PSC Summer School 2018
Responsible Research and Innovation in Plant Sciences
September 10 to 14, 2018
Einsiedeln, Switzerland

Scientific Organization:
Melanie Paschke, PhD, Zurich-Basel Plant Science Center (PSC)

Administration:
Romy Kohlmann (PSC)

For any organizational questions regarding the summer school, please do not hesitate to contact Romy Kohlmann: romy.kohlmann@usys.ethz.ch

Social transformation through innovation and research are key elements in the discussion how the global community could overcome its complex problems, related to environmental and economic constraints in a resource-limited world. Innovation conflicts arise when transformation is mainly technological driven and not taking up ethical, legal and social issues. In response scientists are asked to take a role in science-in-society dialogue.

What does science-in-society mean?
- Knowledge that is adapted to societal needs is co-produced between different stakeholders including scientists.
- Public engagement is key in this process – welcoming civil societal actors as partners to express their values and interests in techno-scientific and innovation choices.

We have to re-think the scientific research process, opening spaces for the public at the beginning of a research project to become together with the

scientists reflective on the question, which innovation and research should be fostered: By whom? Why? In which ways? Says who?

In this summer school, we will implement the responsible research and innovation framework to exemplary research field as plant breeding, smart farming, digitalization in agriculture in plant sciences and to your own research projects. We guide you through the science-in-society research processes that include: anticipating with the public and stakeholders a wide range of possible futures, becoming reflective about involved values and interests, responding to societal needs, co-producing knowledge, creating spaces for social learning and transformation as well as open innovation. In particular, we will also work with the Responsible Research and Innovation (RRI) framework of the European Union.

Theoretical inputs to understand the concepts and methodologies, workshops on tools, exemplary insights in good practices and working with case studies including your own will help you to build a responsible research and innovation process for your own project.

Invited speakers will make presentations on the topic of their research, give insight into their research field, conduct interactive workshops and take part in plenary discussions. They will act as mentors in the case studies group work. The outcome of the group work will be available in the proceedings.

Since 2010 the Zurich-Basel Plant Science Center is organizing summer schools on tackling the big challenges of the 21st century – food security, sustainable transitions in agriculture, resilience in ecosystems or systemic risks in the plant sciences - to name just a few.

2 Didactical concept

Learning objectives

By the end of the summer school, participants will:
- Understand the responsible research and innovation (RRI) framework.
- Gain tools for co-producing knowledge.
- Know how to carry out constructive ethical inquiry, technology assessment and anticipation techniques.
- Be able to apply design thinking.
- Understand deliberation in research.
- Understand challenges in transition management.
- Build a responsible research and innovation process for your own project through case studies and best practice examples.

Number of Participants: 20

Number of ECTS: 2

Individual Performance and Assessment:
- Session summary
- Group work on best practice
- Presentation of group work
- Best Practice report which will be published in proceedings
- Evaluating trends and concepts of a sustainable agriculture production

Organization of Student Work

Before summer school:
- Application includes description of motivation and background.
- Preparatory reading: Students will need to read the assigned literature before the summer school.

During summer school:
- Sessions are composed as lectures, discussions and case study work.
- Group work will be done on case studies, individual working time on this group work is expected to be about 10h
- Presentation and integration: at the end of each afternoon, 1 group presents their experiences and insights. Open Format.
- Case study presentation on day 5 is 30 min per group.

After summer school:
- Groups hand in a finalized version of their case study for inclusion in the proceedings.

Group Enrolment
- Will be on preferred best practice (enrolment at learning platform).

3   Sessions

<u>Monday 10.09.2018</u>

Session 1: Overview

- **Presentation 1:** Melanie Paschke, Zurich-Basel Plant Science Center (PSC), ETH Zurich and Universities of Zurich and Basel & Daan Schuurbiers, De Proeffabriek, Arnhem, The Netherland
- <u>Title:</u> The Responsible Research and Innovation framework – Participation and deliberation

Session 2: Co-producing knowledge

- **Presentation 2:** Christian Pohl, D-USYS td lab, ETH Zurich
- <u>Title:</u> Co-producing knowledge

- **Workshop 1:** Christian Pohl
- <u>Title:</u> 10-step approach for co-producing knowledge

<u>Tuesday 11.09.2018</u>

Session 3: Anticpation, reflexity, inclusiveness

- **Workshop 2:** Daan Schuurbiers
- <u>Title:</u> Enabling inclusiveness: integrating societal considerations in your research through constructive technology assessment

- **Workshop 3:** Melanie Paschke
- <u>Title:</u> Ethical inquiry in deliberation

<u>Wednesday 12.09.2018</u>

Session 4: Design-based approaches

- **Workshop 4:** Grégory Grin, Fri Up, Fribourg, Switzerland
- <u>Title:</u> A practical introduction to Design Thinking

<u>Thursday 13.09.2018</u>

Session 5: Practice examples

- **Presentation 3:** Christine Rösch, Karlsruhe Institute of Technology (KIT), Institute for Technology Assessment and Systems Analysis (ITAS)
- <u>Title:</u> Citizen Participation to design the Agrophotovoltaics system

- **Presentation 4:** Bernadette Oehen, Research Institute of Organic Agriculture (FiBL), Department of Crop Sciences, Frick, Switzerland
- <u>Title:</u> Practice Example: Insight from case studies concerning participatory breeding and valorization strategies.

- **Presentation 5:** Eduardo Perez, World Food System Center, ETH Zurich
- <u>Title:</u> Digitalization in agriculture

- **Presentation 6:** Foteini Zampati, Global Open Data for Agriculture and Nutrition, (GODAN), CAB International, Wallingford, UK
  <u>Title:</u> Practice Example: FAIR data principles for best practice in agriculture research data management

- **Presentation 7:** Maria J. Ferreira dos Santos, Department of Geography, University of Zurich
- <u>Title:</u> Practice Example: **Sustainability with biomass: burning neutral**

<u>Friday 14.09.2018</u>

Session 6: Transition Management

- **Workshop 5:** Jochen Markard, Sustainability and Technology within the Department of Management, Technology, and Economics of ETH Zurich, Switzerland
- **Title:** Sustainability Transitions: Firms, consumers, policies and politics.

4   Speakers (Biography, Description Talk & Workshop Content)

<u>Monday 10.09.2018</u>

Presentation 1: Melanie Paschke, Zurich-Basel Plant Science Center, ETH Zurich and Universities of Zurich and Basel
<u>Title:</u> The Responsible Research and Innovation framework – participation and deliberation

Abstract:

Introduction to the summer school: Responsible research and innovation is an approach that anticipates and assesses potential implications and societal expectations with regard to research and innovation, with the aim to foster the design of inclusive and sustainable research and innovation (Horizon 2020, European Commission). In this introduction, we explore these concepts and their meaning for the research practice.

Deliberation is seen as an important concept in RRI because it should allow to broaden perspectives in society and become inclusive for those not included yet. Deliberative formats and processes are targeting on maximizing the decision-making power of all those targeted as well as on a high responsiveness and accountability of scientists towards needs, values and expectations of those targeted. The process of deliberation can lead to understanding, respect, empathy, and a balance of power. Deliberation in science is a yardstick for scientists in society in modern democracies and in global governance.

In this part we will give you an overview presentation and we will introduce you to tools and techniques used in deliberation and practiced through the summer school.

Literature:

Felt, U., Barben, D., Irwin, A., Joly, P.-B., Rip, A., Stirling, A., Stöckelová, T. (2013). Science in Society: caring for our futures in turbulent times. European Science Foundation Policy Briefing, 50: 1-36.

Stilgoe, J., Owen, R., Macnaghten, P. (2013). Developing a framework for responsible innovation. Research Policy 42: 1568-1580.

RRI Tools (2016). A PRACTICAL GUIDE TO RESPONSIBLE RESEARCH AND INNOVATION. KEY LESSONS FROM RRI TOOLS. Retrieved from:
https://www.rri-tools.eu/documents/10184/16301/RRI+Tools.+A+practical+guide+to+Responsible+Research+and+Innovation.+Key+Lessons+from+RRI+Tools

Bellamy, R., Chilvers, J., Vaughan, N. (2016). Deliberative Mapping of options for tackling climate change: Citizens and specialists 'open up' appraisal of geoengineering, Public Understanding of Science 25: 269-286

About the speakers:

Daan Schuurbiers, director of DPF, a Dutch consultancy for responsible innovation has encouraged early reflection on the possible social impacts of emerging technologies throughout his research and current advisory work. He designs training courses for researchers, builds novel interdisciplinary collaborations, advises on research policy and regularly speaks at conferences to raise awareness with researchers of the broader societal dimensions of their work.

Melanie Paschke is heading the education and science-policy section at the Zurich-Basel Plant Science Center. She has a PhD in ecology and environmental sciences, has led and supervised the development of higher education programs for more than ten years. She has a record of accomplishment as educator in several areas of academic professional conduct and sustainable development. Her focus is on ethical inquiry in the plant sciences and on research integrity.

Presentation 2 & Workshop 1: Christian Pohl, D-USYS td lab, ETH Zurich
<u>Title:</u> Co-producing knowledge

Abstract:
In this presentation and workshop we will apply the 10-step approach for co-producing knowledge in interaction between transdiscisplinary experts and researchers. Through ten questions discussions are opened around research issues, identifying and reviewing the societal problems addressed, identifying relevant actors and disciplines, and clarifying the purpose and form of the interaction with them.

Outcome of the workshop and afternoon case study work is, that you have identified the <u>actors</u> and <u>disciplines</u> that are involved in your cases.

<u>Literature:</u>
Pohl, C., Krütli, P., Stauffacher, M. (2017). The reflective steps for rendering research societally relevant. Gaia 26/1: 43-51.

About the speaker: Christian Pohl is lecturer and senior research fellow at the TdLab (Transdisciplinary lab) at the Department of Environmental Systems Science ETH Zurich. He studied environmental sciences and wrote a doctoral thesis on uncertainty in environmental assessments. His main interest is transdisciplinarity as an intellectual tool to address socially relevant issues, like environmental problems or sustainable development. In his research, he accordingly focuses on transdisciplinary research as a process of knowledge co-production that interrelates research and societal change towards sustainable development.

Tuesday 11.09.2018

Workshop 2: Daan Schuurbiers, De Proeffabriek, Arnhem, The Netherland
Title: Enabling inclusiveness: integrating societal considerations in your research through constructive technology assessment

Abstract:
As part of ongoing attempts to strengthen the responsiveness of research and innovation to societal needs and values – most recently within the framework of Responsible Research and Innovation – scientists are called upon to 'integrate broader societal considerations in their work'. But for all the compelling rhetoric, what does this actually mean at the level of day-to-day research? What sorts of considerations are we talking about? Whose considerations are they? And how could they be applied to research?
In this workshop, we will explore how to integrate societal considerations in your own research. After a brief introduction to the notion of Responsible Research and Innovation and its implications for research practice, we will identify the questions, knowledge requirements and possible concerns that social actors might have. Subsequently, we will explore how you might incorporate these questions as part of your own research through constructive technology assessment.

Literature:

Schot, J., Rip, A. (1997). Technological Forecasting and Social Change
The past and future of constructive technology assessment. Technological Forecasting and Social Change 54: 251-268. DOI:
https://doi.org/10.1016/S0040-1625(96)00180-1

Rip, A., Robinson, D. K. R. (2013). Constructive Technology Assessment and the Methodology of Insertion. In: Doorn, N., Schuurbiers, D., van de Poel, I.,

Gorman, M.E. (eds.) Early engagement and new technologies: Opening up the laboratory. Springer: Heidelberg: 37-53

Elzen, B, Bos, B. (2016). The RIO approach: Design and anchoring of sustainable animal husbandry systems. Technological Forecasting and Social Change. 10.1016/j.techfore.2016.05.023.

Schuurbiers, D. & Fisher, E. (2009). Lab-scale intervention. EMBO reports 10: 424 – 427.

de Saille, S, Medvecky, F. (2016). Innovation for a steady state: a case for responsible stagnation. Economy and Society, 45. DOI: https://doi.org/10.1080/03085147.2016.1143727

European Environment Agency (2013). Late Lessons from Early Warnings could also be useful? EEA Report, 1/2013. Retrieved from: https://www.eea.europa.eu/publications/late-lessons-2

Workshop 3: Melanie Paschke, Zurich-Basel Plant Science Center, ETH Zurich and Universities of Zurich and Basel
Title: Ethical inquiry on emerging technologies

Abstract:
Previous experiences and examples in several fields of technological innovation and sustainable development showed that behind deep and far-reaching societal concerns are often conflicts on overlooked values. An important idea of Responsible Research and Innovation is that engaging in ethical inquiry very down-stream in the research process, i.e. in pre-research or at the very start of a research project can resolve in more acceptance. However, ethical inquiry is still seen as a burden and not as an opportunity for deliberation. Efforts to integrate tools as Constructive Ethical Technology Assessment in the research process are build on the idea of technical mediation or co-construction of the human-technology interactions.
In this workshop, we will see how ethical inquiry can be build in the research and innovation process.

Literature: Kiran, A.H., Oudshoorn, N. & Verbeek, P.-P. (2015). Beyond checklists: towards an ethical-constructive technology assessment. Journal of Responsible Innovatio 2:1, 5-19: DOI:10.1080/23299460.2014.992769

Wedensday 12.09.2018

Workshop 4: Grégory Grin, Managing Director of Fri Up, Fribourg, Switzerland
Title: A practical introduction to Design Thinking

Abstract:
During this workshop, participants will discover Design Thinking — an innovative, human-centered approach to problem solving that starts with a specific challenge and goes through multiple stages of iteration: observation, interviews, brainstorming, and prototyping.
After an introduction of the tools and methods, participants will practice in groups on a real-life challenge, from reframing the challenge, generating and describing ideas, prototyping them and exposing them to external feedback.

Recommended Literature:
It is recommended to watch the 8 minutes "ABC Nightlife" report about how the company IDEO works. This video can be found on Youtube, for example here: https://youtu.be/M66ZU2PCIcM

About the speaker:
Grégory Grin is the Managing Director of Fri Up, the official support organization for business creations in the state of Fribourg. Its mission: to be the entry door for all new entrepreneurs who want to launch their start-up. As a non-profit organization, Fri Up welcomes projects from their very early stage and offers a free of charge, field-oriented and personalized support.
Prior to Fri Up, Grégory worked during 20 years for the development and launch of new consumer technology products and digital services. This very often resulted in the need to create innovative solutions in a human-centered and field-oriented way, in the creation of new businesses and in start-ups acquisitions.
He is a seasoned expert in Design Thinking that he uses to support start-ups and large organizations to develop new business ideas. He also gives Design Thinking lectures in several executive MBA and Master programs in Switzerland.
Grégory has also initiated the TEDx conferences in Fribourg. These conferences gather every year participants around a group of speakers who present ideas, projects or unique achievements.
Grégory Grin holds a MSc in Information Technology (University of Versailles) and is graduated in General Management from the Harvard Business School.

Thursday 13.09.2018

Presentation 4: Dr. Christine Rösch, Karlsruhe Institute of Technology (KIT), Institute for Technology Assessment and Systems Analysis (ITAS), Head of

research area: Sustainability and environment
<u>Title:</u> Citizen Participation to design the Agrophotovoltaics system

<u>Abstract</u>: Even though the technical feasibility of many renewable energy technologies has been proved, their success highly depends on the public opinion. Since the acceptance of renewable energy plants is still discussed controversially, public opposition can be a hurdle for new installations despite their climate friendliness. Thus, the integration of citizens plays a key role in order to design new technological solutions in a way that they are socially acceptable and address the objectives of sustainable development. In this context, we have investigated citizens' perceptions on the system technology Agrophotovoltaic (APV) by applying the Responsible Research and Innovation (RRI) concept. APV combines biomass and solar power production at the same site. By this, the production of renewable energy can be further increased without triggering land use competition and conflicts. The RRI concept comprises two citizens' workshops, one before and one after the construction of the APV pilot plant as well as a survey at the opening ceremony of the pilot plant. In the talk the RRI concept and the findings from citizens' participation how to design the APV system will be presented.

<u>Literature:</u> Gene Rowe & Richard Patrick Watermeyer (2018): Dilemmas of public participation in science policy, Policy Studies, DOI: 10.1080/01442872.2018.1451502

About the speaker: Dr. Christine Rösch was trained as an agricultural biologist. In 1996, she graduated at the University of Hohenheim. From 1996 to 1998, she worked for the Office of Technology Assessment at the German Bundestag (TAB). From 1998 to 2000, she was senior scientist at the University of Stuttgart. Since 2001, she works at the Institute of Technology Assessment and Systems Analysis (ITAS) of the Karlsruhe Institute of Technology (KIT). Since 2010, she is head of the research area "Sustainability and environment" at ITAS. As project and task leader, she has conducted many research projects on behalf of the European Commission, the Federal Ministry of Education and Research and other institutions. Most of her scientific work deals with technology and sustainability assessment in the field of bioeconomy and energy. Recently she works on citizens' participation to develop knowledge for the design of the Agrophotovoltaics system as a possible solution to overcome the dilemma of land use competition for energy and food production.

Presentation 5: [Bernadette Oehen](#), Research Institute of Organic Agriculture (FiBL), Department of Crop Sciences, Frick, Switzerland
Title: Practice Example: Insight from case studies concerning participatory breeding and valorisation strategies.

Abstract:
The EU funded project DIVERSIFOOD aims at increasing food and crop diversity. In the course of the project, we conducted case studies across Europe involved of seed conservation, seed sharing and participatory plant breeding. From the socio-economic perspective, we addressed, how the different initiatives evolved and developed and what was relevant for a joint action. In the presentation, the focus will be on the results of the cases studies and recommendations about strategies, to valorise products from participatory breeding.

Literature:
S. L., van Bueren, E. T. L., Ceccarelli, S., Grando, S., Upadhyaya, H. D., & Ortiz, R. (2017). Diversifying food systems in the pursuit of sustainable food production and healthy diets. Trends in plant science, 22(10), 842-856.
Ceccarelli, Salvatore. "Efficiency of plant breeding." Crop Science 55.1 (2015): 87-97.

About the speaker: Bernadette Oehen works in the Department of Socioeconomic sciences at FiBL.
She leads the group "Food and Consumer Research". Her research topic is consumer decision making, market development and sustainable valorisation strategies.

Presentation 6: Eduardo Perez, World Food System Center, ETH Zurich, Switzerland
Title: Practice Example: Digitalization in agriculture

Despite the opportunities that Smart Farming offers to rethink the way we produce our food, the implementation rates of these new technologies remains relatively low. Trying to translate a pure technological approach to the development of new applications in agriculture has proven unpractical. Furthermore, providing a legal framework remains incredibly challenging for governmental institutions all around the world as technologies are in constant change and questionable cases of data use/sharing are part of the daily news.

It is within this context that ETH Studio AgroFood was created in order to explore the challenges of digitalization in the agricultural sector, with special

emphasis in research, networking and teaching. A more inclusive approach that restores agricultural expertise and the farmers' needs as key elements in the innovation process is part of its core. Support in the development of interdisciplinary research projects, implementation of a teaching setup that encourages entrepreneurship in the agricultural domain and coordination of events with the public are currently in process to help accomplishing a new vision for the agriculture in Switzerland.

About the speaker: Eduardo is a biochemist and holds a Doctorate in Biological Sciences from the University of Concepción, Chile. After completing his studies, Eduardo worked as a researcher in the field of plant genomics at the Biotechnology Center at the University of Concepción (CB-UdeC) and the Institute of Agricultural Research (INIA) in his home country. Later on, his interest in plant bioactives and their potential health benefits led him to explore the field of food biochemistry and processing at the Regional Centre for Studies in Food and Health (CREAS), where he worked until joining the ETH as postdoc in 2011. As part of the Crop Science group, he studies the impact of environmental stress on crop quality and metabolism with special focus on bioactive production. His current research explores the effects of drought stress in commercial and native potato genotypes by combining advanced phenotyping tools such as Computed Tomography and classic biochemical methods for quality analysis.

Presentation 7: Foteini Zampati, Global Open Data for Agriculture and Nutrition, (GODAN), CAB International, Wallingford, UK

Title: Practice Example: FAIR data principles for best practice in agriculture research data management

An enormous amount of agricultural data is generated from universities and research institutions and the open data movement is encouraging these organizations to make data discoverable, reuseable and reproduceable. There are few guidelines and standards that exist on best practice in open research data management. However, the FAIR Principles, developed by the Dutch TechCenter for Life Sciences are gaining traction in the donor and research community as a best practice to collect, use, and manage data in the agricultural sector.

About the speaker: Foteini Zampati is a data rights research specialist at the GODAN Secretariat and she is based in Germany, in Darmstadt at the Kuratorium für Technik und Bauwesen in der Landwirtschaft (KTBL) supported by the German Government.

She is a legal professional with over 15 years' experience in legal counselling field. She studied Law and she holds a Master's degree in European Union Law and European Business Law.

She participates as an expert in a project about the support of the Global Open Data for Agriculture and Nutrition (GODAN) initiative on Ethical and Legal aspects of Open data.

A project to develop solutions that ensure a fair distribution of the benefits of (open) data and increase the motivation for the use of open data in the agricultural area. The project is currently composed of partners GODAN,KTBL and the Centre for Agriculture and Biosciences International (CABI).

Presentation 8: Maria J. Ferreira dos Santos, Department of Geography, University of Zurich

Title: Practice Example: **Sustainability with biomass: burning neutral**

In this presentation and workshop we will take an overview of the past, current and future projections of biomass based energy. We will focus on charcoal, due to its growing demand to meet urban dweller needs in many areas of the global south. More than half the global population now lives in cities, and urban-dwellers are restricted to charcoal use because of easiness of production, access, transport, and tradition. Increasing demand for charcoal, however, may lead to increasing impacts on forests, food, and water resources, and may even create additional pressures on the climate system. There is pressure to switch charcoal use to other energy carriers, however, how do we deal with values and societal norms that seem to be incorporated in the heritage of a country? How can models deal with these values? Could they be respected and innovation still happen? How can feedbacks from communities be integrated in the modeling and innovation building process? The presentation as well as associated case study (see below) will give participants a deep insight into the complexity of responsible innovation at the socio-environmental boundary. Here we will look into the potential of charcoal to become not only renewable, but also both carbon and deforestation neutral. We will learn concepts such as nexus thinking, charcoal life cycle analysis and discuss how and whether innovations in plant sciences (in broad sense) can be useful to meet this demand.

About the speaker:

Maria J. Ferreira dos Santos is an Assistant Professor in Earth System Science, focusing on understanding couple social-ecological systems. She holds a

Doctorate in Ecology from the University of California Davis, USA. After her studies, she did two postdocs at the University of California Berkeley and at Stanford University to understand how past and current land use changes affect our current ecosystems, and the governance structure that is needed to achieve multi-goal land use. Later on, she was an Assistant Professor at Utrecht University, The Netherlands where she focused on Sustainable Development, Global Climate and Land Use change. As part of the Department of Geography, she is interested how the feedbacks between human decision-making and ecological systems affect the resilience of our Earth System.

Friday 14.09.2018

Workshop 5: Dr. Jochen Markard, Sustainability and Technology within the Department of Management, Technology, and Economics of ETH Zurich, Switzerland
Title: Sustainability Transitions: Firms, consumers, policies and politics.

Abstract:
Sustainability issues such as climate change, lack of clean water and sanitation, depletion of natural resources, waste, poverty or hunger pose extraordinary challenges for societies. Research in the field of „sustainability transitions" addresses such grand sustainability challenges and analyzes how existing sectors (energy, transport, food) change in response. A focus of this perspective is on the role of innovation for larger societal transitions. Transitions research departs from the normative assumption that established sectors *need to change* fundamentally to become more sustainable in the long run. *Sustainability transitions* are purposive transitions of sectors and industries that are associated with sustainability goals and guided by public policies.
In the workshop, I will introduce key concepts of sustainability transitions research (radical innovation, transition pathways, multi-level perspective) and provide examples from the ongoing energy transition. Then we will discuss the challenges of sustainability transitions in the food sector. We will focus on actors (esp. firms and consumers), public policies and the role of politics.

Recommended Literature:
Geels, F.W. et al. 2017: Sociotechnical transitions for deep decarbonization. Science, VOL 357 ISSUE 6357, p. 1242-1244

Hinrichs, C.C. 2014: Transitions to sustainability: a change in thinking about food systems change? Agriculture and Human Values, Volume 31, Issue 1, pp 143–155

About the speaker:
Jochen Markard has a background in engineering and management studies and works as a senior researcher at ETH Zurich, in the Group for Sustainability and Technology (Department of Management, Technology, and Economics). In his research, Jochen studies the interaction of technology, actor strategies, politics, and society. A focus is on the emergence of new technological fields, which have a potential to contribute to larger societal transformation and sustainability transition. Jochen works with a range of different theoretical perspectives from innovation and transition studies, management studies, and political sciences.

5   Case Studies

Responsible Research and Innovation start with questions, some of these are:

(1) What are the societal relevant questions linked to this case study?
(2) What norms, values or interests are linked to these questions? Are underlying ethical, legal or social conflicts eminent?
(3) Who are the users of the research? Is the problem that you have identified the problem that they want to be solved? Is the research responsive to their needs and their problems?
(4) Can research or related technology development serve the needs, values, interests of this community?
(5) How can the users be integrated in the research process and at what stages? What can their contribution be?

A very in-deep analysis tool for RRI issues you can find here:
www.rri-tool.eu/self-reflection-tool

Group Cases (under development):

GROUP CASE 1

Rewilding in crop plants. Agricultural productivity needs to be secured with less resources as water and nutrients and increased resistance to pathogens etc. Rewilding with new plant breeding technologies has been highlighted as one idea to restore genes from wild ancestors that have been lost during domestication and are linked to resource-efficiency and resistance.

- What are the problems that rewilding as a concept wants to tackle?
- For what crops and traits could it be useful?
- Using deliberative mapping elaborate: Evaluate reverse breeding as one option to generate resource-efficient and resistant crop varieties. Systematically weigh up the pros and cons of the potential options under consideration, taking into account economic, social, technological, ethical and legal dimensions linked to the different courses of action.

Case study supervision: Paschke

Literature:
Deliberative Mapping Guidelines:
Stirling, A. and Davies, G. (2004). Briefing 2 and 3 at www.deliberative-mapping.org

Rewilding:

Palmgren, M.G. et al. (2015). Are we ready for back-to-nature crop breeding? Trends in Plant Science, 20, No. 3: 155-164

Insights into public debate:

van Hove, L., Gillund, F. (2017). Is it only the regulatory status? Broadening the debate on cisgenic plants. Environ Sci Eur 29:22.
DOI 10.1186/s12302-017-0120-2

Helliwell, R., et al. (2017). Why are NGOs sceptical of genome editing? EMBO reports (2. Nov. 2017): https://doi.org/10.15252/embr.201744385

Ishii, T., Araki, M. (2016). Consumer acceptance of food crops developed by genome editing. Plant Cell Rep 35:1507–1518. DOI 10.1007/s00299-016-1974-2

Nuijten, E. et al. (2016). Concepts and Strategies of Organic Plant Breeding in Light of Novel Breeding Techniques. Sustainability, 9, 18:
doi:10.3390/su9010018

GROUP CASE 2

Digital farming. Digital farming scenarios are coming with a lot of promises and positive expectations for a sustainable and more productive agriculture. Digital farming developments also raise a bunch of societal-relevant questions.

Digital farming is done through data collection and precision equipment, on-time soil and plant measurements by new sensors and efficient computational power and modelling. With this a sophisticated and integrated decision-making of farmers on the farm should be enabled.

However, the data-intensive technologies involved in smart farming bring also uncertainty about data management scenarios, two extreme ends of the spectrum might be: 1) closed, proprietary systems in which the farmer is part of a highly integrated food supply chain or 2) open, collaborative systems in which the farmer and every other stakeholder in the chain network is flexible in choosing partners.

- What are the societal relevant questions linked to these scenarios?

- What norms and values or interests are underlying to these scenarios? What ethical, legal or social conflicts might arise? Could you translate identified values into a data management design?

Case study supervisors: Musker, Perez

Literature:

Walter, A., Finger, R., Huber, R., Buchmann, N. (2017). Opinion: Smart farming is key to developing sustainable agriculture. Proceedings of the National Academy of Sciences. DOI:10.1073/pnas.1707462114.

Wolfert, S. et al. (2017). Big Data in Smart Farming – A review. Agricultural Systems 153: 69-80. https://doi.org/10.1016/j.agsy.2017.01.023

Van de Poel, I (2013). Translating Values into Design Requirements. In: Philosophy and Engineering: Reflections on Practice, Principles and Process (pp.253-266): DOI 10.1007/978-94-007-7762-0_20

GROUP CASE 3

Responsible innovation in seed systems. The rules of formal seed system are debated with questions about different interests of the participants and users of plant varieties.
Discussions arise around innovations in plant varieties moving away from larger ecological interests and excluding agrobiodiversity conservation and development, regulations and IPR agreements that limit the informal plant breeding and in-situ breeding systems, as well as the access of farmers to seed varieties and feedbacks between the seed system and an industrialized agriculture with the potential of reducing resilience of the food system. In this case study recommendations and use cases for responsible innovation in the plant breeding system should be analyzed and summarized in a policy brief.

Case study supervisors: Oehen, Paschke

Literature:
Kochupillai, M. (2016). Promoting sustainable innovations in plant varieties. Munich Studies on Innovation and Competition 5. Berlin, Heidelbeg: Springer-Verlag. DOI 10.1007/978-3-662-52796-2

GROUP CASE 4

Urban Agriculture and Sustainable Food Systems. With the Milan Urban Food Policy Pact (2015) industrialized cities are seeking to re-envision their urban food systems and link it to the sustainability development goals (SDGs). Especially, movements for sustainable urban food production are taking several directions: from community gardens to community-assisted agriculture or towards innovative and often technological-driven urban farming enterprises (e.g. vertical farming, roof farming with greenhouse facilities or integrated fish-plant production systems).

While in principle most of us agree to support local sustainable food production systems, contributors need to deliberate on inter- and intrapersonal conflicts. These emotional and value-based dilemmas need deliberation and social learning.

Can innovative designs or technologies support local community-assisted agriculture in solving their dilemmas? In this case study you carry out the design of the prototype for a watering system that is sustainable and solving interpersonal and intra-personal dilemmas in the water management of a community garden.

The following questions could be elaborated:
- What are the goals of urban community-assisted food systems?
- What are the inter-personal and intra-personal dilemmas in the carrying out community assisted farming or gardening projects?
- How could a design process for a watering system look like that respond to intra- and interpersonal dilemmas?

Case study supervisors: Paschke

Literature:

Cohen, N., Reynolds, K. (2017). Resource needs for a socially just and sustainable urban agriculture system: Lessons from New York City. Renewable Agriculture and Food Systems: 30(1); 103–114. doi:10.1017/S1742170514000210

Ozkaramanli, D. (2018). Me against myself. Addressing personal dilemmas through design. DOI: 10.4233/uuid:5b36ba74-d629-4ee2-9f08-edeb33d5ca59

Desmet, P.M.A, Roeser, S. (2015). Emotions in Design for Values. In: J. van den Hoven et al. (eds.), Handbook of Ethics, Values, and Technological Design. DOI 10.1007/978-94-007-6970-0_6

GROUP CASE 5

Sustainability with biomass: burning neutral. In this case study we will look into the potential of charcoal to become not only renewable, but also both carbon and deforestation neutral. We will learn concepts such as nexus thinking, charcoal life cycle analysis and discuss how and whether innovations in plant sciences (in broad sense) can be useful to meet this demand.

Literature:

Santos M. J., Dekker S. C., Daioglou V., Braakhekke M. C., van Vuuren D. P. (2017). Modeling the Effects of Future Growing Demand for Charcoal in the Tropics. Frontiers in Environmental Science, 5. DOI=10.3389/fenvs.2017.00028

Overview on the research project: Charcoal, Food, and Water Production in the Tropics: Applying Nexus Thinking to Improve Research and Policy Approaches in Complex Landscapes. Retrieved from: https://www.frontiersin.org/research-topics/4601/charcoal-food-and-water-production-in-the-tropics-applying-nexus-thinking-to-improve-research-and-po

Case study supervisors: Ferreira dos Santos

6   General Information

Accommodation

Venue: September 10 to 14, 2018, Study week in Einsiedeln (Canton Schwyz):

We are staying at the Hotel Allegro in Einsiedeln, close to the beautiful Sihlsee (Central Switzerland). The hotel provides meals of well-balanced nutrition, and wherever possible using produce from the region. Breakfast is buffet continental style. The surroundings provide you with beautiful views on the surrounding mountains and on the nearby lake Sihlsee; there are lots of hiking tracks within the area of the hotel.

Hotel website: www.sjbz.ch/

Contact information:
Hotel Allegro – Schweizer Jugend- und Bildungszentrum
Lincolnweg 23
8840 Einsiedeln
Tel. +41 (0)55 418 88 88
http://www.hotel-allegro.ch/home/

Location plan for Hotel Allegro (http://goo.gl/maps/cIFxA):
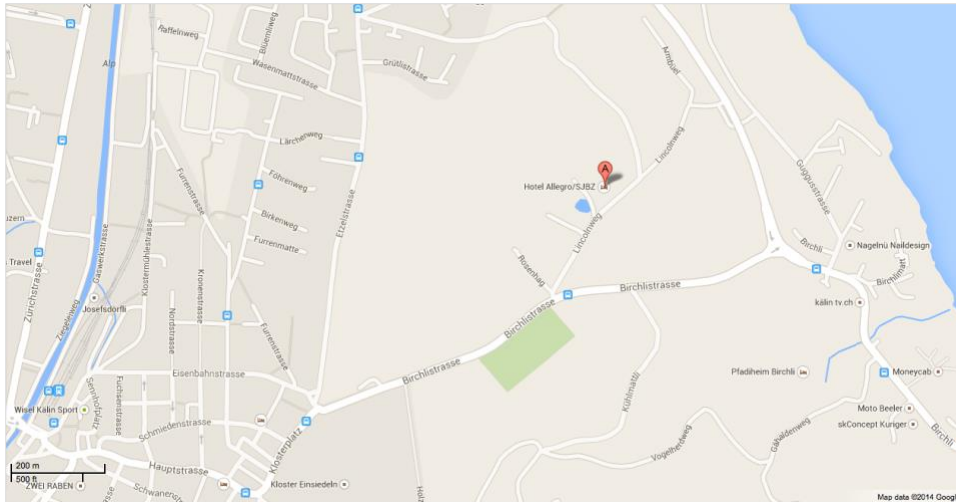
How to get to the venue in Einsiedeln

There is a bus stop close (approx. 250 m) to Hotel Allegro in Einsiedeln, this bus stop is called „Friedhof". Check the SBB online timetable for your detailed connections: http://fahrplan.sbb.ch/bin/query.exe/en
Buy a single train ticket to Einsiedeln, Friedhof

Example: Travel plan from Zurich (Main station) to Einsiedeln (Bus stop: Friedhof):

In Einsiedeln, take the postal bus in the direction of "Hoch-Ybrig" (or Studen), and get off at the stop "Friedhof". From here, the Hotel Allegro is just a three-minute walk. Upon arrival at the Hotel, go to the main desk and ask for Romy Kohlmann.

Region

The area is geographically interesting and beautiful with several high mountains. Einsiedeln is located up a plateau (ca. 880 m (2,890 ft) above sea level) and situated near the artificial mountain lake Sihlsee. The dam, which retains the lake, produces electricity for the trains and protects the city of Zurich further down the valley from the flood of the Sihl. The village is a popular tourist destination in central Switzerland. The Benedictine Einsiedeln Abbey, located within the village, is considered one of the most important Roman Catholic pilgrimage sites in Europe. Since the Middle Ages the Graces Chapel and a statue of the Black Madonna have been the centerpiece of the pilgrimage. Einsiedeln is also a popular destination for sports year round.

For more information:
http://www.einsiedeln-tourismus.ch/en/index.cfm