our colleagues from the Research Institute of Organic Agriculture (FiBL) to combine our areas of expertise. We expect that our results will provide insights concerning where and for which crops organic production can have the highest impacts for improving environmental performance. These results can inform decision makers and companies where to best focus on organic production for efficiently contributing to more sustainable global food production.

Dr. Stephan Pfister is Senior Research Associate in the group of Ecological Systems Design at the Institute of Environmental Engineering. His research project is funded by the WFSC's Mercator Research Program, Organic Production Systems.

Recent Food System Publications

Below is a selection of recent publications from WFSC members that highlight their work on food system topics.

Andres C, Bhullar GS (2016) Sustainable Intensification of Tropical Agro-Ecosystems: Need and Potentials. Front Environ Sci 4:5

Brnic M, Wegmüller R, Melse-Boonstra A, Stomph TJ, Zeder C, Tay FM, Hurrell RF (2016) Zinc absorption by adults is similar from intrinsically labeled zinc-biofortified rice and from rice fortified with labeled zinc sulfate. J Nutr 146:76-80

Chaudhary A, Pfister S, Hellweg S (2016) Spatially Explicit Analysis of Biodiversity Loss Due to Global Agriculture, Pasture and Forest Land Use from a Producer and Consumer Perspective. Environ Sci Technol 50:3928-3936

Frewer LJ, Fischer ARH, Brennan M, Bánáti D, Lion R, Meertens RM, Rowe G, Siegrist M, Verbeke W, Vereijken CMJL (2016) Risk/Benefit Communication about Food - A Systematic Review of the Literature. Crit Rev Food Sci Nutr 56:1728–1745

Deryng D, Elliott J, Folberth C, Muller C, Pugh TAM, Boote KJ, Conway D, Ruane AC, Gerten D, Jones JW, Khabarov N, Olin S, Schaphoff S, Schmid E, Yang H, and Rosenzweig C (2016) Regional disparities in the beneficial effects of rising CO2 concentrations on crop water productivity. Nature Clim Change Advance online publication

Erzinger MM, Bovet C, Hecht KM, Senger S, Winiker P, Sobotzki N, Cristea S, Beerenwinkel N, Shay JW, Marra G, Wollscheid B, Sturla, SJ (2016) Sulforaphane Preconditioning Sensitizes Human Colon Cancer Cells towards the Bioreductive Anticancer Prodrug PR-104A. PLoS One 11:1–17

Galetti V, Mitchikpè CES, Kujinga P, Tossou F, Hounhouigan DJ, Zimmermann MB, Moretti, D (2016) Rural Beninese Children Are at Risk of Zinc Deficiency According to Stunting Prevalence and Plasma Zinc Concentration but Not Dietary Zinc Intakes. J Nutr 146:114–123

Grandl F, Luzi SP, Furger M, Zeitz JO, Leiber F, Ortmann S, Clauss M, Kreuzer M, Schwarm A (2016) Biological implications of longevity in dairy cows: 1. Changes in feed intake, feeding behavior, and digestion with age. J Dairy Sci 99:3457-3471

Grandl F, Amelchanka SL, Furger M, Clauss M, Zeitz JO, Kreuzer M, Schwarm A (2016) Biological implications of longevity in dairy cows: 2. Changes in methane emissions and efficiency with age. J Dairy Sci 99:3472-3485

Liu W, Yang H, Folberth C, Wang X, Luo Q, Schulin R (2016) Global investigation of impacts of PET methods on simulating crop-water relations for maize. Agricult Forest Meterol 221:164-175

Scherer L, Pfister S (2016) Global Biodiversity Loss by Freshwater Consumption and Eutrophication from Swiss Food Consumption. Environ Sci Technol Article ASAP

Schmitt E, Keech D, Maye D, Barjolle D, Kirwan J (2016) Comparing the Sustainability of Local and Global Food Chains: A Case Study of Cheese Products in Switzerland and the UK. Sustainability 8:419

Member Highlights

Prof. Bruno Studer won the 2016 research prize of the Günter and Anna Wricke Foundation for his research achievements in forage crop genetics. The prize is given to young researchers from agricultural, horticultural or forest genetics. Read more www.wricke-stiftung.de/index.html

Prof. Nina Buchmann was elected as a member of the External Advisory Board for the Food Security Center at University of Hohenheim, Germany.

Prof. Jaboury Ghazoul was granted an award for Outstanding Services as President of the Association of Tropical Biology and Conservation.

Prof. Johan Six and colleagues published the first ever "Global Soil Biodiversity Atlas" in May. This 170+ page atlas introduces the world belowground and its protagonists, using text, photographs, and maps to explain what soils are and to highlight their multiple ecosystem services. Available as a free PDF at https://globalsoilbiodiversity.org/node/271.

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